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MODERN MEGALITH EXPLORATIONS

By Kathleen McAuliffe

On the western coast of Scotland, perched high upon a windswept bluff overlooking Glasgow, is a circular, megalithic structure 40 feet in diameter. This ring of weather-beaten whinstone looks like a mini-Stonehenge, the artifact of a prodigious race of ancient Britons. **Sighthill**, as the monument is known, stands out in stark contrast to the factories and blackened chimney stacks that dot the horizon. How did it come to dominate a skyline that is today remembered as the birthplace of the Industrial Revolution?

The secret resides in a time capsule buried deep within the foundations of the central stone. Papers contained there explain that Sighthill does not date back to the Neolithic megaliths of Avebury or to the famed stone rows of Carnac, in Brittany. Rather, it is Britain's first megalithic observatory to be erected in 3,000 years.

Completed in 1979, Sighthill was commissioned by the Glasgow Parks Department as a tribute to four city scholars who played a pivotal role in exposing the hidden geometry underlying the stone relics of Europe. They are Professor Alexander Thom and his son, Dr. Archie Thom, both engineers by training; Dr. Archie Roy, professor of astronomy at Glasgow University; and Euan MacKie, assistant keeper at the university's Hunterian Museum. Unraveling the mystery of the ancient megaliths has been no easy challenge, even for the Glasgow group. Medieval people thought the great stone monuments had been constructed by giants. As late as the 1920s, many antiquarians presumed them to be the work of the Druids—Celtic priests esteemed by Julius Caesar and others for their great wisdom. When radioactive carbon dating finally established that the circles were built between 2900 and 1200 B.C., the world was startled. The stone monuments found scattered from the Mediterranean basin to Scandinavia predated the Druids by a millennium.

Precise measurement of the megaliths' age only made their origins more obscure. Was their purpose to mark territorial boundaries, or did they serve some esoteric function in ceremonial rites surrounding birth, death, and feast or famine? The full story behind the ancient megaliths may never be known. No writings, not even inscriptions etched on stone, have come down to us.

One thing is certain: Whatever their religious beliefs or the social fabric of their culture, astronomy played an integral part. The stone circles of Britain and northern France are among mankind's first observatories, according to Gerald S. Hawkins, author of *Stonehenge Decoded* (1966), and probably were among the earliest calendars.

Now, thanks to years of painstaking research by Alexander Thom, who together with his son studied more than 400 Neolithic sites, the details of a broader picture have emerged. The stone alignments relate to the movements of the sun, the moon, and bright stars.

MacKie's excavation of megalithic sites, such as at Kintraw, in the Scottish Highlands, further bolstered the Thoms' findings. But archaeologists were not easily convinced. Such an interpretation requires a nationwide astronomical program, working with a fixed standard of measurement (what he calls a megalithic yard—2.72 feet). Moreover, the layouts of later stone rings led Thom to hypothesize that the builders may have possessed knowledge of Pythagorean geometry some 2,000 years before the Greeks. Many experts find impossible the idea that such an advanced society could have existed in prehistoric Europe. Their position is cogently stated by archaeologist Glyn Daniel, writing in a recent issue of *Scientific American*: "Many people, no doubt bored by the prosaic account of megaliths to be got from archaeological research, jumped on the Hawkins-Thom bandwagon, accepting the builders of megaliths not only as experts in Pythagorean geometry and possessors of accurate units of mensuration but also as skilled astronomers who studied eclipses, the movements of the moon, and the positions of the stars. To me this is a kind of refined academic version of astronaut archaeology."

It is against this backdrop that Duncan Lunan, the Scotsman charged with the design and construction of the new megalith, acknowledges an ulterior motive behind the project: "The alignment and layout of Sighthill are entirely derived from prehistoric megaliths, notably the pattern of view stations around le Grand Menhir Brisé, at Carnac. Since many archaeologists still maintain that the ancient sites are not observatories—and ours most certainly *is*—where does the difference lie?"

To Lunan, an astronomy buff and author of several books, building a contemporary stone circle presented an irresistible challenge. For starters, megaliths are not easy to come by these days. Most modern quarries use fast-burning explosives, such as gelignite, which bring down the rock in small pieces suitable for highway construction. The stones required for Sighthill had to fit a human scale—standing some four to six feet above the ground. Only a slower-burning explosive, such as black powder, would permit the recovery of boulders that size. After combing up and down the west coast of Scotland, the search finally ended at Beltmoss Quarry, in Kilsyth, otherwise known as the Back-of-the-Hill Quarry, on Tak-ma-Doon Road. "With a name like that," Lunan remarks, "we should have guessed it would be the last black-powder quarry in all of Scotland."

Then there was the difficulty of hoisting the rocks up to the hilltop. For the smaller stones, the Royal Navy came to the rescue with a Sea King helicopter, executing Operation Megalithic Lift in only 35 minutes. The larger rocks were too heavy even for the helicopter; only an earthmover would do. "Inasmuch as the early Britons had only rafts and sledges to move rocks weighing up to sixty tons," Lunan says, "the effort they invested would be comparable to sending a man to the moon today."

Ironically, the ancients had a significant advantage over the modern-day megalith builders in the accuracy of their astronomical layouts. To align stone markers with celestial bodies on the horizon, they probably employed several generations of sentinels, who would make their observations from carefully chosen vantage points. The moon, for example, migrates to its most northerly and southerly positions in the sky once every 18.6 years. To mark the lunar "standstills," the point where the moon reverses its apparent motion on the horizon, the early astronomers are thought to have refined their sight lines over a century or more. The prolonged observation time was necessary because fluctuations in temperature and humidity affect refraction: The earth's atmosphere bends light rays so that a celestial object appears higher in the sky than its true theoretical position. The extreme accuracy of the ancient alignments suggests that refraction had to be averaged over a number of lunar standstills.

The Manpower Services, however, had allotted a considerably shorter time scale for the completion of the project. This meant going about the task entirely in reverse. Instead of observing the horizon events, Lunan had to calculate these positions in degrees relative to due north for the exact latitude of Sighthill. Next he had to modify his figures to take into account both refraction and parallax (displacement due to an observer position on the earth's surface other than at its center). Once the precise bearings of key lunar and solar events had been worked out, a surveyor's theodolite was used to pinpoint landmarks on the horizon that coincided with each degree setting. (Chimney stacks and cathedral spires came in handy for this purpose.) The stones were visually aligned with these features, in much the way early peoples may have used prominent notches and peaks on the horizon to aid them in their own arrangements.

As the last stone was positioned, more than 1,000 people turned out for the event, including the press and television crews. All told, 17 stones were incorporated into the layout, which had been scaled down from 40 miles across (the diameter of the view station at Carnac) to 40 feet. The observer at Sighthill is meant to look across the circle, with the marker stone on the far side occluded, and see the event happen over the central stone. If Lunan's calculations were correct, Sighthill would mark the lunar standstills, sunrise and sunset at the summer and winter solstices, and the rising of the bright winter star Rigel—both as it is now and as it appeared in the sky in 1800 B.C.

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A full month would pass before the first major test of the Glasgow megalith, summer solstice, and during that suspenseful time Lunan had more than one doubt about the accuracy of his calculations. He considered the precaution of buying a one-way ticket to Buenos Aires. But Sighthill was there to stay; ten-ton concrete foundations would see to that. "It would be bad enough to tell the Parks Department that I'd got it wrong, but can you imagine trying to explain it to Professor Thom?"

There was another niggling worry. Should the modern-day megalith builders have blundered, it would serve only to fuel the opposition's argument. "After all," Lunan said, chuckling, "we can't very well maintain that people in the Neolithic and the Bronze Age built astronomically aligned structures if we ourselves failed using twentieth-century technology."

The dramatic moment approaches when the Glasgow team will find out whether its hard work has paid off:

3:30 A.M., June 21, 1979: Thirty people mount the hill. Black clouds shroud the horizon. A downpour soon scatters the crowd.

10 P.M., June 21: A dozen people return to catch the setting of the sun at summer solstice. Torrential rains dampen their hopes. Only a few more days to go before the sun will change its course.

3:30 A.M., June 22: The rising sun draws the hard-core enthusiasts back to Sighthill. More rain.

10 P.M., June 22: The group dwindles. More clouds, interspersed with drizzle.

3:30 A.M., June 23: Sighthill is now a mudslide, but three brave the climb. Their efforts are in vain.

10 P.M., June 23: A solitary figure makes the treacherous ascent. The sky is sullen and overcast. Miraculously Lunan's moment of glory arrives: The clouds part, and a great ball of fire sets over the central stone.

While Lunan thinks of his achievement as a blow to critics of archaeoastronomy, it is unlikely to change their views. If they had sought to be converted, the statistics would surely have convinced them by now. Hawkins's computer calculations of Stonehenge's alignments to summer-winter solstice and the lunar standstills place a one-in-a-million probability on the boulders' appearing in that configuration purely by chance. The Thoms' survey of hundreds of Neolithic sites ascribes the likelihood of pure-chance alignments to other stellar events, such as the rising of Capella, at still lower probabilities. Why, then, the staunch refusal to believe that the early inhabitants of Britain possessed sophisticated knowledge of the movements of the sun, the moon, and the stars? Presumably, agriculture and navigation would have promoted their interest. Nor is there any reason to believe that prehistoric man was in any way inferior to his latter-day descendants in terms of brain size or intellectual capacity.

Yet doubts linger. My own skepticism stems from a much more practical concern, namely, the weather. We are expected to believe that the ancients dragged 60-ton boulders from quarries sometimes more than 200 miles away—*for what?* To stare up at black clouds or die of pneumonia in a torrential downpour?

"That's not much of a problem," Lunan says. "Three thousand to five thousand years ago Britain had a much better climate. The Greek historian Diodorus says it had excellent weather, with harvests twice a year, when 'the great spherical temple dedicated to Apollo'—probably Stonehenge—was in use. Maybe it is because Britain became colder and wetter that we stopped building astronomical circles—until now!" ∞