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The monumental Moai statues or stone heads of Easter Island, built by the Rapa Nui people somewhere between 1250 and 1500 CE, have been a big mystery ever since it was initially discovered by the Europeans on Easter Sunday of 1722. This graphic by Fernando Baptista solves the puzzle of how the 887 monolithic human figures, weighing 86 tons, was moved from the quarries to their locations on the island. Infograde Best Infographic Design {"cookieName":"wBounce","isAggressive":false,"isSitewide":true,"hesitation":"","openAnimation":false,"exitAnimation":false,"timer":"","sensitivity":"","cookieExpire":"365","cookieDomain":"","autoFire":"18000","isAnalyticsEnabled":false} For most, the mention of Easter Island, or Rapa Nui, the small, isolated island more than 2,000 miles off the coast of South America, conjures images of giant statues known as moai.But ever since Dutch explorers found the island on Easter Sunday in 1722, people have wondered how the Rapanui, the island's native inhabitants, were able to transport the hundreds of huge sculptures from the quarry where they were carved to stone platforms throughout the island, all without the use of wheels or draft animals.Over the last sixty years, scientists have theorized that the Rapanui moved the moai -- some of which are as tall as 33 feet and weigh more than 80 tons -- using various methods, from strapping the statues to tree trunks and dragging them on the ground to rolling them on sleds over felled trees.But in the July issue of National Geographic, Hannah Bloch explores the latest theory, put forward by Terry Hunt, an archeologist at the University of Hawaii, and Carl P. Lipo, an anthropologist at California State University Long Beach.Hunt and Lipo theorize that three groups of Rapanui literally "walked" moai, with nothing more than ropes, manpower and patience. As shown in the recreation above, two groups help moved the statue forward, while another group, positioned behind the moai, uses a rope to keep the statue upright.The theory, which is the subject of their book, "The Statues That Walked," is supported by Rapanui folklore.The experts can say whatever they want, Suri Tuki, a 25-year-old Rapanui man told National Geographic, referring to previous theories. But we know the truth. The statues walked. As Bloch explains, "In the Rapanui oral tradition, the moai were animated by mana, a spiritual force transmitted by powerful ancestors."Find a full explanation of the the various theories of the moai in the July issue of National Geographic, which is already available for the iPad and will hit newsstands on June 26.LOOK: Scientists recreate "walking" statues:WATCH: Five theories of how the statues were moved:\r\r","\r\r","\r\r"],"adCount":0}}> When it comes to Easter Islands towering stone heads, theres now one fewer mystery to solve. Researchers have long puzzled over why the huge statues were placed where they are. However, a new study says the people of Rapa Nui, as the island is called in the local language, positioned them near sources of humanitys most vital resource: fresh water. Archaeologists studied the location of the statues, or moai, and the platforms on which many of them stand, known as ahu. Polynesian seafarers first arrived on Rapa Nui, 2,300 miles off the coast of Chile, approximately 900 years ago. They then went on to construct more than 300 ahu and almost 1,000 moai, which are believed to represent significant ancestors. The authors of the new study, published in the journal PLOS One, sought to understand the distribution of the ahu in order to further understand their creators. Study co-author Carl Lipo, professor of anthropology at Binghamton University, New York, told CNN: That knowledge would tell us something about how the early people of Rapa Nui used the landscape and what they found important. Researchers from six US institutions isolated an eastern area of Rapa Nui, containing 93 ahu. They analyzed the natural resources near the ahu, focusing on rock mulch gardens in which crops like sweet potatoes were grown, marine resources including sites for fishing, and sources of fresh water. There proved to be no significant correlation between the location of the ahu and the presence of nearby gardens, suggesting that the ahu were not situated in order to monitor or signal control over these resources. While both marine resources and fresh water sources were found near the ahu, the researchers concluded only the latter was significant; after all, both typically occur in the same locations and fresh water was much less widely available. Related article Easter Island limits tourism in preservation efforts The research team mapped the island which has no streams or springs for sources of fresh water. They discovered that it emerged from underground in areas along the coast, through a process called groundwater discharge. Fresh water would literally come out right between the coast and the ocean in a stream. Wed see horses drinking out of the ocean, and it turned out they knew exactly where the fresh water was coming out, said Lipo. That explained the high concentration of moai and ahu along the coast, the researchers inferred. Inland statues, too, could be connected to fresh water: they were found to be situated near caves, or other fresh water sources. The findings suggest that Rapa Nuis moai and ahu were valuable beyond their ancestral significance to the islands early people, the study authors concluded. Building the statues wasnt inexplicable behavior, but something that was not only culturally significant but central to their survival, Lipo said. Next, the researchers hope to further understand why such vast, elaborate statues were constructed. If their primary function was to indicate or claim ownership of a fresh water source, Lipo said, a simpler construction would surely suffice. Its incredible how much energy went into them, he observed. The statues and the ahu themselves werent just a single event they made the statues and these platforms to put them on, and then remade the platforms and additional statues to put on them. One of the mysteries of Easter Island is the question of how the large statues, called moai, were transported from the one quarry where they were made to their points of display upon the ceremonial platforms, or ahu, all around the island. This series has already explored some basics on: the physical nature of Rapa Nui (Easter Island); the ahu and moai; and the carving of moai in the Rano Raruku quarry. We turn now to the moving of moai. Ahu and Moai of Easter Island (map Daniel C Browning Jr) How Easter Islanders could effectively move hundreds of huge monolithic creations without modern conveyance is a long-debated topic. Lacking metals when Europeans arrived, the Rapanui (native Easter Islanders) were a Stone Age culturethat is not a denigration, but the reality of isolated life in that remote volcanic place. Waiting on the Bus: completed moai stand in pits at Rano Raraku, ever vainly awaiting transport to ahu (photo Daniel C Browning Jr) Data which made the original transport problem and proposed solutions more vexing: some 300 ahu are found all around the island, at distances up to nine miles from the Rana Raraku quarry. The largest moai transported to ahu were nearly 10 meters (almost 33 ft) tall and weighed around 75 metric (82 US) tons. The calculated Statistically Average Moai (dubbed SAM by Jo Ann Van Tilburg and her Easter Island Statue Project)1is 4.05 m (13.2 ft) tall and weighs in at 12.5 metric (13.78 US) tons. Easter Island was devoid of trees of any significant size (for use as levers or rollers) when first seen by European explorers. There is no evidence the wheel was known or utilized by Rapanui in prehistory. They also did not have draft animals (nor any native land mammals at all). More completed moai stand in pits at Rano Raraku, with a transport road barely discernible in a meandering path roughly from the statues towards the left face of the Rano Kau crater in the far background (photo Daniel C Browning Jr) To make it more interesting, the collected cultural memory (ethnography) is unanimous that the moaiimbued with the mana of the deceased ariki (chiefs) they representedactually walked from the quarry to their ahu. All of this is fuel for the Ancient Aliens people and one does not have to look far online to find extraterrestrial origin theories for the moai. But such theories only develop and take root because of a widespread assumption: that ancient people lacked the capacity to solve problems we find daunting. Our inability, from a modern perspective, to conceive of working solutions for ancient problems encourages a disbelief which, coupled with cultural elitism, is a recipe for latent racism in which primitive becomes savage or even worse. One part of the transport solution has been known since 1914, when Katherine Routledge recognized the traces of several tracks radiating from Rano Raraku quarry and deduced they were for moai. Indeed, excavation has confirmed they were built as roads with a standard surface design. Moai can be found lying about along those paths, apparently abandoned when they brokeor fellduring transport. A fallen moai on the road (called Te Ara O Te Moai) leading SW from Rano Raraku quarry, where statue heads can be seen on the left slope of the crater in the background (photo Daniel C Browning Jr) Several experimental archaeology efforts have attempted to show how the moai were moved.2 Some of these have assumed the statues were transported horizontallylaying downwith both supine (face up) and prone (face down) positions posited. But abandoned statues lie (none were found standing) along the moai roads in both prone and supine positions. Further, many moai on roads are not broken, suggesting they were abandoned because they fell from a vertical position during transport. Unbroken fallen prone moai on the Te Ara O Te Moai road (photo Daniel C Browning Jr) The most recent, and in my mind most convincing, reconstruction of moai transport on Easter Island proposes a system not requiring huge amounts of timber, manageable by a relatively small number of workers, and even satisfies the oral tradition ofwalking moai.3 Terry Hunt and Carl Lipo noted that moai have a low center of gravity, a significant forward lean (in examples at the quarry or in transport), appear to be slimmed down in the final finishing at their ahu, and have a D-shaped footprint with the straight side at the back. Based on this they proposed a system of rocking and stabilization by three teams pulling on ropes attached to the head or neck of the moai. Rocking to one side on the D-shaped base will cause the opposite side to pivot forward. The low center of gravity and guy-ropes held from behind keep the statute from falling over. When it rocks back past vertical in the opposite direction, the moai will pivot forward on the other side. In this way, the statue can be walked forward with coordinated rather than brute effort. See the results (preceded by a review of other theories) in this clever National Geographic video. Next in this series: embellishments of moai. Thanks for looking! It's a towering problem, one to stump the most determined of milliners. You've carved almost 1,000 immense statues standing up to 10 metres (33 ft) tall. And now you want to put their hats on.There's just one problem. The hats, like the graven colossi themselves, are hewn out of solid rock, and weigh several tonnes a piece. How on Earth could you ever lift and fit this hulking headwear?This ancient puzzle is just one of many posed by the strange stone legacy of Easter Island, whose unflinching moai statues maintain their silent vigil long centuries after the mysterious collapse of the Polynesian Rapa Nui society that erected them.(Sean Hixon/Penn State)"Of the many questions that surround the island's past, two tend to stand out," explains anthropologist Carl Lipo from Binghamton University."How did people of the past move such massive statues, and how did they place such massive stone hats (pukao) on top of their heads?"Researchers already solved the first part of the puzzle. For decades, archaeologists have experimented with various methods of 'walking' the moai rocking replica statues from side to side along prepared paths, ever slowly inching the towering figures forward.It's kind of like shuffling a fridge into a new kitchen (although decidedly more epic).But what about the world's heaviest hats?In a new study, Lipo and his team suggest that the cylindrical pukao with diameters up to 2 metres (6.5 feet) and weighing 12 tonnes may have been rolled across the island from the red scoria quarries they were cut from.That's how they were transported to the moai, but to lift them onto the statues' elevated heads, props and a little physics trickery would be needed, with a ramp-and-ropes technique called parbuckling.(Sean Hixon/Penn State)"In parbuckling, a line would have been wrapped around the pukao cylinder, and then people would have pulled the rope from the top of the platform," says Lipo."This approach minimises the effort needed to roll the [pukao] up the ramp. Like the way in which the statues were transported, parbuckling was a simple and elegant solution that required minimum resources and effort."The solution may seem simple in hindsight, but to show that the hypothetical rig would have been workable for Rapa Nui islanders required building detailed 3D models of 50 pukao and 13 red scoria cylinders found on the island, and calculating how the huge hats may have been pulled up the inclined ahu platforms."Transport equations based on Newtonian physics, human strength estimates, and estimates of moai height and pukao mass at four different ahu verify that pukao transport by rolling up a ramp is physically feasible with 15 or fewer people," the researchers write, "even in the case of the most massive pukao (about 12 metric tonnes)."This technique means it wouldn't have required huge number of peoples or resources to construct and assemble the moai and pukao, which helps discredit the view that the Rapa Nui may somehow have helped destroy their own civilisation through overpopulation taxing the island's natural resources."Instead, we see moai and pukao carving and their transport as vivid cultural expressions of groups in a challenging and competitive environment," the authors write."Multiple lines of evidence, including the ingenious engineering to 'walk' statues and top them with massive stone hats, point to Rapa Nui as an odd story of success in a most unlikely place."(Sean Hixon/Penn State)And yet, for all that ingenuity and coordinated effort, most of the pukao are sadly no longer affixed to the moai heads.Centuries of weather, erosion, and animal activity have seen the majority of these rock hats fall back to Earth, where they rest crumbled and damaged around the island surface which is one of the reasons you rarely see this monumental headwear in photos of the iconic statues.Something to think about next time your hat blows off on a windy day.The findings are reported in the Journal of Archaeological Science. Some ancient statues on Easter Island wear multi-ton stone "hats" known as pukao. A team of researchers say that a technique called parbuckling was most likely used to move the hats into place. Carl Lipo Researchers say they might have figured out how Easter Islanders managed to move carved stones weighing many tons across the island and to the top of the famous statues known as moai. Back in 2012, the research team came to the conclusion that the statues some of which are as tall as a three-story-building had been "walked" into place from the quarry. A new study sought to answer the next question: How did people on the island put additional red stone cylinders, known as pukao, on top of the statues? But first, this question: What are those things? "Hats are these additional features that are put on top of the statues that come from a different quarry on the other side of the island," says Carl Lipo, co-author of the study and an archaeologist at Binghamton University. "The people not only moved the statues, but they actually went to a different quarry and moved multi-ton rocks, and then lifted them up on top of the statues. The hats are sort of an elaboration on the statues, something that sort of topped them and probably honored the ancestor that the statue represents." There are nearly 1,000 statues on Easter Island, which is also known as Rapa Nui. Of the 400 statues that were moved from the quarry, about 100 of them have pukao, which seem to have been added to the statues later. The chronology isn't clear, but Lipo's best guess is that pukao were in vogue in the 15th or 16th century. The latest research is part of effort that's been underway by Lipo and his fellow researchers since 2000, "to try to figure out why would people have made these gigantic statues and invested so much effort in this sort of monumental architecture on this incredibly tiny, tiny place that's in the middle of the Pacific," he says. To learn how the pukao had been moved from the quarry and into place atop the statues, the team built 3-D models of each of the cylinders. That allowed detailed study of all the hats' features and indentations, so researchers could understand the physics of how the stones were moved. The researchers found that many of the stones had grooves around their center, which suggested that there had been significant force grinding them down along their circumference. They began to look at how the people might have moved the pukao, and developed the hypothesis that they were rolled up ramps to the top of the statues, using a technique known as parbuckling. "It's a pretty common technique for moving big, round objects," Lipo says. "You don't see it much today, but moving cargo on ships, and moving big barrels, people would wrap ropes around the center of the barrel and then, from the top of the ramp, pull the barrel up the ramp. ... All the attributes we saw match that model." It's the same technique that was used in 2013 to right the Costa Concordia. "People often don't appreciate the ingenuity of prehistoric people," Lipo says. "This is what leads people to think, 'Well it must have been aliens to do it,' because they can't imagine that our ancestors were as clever and able as they actually were. And of course, the lack of technology means that people had to be extraordinarily clever about doing things, because there were not very many options." Rubble from the ramps is still visible on the sides of the platforms the statues stand on, Lipo says. And there's one ramp, which he calls "the smoking gun," that still has a pukao sitting at the bottom of it. Clues like that are common on the island, Lipo says. "People will say, 'No one knows how they carved the statue.' Oh, well the tools are lying on the ground next to the statue. It's not that mysterious. It requires looking." While his team's explanation could be disproved in the future, Lipo says what they sought to do was gather the evidence and determine the best current explanation for how the pukao were moved. "The trouble with archaeology is that you can say anything you want," he says. "The hardest thing to do is say something that you can be wrong about. ... It's like any science: We're as certain as we are at the moment. That could be challenged we hope maybe it will be. But we have to put our best guess forward."To move each moai, two groups may have rocked it side to side while a rear group kept it upright.Illustration by Fernando G. Baptista, National GeographicPotbellies might help explain how the moai were moved.For centuries, scientists have tried to solve the mystery of how the colossal stone statues of Easter Island moved. Now there's a new theoryand it rocks.The multiton behemoths traveled up to 11 miles (18 kilometers) from the quarry where most of them were carved, without the benefit of wheels, cranes, or even large animals.Scientists have tested many ideas in the past, figuring that the islanders must have used a combination of log rollers, ropes, and wooden sledges. Now a pair of archaeologists have come up with a new theory: Perhaps the statues, known as moai, were "engineered to move" upright in a rocking motion, using only manpower and rope.Watch video: Easter Island statues rocking forwardTerry Hunt of the University of Hawaii and Carl Lipo of California State University Long Beach have worked closely with archaeologist Sergio Rapu, who's part of the South Pacific island's population of indigenous Rapanui, to develop their idea. They've observed that fat bellies allowed the statues to be tilted forward easily, and heavy, D-shaped bases could have allowed handlers to roll and rock the moai side to side.Last year, in experiments funded by the National Geographic Society's Expeditions Council, Hunt and Lipo showed that as few as 18 people could, with three strong ropes and a bit of practice, easily and relatively quickly maneuver a ten-foot (three-meter), five-ton moai replica a few hundred yards (a few hundred meters). No logs were required. (National Geographic News is a division of the Society.)In previous efforts to solve the mystery, Czech engineer Pavel Pavel worked with Norwegian explorer-adventurer Thor Heyerdahl and a team of 17 helpers to propel an upright, 13-foot (4-meter), nine-ton moai forward with twisting motions, keeping the statue fully upright at all times. That was in 1986. But Pavel's team damaged the moai's base and had to stop. (Related: "Easter Island Settled Later, Depleted Quicker Than Thought?")A year later U.S. archaeologist Charles Love and a team of 25 erected a 13-foot (4-meter), nine-ton model upright on a wooden sledge and moved it over log rollers, advancing it 148 feet (45 meters) in two minutes.(Podcast: National Geographic's Hannah Bloch on Easter Island statue theories.)Meanwhile, for many of Easter Island's 2,000 or so indigenous Rapanui, descended from the original Polynesian settlers, the answer is simple. "We know the truth," says Suri Tuki, 25, a tour guide. "The statues walked."Full story: "Easter Island: If They Could Only Talk," from the July issue of National Geographic magazine >>Despite being one of the worlds most remote inhabited locations, Easter Island has achieved an impressive level of worldwide fame. This is doubtless largely due to the iconic Easter Island heads dotted across the Pacific islands landscape.The term Easter Island heads is actually a misnomer. In truth, these statues also include bodies. Nonetheless, the heads are certainly large in relation to the bodies, many of which are also buried to the shoulders. This has contributed to the myth that the Moai (as these statues are known) are pretty much all-cranium. In any case, the origins of these stone sentinels remain shrouded in mystery. Who built them, and why? How were they carved and eventually put into place? We at Sky HISTORY are eager to explore many common theories and assess whether they stand up as well as the Moai themselves.What do we know about Easter Islands history?In the Sky HISTORY series Truthseekers, experienced historians including Dr Fern Riddell and Dr Karen Bellinger have endeavoured to find out when the Moai were built. The historians research has uncovered quite a few intriguing theoriesTwo dozen wooden pieces inscribed with glyphs were produced on Easter Island. This type of script could theoretically tell us much about the history of the island, but has never been deciphered. Read more about Mysteries On the plus side, stories and songs about this history have been passed down through generations of the islanders, otherwise known as the Rapa Nui. This Polynesian name has been used to refer to not only the islands people but also the island itself.According to legend, Polynesian king Hotu Matua took his people to the island after an adviser to the king dreamed of its existence. However, regardless of whether this story is true, historians have not identified any reliable written record of when Polynesians first arrived on Easter Island.When were the Moai built?There have been various theories as to when Easter Island was first settled. In the 1940s, Norwegian explorer Thor Heyerdahl believed that the initial settlers came from Peru around 500 AD. To try and prove his theory, he built a raft from native Peruvian materials and used it to sail from Peru to Polynesia. Many of the Moai statues sit on stone pedestals known as ahu. On an expedition to the island in the 1950s, Heyerdahl noticed that the ahu stonework resembled that of Inca structures in Peru. This appeared to bolster his theory, but genetic and linguistic data suggests that the earliest settlers hailed from Polynesia rather than Peru. Read more about Mysteries Furthermore, radiocarbon analysis implies that the island was not colonised until about 1200 AD. This supports the general consensus that the Moai were built over the next few hundred years. Indeed, many of these sentinels were reportedly standing when Dutch navigator Jacob Roggeveen set foot on Easter Island in 1722.How were the Moai made?There are more than 900 Moai statues on Easter Island. The exact number is not known, as more and more have been discovered over the years, meaning that yet more might still remain hidden.Of the known Moai, almost all are carved from tuff, a type of rock comprising solidified volcanic ash. Making a Moai statue would entail drawing an outline on the rock wall before chipping away the rock surrounding this outline.How were the statues transported?It was long believed that the Rapa Nui felled trees to use as rollers. Completed Moai would be placed on logs which would subsequently be rolled, enabling the statues to be transported to their intended destinations relatively smoothly. Read more about Treasure Hunting By the 18th century, when Europeans first arrived on the island, they found it almost entirely devoid of trees. This fed the conviction that the Rapa Nui caused their civilisations own decline by committing ecocide.However, more recent scholarship challenges this theory. The shrinking of the islands woodland is now largely attributed to rats who arrived with the islands early Polynesian settlers and ate tree seeds and saplings.The Rapa Nui claimed that the Moai simply walked to their final positions. Modern research has since proved it possible for workers to walk such a statue by pulling ropes tied to it. Doing so can produce a rocking motion that pulls the Moai forward.What do the Easter Island heads represent?British explorer Captain James Cook visited Easter Island in 1774. The Rapa Nui informed him that the Moai represented their former high chiefs.To explore many more mysteries of the sea, subscribe to the Sky HISTORY Newsletter! It's a towering problem, one to stump the most determined of milliners. You've carved almost 1,000 immense statues standing up to 10 metres (33 ft) tall. And now you want to put their hats on.There's just one problem. The hats, like the graven colossi themselves, are hewn out of solid rock, and weigh several tonnes a piece. How on Earth could you ever lift and fit this hulking headwear?This ancient puzzle is just one of many posed by the strange stone legacy of Easter Island, whose unflinching moai statues maintain their silent vigil long centuries after the mysterious collapse of the Polynesian Rapa Nui society that erected them.(Sean Hixon/Penn State)"Of the many questions that surround the island's past, two tend to stand out," explains anthropologist Carl Lipo from Binghamton University."How did people of the past move such massive statues, and how did they place such massive stone hats (pukao) on top of their heads?"Researchers already solved the first part of the puzzle. 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