



# Southwest Florida Archaeological Society (SWFAS)

## 1980 to 2020 - OUR 40th YEAR

### May 2020 Newsletter

<http://swflarchaeology.org/>

#### **PRESIDENT'S CORNER** *By John F. Furey M.A., RPA*



The SWFAS Newsletter will return in October, 2020; have a great and safe Summer. As many of us have to shelter at home to be safe during this pandemic, use the time to write an article for the Florida Anthropologist, or the SWFAS Newsletter or read some of those books that have somehow piled up in your library. We are off for the Summer and await the rulings on school college and university openings in September. So much of our society is in flux these days from the pandemic deaths, the business closings and related job losses to our economy and the mostly peaceful social demonstrations taking place in our streets today about institutionalized American racism. All of these crises coming together have revealed structural problems and weaknesses in our society that have been institutionalized and codified and not properly addressed. If we are to be a truly 'Great Society', we must confront them and make fundamental changes now, not later.

#### **72nd FAS ANNUAL OCTOBER MEETING IN NAPLES CANCELLED**

The FAS Board of Directors has cancelled the rescheduled FAS 2020 72nd Annual Meeting in Naples, Florida at The Ritz Carlton Golf Resort, Naples, due to the uncertainty over the pandemic Covid-19 virus. The 2021 Meeting will be hosted by the Central Florida Anthropological Society (CFAS). Information on this meeting will be released later this year. Please plan to attend.

#### **SCALLOP SIZE AND CLIMATE CHANGE STUDY AT PINELAND**



A recent article in the AWIARE Newsletter noted that a study by Lindsey Parsons, a graduate student in geology at the University of Georgia, was awarded a grant to continue research on scallop harvesting practices of prehistoric Tampa Bay Natives that were affected by climate change between A.D. 800 and 1850. She will be conducting stable isotope analysis of bay scallops collected at Weedon Island and the Bayshore Homes sites. Her previous research at the Pineland Site at the Randell Research Center on Pine Island indicated that the scallops collected during the Little Ice Age (A.D. 1200 – 1850) were larger when it was cooler and conditions were optimal. During the earlier Medieval Warm Period (A.D. 800 – 1200) the scallops were smaller. She has been selected to receive this year's AWIARE/Levett Foundation student research grant of \$10,000 to support her MS research. Congratulations Lindsey. To receive the AWIARE Newsletter please go to <http://awiare.org/> and sign up.

#### **ARTICLES: NEW TECHNOLOGIES**

As a special for the May Newsletter, I have included four articles for your reading pleasure. I try to find interesting, informative and different articles that I think will be of interest to most of our readers, and I hope that I have been doing a decent job in that respect. Enjoy! If you have an article that you feel others would be interested in, please submit it to me at [jffurey@charter.net](mailto:jffurey@charter.net) for inclusion in a future SWFAS Newsletter. Thank you.

Unfortunately, we had to cancel the presentation by Bob Carr on the Prehistoric Naples Canal last month but, Bob has been busy on the East Coast and a recent article by Linda Robinson in the Miami Herald sheds some light on conch shells from Bobs' excavations at the Bonnet House Museum and Gardens in Ft. Lauderdale. This new evidence adds credence to an earlier discovery of Florida by John Cabot that is supported by some earlier maps. Interesting!

The other three articles deal with the application of new technologies in archaeology. One covers how DNA analysis reveals ancient epidemics among the Aztecs and can identify the correct pathogens involved. The third article demonstrates how a 3D printer can help reconstruct an ancient building made from blocks of stone much too large and heavy to move. The final article shows through lidar the high interconnectivity of the Mayan states by uncovering the roads that linked them and has even uncovered defensive works.

## SWFAS 2020 NEWSLETTER AND PRESENTATION SCHEDULE

### ***ALL PRESENTATIONS IN 2020 HAVE BEEN CANCELLED***

2020	JUNE - SEPTEMBER	NO MEETINGS AND NO NEWSLETTERS
2020	OCTOBER	NEWSLETTER
2020	NOVEMBER	NEWSLETTER
NOVEMBER 18, 2020		COLLIER COUNTY MUSEUM PRESENTATION - CANCELLED
2020	DECEMBER	NEWSLETTER
DECEMBER 12, 2020		SATURDAY FIELD TRIP TO KORESHAN STATE PARK, ESTERO, FLORIDA - CANCELLED
2021	JANUARY 2021	WE HOPE TO BEGIN THE SWFAS PRESENTATIONS AGAIN TBA

### **ARTICLES**

#### **STILL THINK PONCE DE LEON DISCOVERED FLORIDA? MORE EVIDENCE THAT YOU ARE WRONG**

*by Linda Robertson*

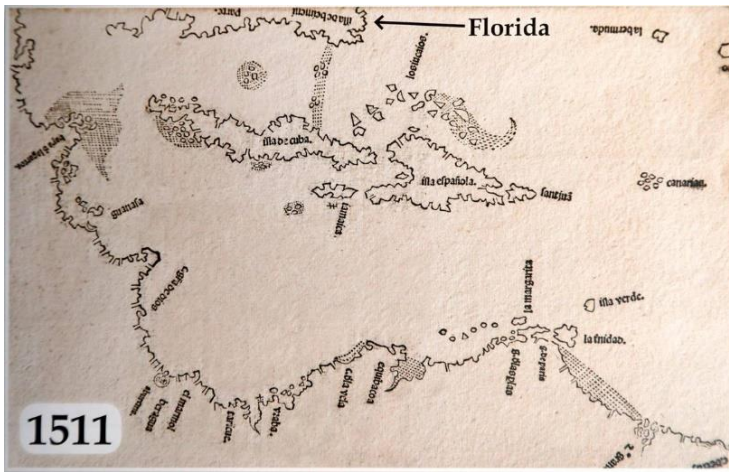
*from the Miami Herald at <https://www.miamiherald.com/news/local/community/miami-dade/article240932171.html>  
updated March 19, 2020*



Of all the outlandish myths about Florida's outlandish history, one of the most stubborn holds that Ponce de Leon discovered it in 1513 when he was searching for the Fountain of Youth. But evidence compiled by a Florida Keys map collector, a South Florida archaeologist and a Naples ocean engineer further debunks the tall tale of the Spanish conquistador whose name graces textbooks, schools, boulevards, hotels, parks, statues and the most popular tourist site in St. Augustine, where Juan Ponce de Leon never set foot. Ponce de Leon may have named the place then known as Bimini — which he thought was an island — after the Easter time "Feast of Flowers," but he was not the first European to land in La Florida.

If not Ponce de Leon, who? The three authors of a new book released Friday, "The Florida Keys: A History Through Maps," present a compelling theory that Floridians ought to be naming more stuff in the Sunshine State in honor of John Cabot, the Italian explorer who sailed to the coast of North America in 1497 and claimed it for King Henry VII of England. Some historians believe Cabot was the first European to find Florida when, after failing to locate a Northwest Passage to China, he journeyed so far south from Canada that he could see Cuba to the east, according to an account by Cabot's son, Sebastian. "That would put Cabot off the Florida Keys long before Ponce de Leon got here and named them the Martyrs," said Brian Schmitt of Marathon, an avid map collector and owner of the oldest real estate company in the Keys. "Lots of what we've been taught about Ponce de Leon is fanciful creation passed down through the centuries. Maps show Florida was well known by Europeans before Ponce de Leon arrived." Archaeologist Bob Carr's analysis of conch shells he unearthed in Fort Lauderdale supports what the maps illustrate. "Floridians need to stop living under the illusion that Ponce was our famous founder," Carr said. "We need to get beyond the tourism hoax of the Fountain of Youth and learn about our complicated history."

Schmitt's most prized acquisition is the 1511 Peter Martyr Map made by the prolific Italian historian who worked for the royal court of Spain. Peter Martyr D'Anghiera wrote the first accounts of explorations in Central and South America in a gossipy style. He interviewed all the intrepid mariners of the day, including Christopher Columbus, Amerigo Vespucci and Sebastian Cabot, and examined their ships' logs and charts.



*This 16th century map evidence that Ponce de Leon was not the first European to discover Florida? The map's owner, Brian Schmitt, an avid map collector and resident of Marathon, says it is.*

The map shows detail of the Florida coastline and what clearly appear to be the Keys and the Dry Tortugas north of the islands of Cuba and Hispaniola. Schmitt purchased the map from a San Diego dealer for \$250,000.

“If you are a map collector, it’s the Holy Grail — the earliest attainable map of the New World,” Schmitt said. His presentation of the map and book on Friday in downtown Miami was originally planned to coincide with the Miami Map Fair, which was cancelled because of coronavirus concerns. “But it is only about 8-1/2 by 11 inches in size, not particularly pretty, a woodcut on hand-laid paper, with some print-through Latin script on the back side. “Maps are the confluence of art and science, and some are breathtakingly beautiful. Not this one. I tell visitors if you can identify the one in my

collection that’s worth more than all the others combined, you can have it.”

Two other maps buttress the anti-Ponce argument: The 1500 Juan de la Cosa map depicting vast lands north of Cuba shows British flags planted along the east coast of the U.S., which would dovetail with the theory that England’s claim to the original 13 American colonies was a byproduct of Cabot’s discoveries.

A second map, created in 1502 and called the Cantino Planisphere, depicts the peninsula of Florida with a remarkably accurate rendering of its inlets and bays. Alberto Cantino, a spy for an Italian duke, smuggled the map out of Portugal when European countries were in competition for claims to New World territory. The original was found hundreds of years later being used as a screen at a butcher shop. “Once aggregated into maps, this geographic information was jealously guarded, allowing Spain and Portugal to maintain an advantage in trade and colonial expansion over other European countries,” Schmitt said, describing how maps were pieced together like puzzles, as cartographers compiled sketches and descriptions of the coastline made from the deck or crow’s nest or from expeditions on shore. “It wasn’t until 1600 that they had instruments for more accurate measurements.”

In the book, co-author Carr presents an archaeological argument that adds to the body of evidence that Ponce didn’t discover Florida. Carr, who excavated the prehistoric Tequesta Indian villages at the mouth of the Miami River, discovered a mound of 22 conch shells when he was surveying land at the Bonnet House Museum and Gardens in Fort Lauderdale in 1984. He found uncharacteristic gaping holes in the middle of the shells and one with a distinctive thin metal blade hole. Radiocarbon tests showed the shells dated from the late 15th century. “These can’t have been opened by Spanish explorers because the Spanish had already been in the Caribbean by that time and knew how to open conch shells efficiently, the way the indigenous people opened them by piercing a hole in the crown, severing the tendon attachment and extracting the conch for a meal,” he said. “Whoever did this really labored to bust them open and eat them.”

Carr concluded the shells were proof of a European landing that pre-dated Ponce. “Christopher Columbus knew how to open conch shells and Ponce had traveled with Columbus. These were opened by people who were not Spanish and had never been in the Caribbean but who likely arrived in South Florida from the north along the Atlantic coast or had sailed directly from Europe,” Carr said.

Among Schmitt’s collection of 1,000 maps is the first map of New Providence in the Bahamas, the only full copy of what is likely the first English map of the West Indies or Spanish Main, and the only copy of one of the first maps to name the Tortugas and Los Martires (the original name of the Keys). “I’ve been collecting for 25 years and my focus is on the Keys, the Bahamas, Cuba and South Florida, the areas where I’ve been boating and diving my whole life,” said Schmitt, 66. His family moved to the Keys from Detroit in 1955 and started a real estate company. Schmitt has never left. His boat is named the Hippocampus, after Neptune’s horse. “I grew up in the real estate business and developed a sense of the land and a love for the islands.”

The second part of the new book is about the mapping of the Keys, and the first to do it, in 1770, was William Gerard De Brahm, whose skill as a cartographer earned him the title of Surveyor General of the New World for England. One of his most unusual printed charts — perhaps a precursor to the climate change projections of the 21st century — depicted Florida 10,000 years ago when water levels were lower in order to demonstrate that the Keys were part of Florida and refute Spain's claim that the Keys were geologically linked to Cuba. "Spain tried to claim the Keys as part of Cuba when Spain traded Florida to England," Schmitt said. "With this very odd map, De Brahm defended England's claim."

De Brahm wrote incredibly detailed journals about the Gulfstream and Florida's flora and fauna, including its insects, bears, panthers, snakes and crocodiles, of which he had heard "instances that they have attacked Children without the House, and carried them off the Land into the Water, but cannot vouch for its Truth." And he warned that "Tempests will be seen more than in any other part of the Globe." Of the Keys he said: "None of the islands is inhabited by any of the human species, but constantly visited by the English from New Providence, and Spaniards from Cuba, for the sake of wrecks, madeira wood, tortoise, shrimps, fish, and birds: of the latter a variety exist on the islands and about Cape Sable, amongst which is peculiarly a large red bird, which measures six feet from the toe to its bill's end, (which is crooked, and has its maxillary motion on its upper part, as on that of a parrot) and is called flamingo."

Maps help explain why the Ponce de Leon legend has persisted. "The most chronicled story was Ponce's story," Schmitt said. "Spain controlled Florida for 250 years. They owned the place and they publicized the history they wanted believed. "Why is this called America? Because of a mistake by Martin Waldseemuller," Schmitt said of the 1507 world map by the German cartographer that used the name America for the first time. "Vespucci exaggerated his accomplishments and Waldseemuller said we might as well name it after Amerigo and it took on a life of its own. "In subsequent versions — I have a 1513 Waldseemuller map — America is gone and it's called Terra Incognita."

Other historians believe Gaspar and Miguel Corte-Real, brothers from Portugal, reached Florida first on voyages in 1500, 1501 or 1502. "The argument against Sebastian Cabot is that he made things up. And nobody really knows exactly what happened to John Cabot," Schmitt said. "There's no written record of his voyages. You find different versions of the same events when you're doing historical research, so you've got to find the most credible one. Maybe I'm too confident in Peter Martyr but I don't share those reservations about Sebastian, who became the pilot major of Spain."

Ponce de Leon did land in Florida in 1513 but somewhere near Cape Canaveral, 125 nautical miles south of St. Augustine. He then sailed south, recorded interaction with the native "Chequesta" people at the mouth of the Miami River, rounded Cape Florida and headed north up the Gulf coast, where he was chased away near Fort Myers by Calusa Indians. "Having received a charter from the King of Spain to colonize the land, Ponce certainly had prior knowledge of Florida, which at the time was called Beimeni, or Bimini, not to be confused with today's small island in the Bahamas," said Todd Turrell, co-author of the book with Schmitt and Carr. "The Columbus family, who had the charter for Cuba and the Bahamas, was angry that the Beimeni/Bimini charter had not been issued to them. Ponce renamed Bimini as Florida, a fact confirmed by Spanish explorer Alonso Alvarez de Pineda, who noted by hand on his 1519 chart of the Gulf of Mexico: 'Florida, formerly Bimini.'"

Ponce returned to the Gulf coast eight years later for another attempt at settlement with two ships crammed full of 200 people and 50 horses. Near present-day Marco Island he was attacked by Calusa tribesmen and hit in the leg with an arrow. He retreated to Cuba where he died from an infection of his wound.

American author Washington Irving inflated the Fountain of Youth myth when he wrote two books on the Spanish conquest of the Americas that combined history and fiction. "Thanks to Irving's narrative skills the false Ponce became a star performer in a fiesta of illusion that persists to this day," T.D. Allman writes in "Finding Florida: The True History of the Sunshine State." Celebrations in 2013 of the 500th anniversary of Ponce's discovery reinforced the myth as "millionaires donated money, academics composed screeds, and politicians lauded Florida's made-up history while people all over the state were caught up in the street parades, the beauty pageants and, occasionally, the attempts to convene serious intellectual colloquia in commemoration of Florida's definitive fake event. ... For the latest of countless times people in Florida cavorted, ignorant of the events that had led them to perch on this soggy former annex of the sea — uncaring, too, as to what this disregard for the past might bode for their future."

## MYSTERY OVER DEATH OF 15 MILLION AZTECS MAY BE SOLVED AFTER NEARLY 500 YEARS, STUDY SUGGESTS

by Judith Vonberg

January 16, 2018

from *The Independent* at <https://www.independent.co.uk/news/world/americas/salmonella-aztec-epidemic-millions-killed-1545-dna-enteric-fever-typhoid-central-america-a8161421.html>

Scientists believe they may have discovered the cause of an epidemic that struck Mexico's Aztec population in 1545, killing up to 15 million people. In a paper published in *Nature Ecology & Evolution*, they describe how DNA extracted from the teeth of 29 skeletons buried in a cemetery in southern Mexico revealed previously unidentified traces of the salmonella enterica bacterium. The bacterium is known to cause enteric fever, of which typhoid is an example. According to the study, the symptoms tally with those mentioned in records from the time, which describe victims developing red spots on the skin, vomiting, and bleeding from various body orifices.

The epidemic was one of several to hit the indigenous population soon after the arrival of Europeans in the early 16th century. "When the Europeans arrived in Mexico, they brought with them lots of different diseases," Ashild Vagene, co-author of the study, told *The Independent*. "There were dozens of epidemics across the New World and Mexico was particularly hard hit." "What we're talking about is the devastating decimation of indigenous populations by previously unknown diseases," Dr Caroline Dodds Pennock, lecturer in International History at the University of Sheffield, told *The Independent*. "Mortality rates were maybe 80 or 90 per cent by 1600," she said. "Imagine nine out of every 10 people dying - it's almost unimaginable."

The cause of the 1545-1550 epidemic has been debated for more than a century. Measles, pneumonic plague and influenza have all been suggested as possibilities, but historians have never reached a consensus. The indigenous population gave the outbreak the name "cocoliztli", a generic term meaning "pestilence" in the Aztec Nahuatl language. Although estimates vary, the epidemic likely wiped out between five and 15 million people – up to 80 per cent of the population. It came just two decades after a smallpox epidemic that killed up to eight million people just after the Spanish arrival and is considered one of the most devastating epidemics in human history. It affected large areas of central Mexico and Guatemala, perhaps extending as far south as Peru.

Ms Vagene and her team analysed the DNA from two sets of skeletons: 24 that were buried in a cemetery that is closely linked with the "cocoliztli" epidemic, and five found in a cemetery that was in use before the Spanish colonisers arrived in 1519. The DNA was analysed using a new piece of software that allows scientists to screen for any known pathogen. "This is ground-breaking for our field of ancient DNA," Ms Vagene said. "It allows us to screen for all pathogens that we know today without having to specify a target organism. We can look for the unknown, which is wonderful."

The salmonella strain was found in 10 of the 24 "post-contact" skeletons and none of the "pre-contact" bodies, which Ms Vagene described as a "great finding". "Ancient DNA doesn't always preserve very well. It breaks down over time," she said. "So to be able to find it in 10 out of 24 is significant."

The fact that traces were found in the teeth is significant too, according to Ms Vagene. "Salmonella is a disease that you would normally catch through contaminated food or water sources," she said. "It would start in the gut, so finding it in the teeth suggests it had got into the bloodstream. The disease had spread everywhere in their body." This suggests that these individuals were not simply carriers of the disease - they were victims of it.

More research is needed to determine whether salmonella enterica was the sole cause of the epidemic or whether other viruses and pathogens were also present in these bodies. Ms Vagene also pointed out that her team only studied one group of skeletons from one burial site. "We just don't know if this pathogen was present in other areas (affected by the outbreak)," she explained. Whether it was Europeans who introduced salmonella to the indigenous population is also uncertain. Several factors point towards this conclusion, however. Salmonella enterica existed in Europe well before the Spanish began their conquest of the region, while the "pre-contact" skeletons analysed for this study had no trace of the pathogen. Furthermore, it is possible for someone to carry the pathogen without presenting any symptoms.

"Seemingly healthy individuals could have travelled from Europe to Mexico without knowing that they had it," said Ms Vagene. If the infected person's faeces had come into contact with the local water supply, that could have led to a rapid spread of the disease, she explained.

Elizabeth Graham, professor of archaeology at University College London, offered a different interpretation of the findings. "Salmonella wasn't necessarily the root cause of the epidemic," she told The Independent. People may have been getting sick because of a different disease, which meant that they were less able to look after themselves and each other, increasing the risk of salmonella. "Everyone was hit at once. No one was able to care for anyone else," she explained. "Salmonella may be a sign of people not being able to care for one another." But she welcomed the research and the development of enhanced DNA analysis tools that enabled it.

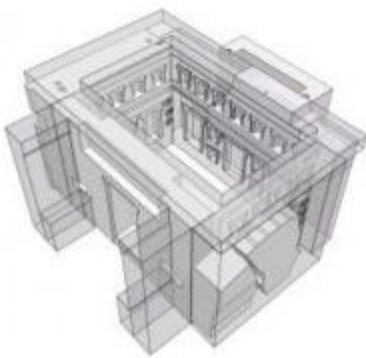
"Even today, diagnosis of diseases is difficult," she said. "It's so much more difficult to try to figure out how people died hundreds of years ago." Infectious diseases are particularly difficult to identify, Professor Graham explained, as they usually don't affect the skeleton. "Almost no DNA could be detected on skeletons a while ago," she said. "Detection methods have certainly improved."

Dr Dodds Pennock also welcomed the study and its measured conclusions. "Salmonella is probably not the full story and this study doesn't answer all of the questions," she said. "But it offers very interesting additional evidence for what was happening in the valley of Mexico and beyond in the mid 16th century."

### 3D-PRINTED RECONSTRUCTIONS PROVIDE CLUES TO ANCIENT SITE

Wed, Dec 12, 2018

from Popular Archaeology at <https://popular-archaeology.com/article/3d-printed-reconstructions-provide-clues-to-ancient-site/>



3D printed model of the ancient site of Tiwanaku. Dr Alexei Vranich, 2018

BIOMED CENTRAL—Part of the ancient archaeological site of Tiwanaku, Bolivia, believed by Incans to be where the world was created has been reconstructed using 3D printed models of fragments of an ancient building. The results are presented in a study\* published in the open access journal Heritage Science. Researchers at UC Berkeley, USA, created accurate, 3D-printed miniature models of architectural fragments to reconstruct the Pumapunku building in the Tiwanaku site. Considered to be an architectural wonder of its time (AD 500-950), Pumapunku has been ransacked over the last 500 years to a point where none of the remaining 150 blocks that comprised the original building remain in their original place.

Dr Alexei Vranich, the corresponding author said: "A major challenge here is that the majority of the stones of Pumapunku are too large to move and that field notes from previous research by others present us with complex and cumbersome data

that is difficult to visualize. The intent of our project was to translate that data into something that both our hands and our minds could grasp. Printing miniature 3D models of the stones allowed us to quickly handle and refit the blocks to try and recreate the structure. It is possible that using 3D printed models of fragments could help the study of other historic sites that have fallen apart in time, such as Angkor Wat in Cambodia, or that have been the victim of recent destruction, such as Palmyra in Syria. "

The 3D reconstruction of Pumapunku not only shows possible configurations of what the site may have looked like, but also gives clues about the purpose of the building. Dr Vranich said: "One particularly interesting realization was that smashed doorways of different sizes that lay scattered around the site were aligned in a manner that would create a "mirror" effect; the impression of looking into infinity, when, in fact, the viewer was looking into a single room. This may relate to the Incans belief that this is the site where the world was created and could also suggest that the building was used as a ritual space."

The authors printed 3D models of a total of 140 pieces of andesite and 17 slabs of sandstone based on measurements compiled by various scholars over the past century and a half of the height, length and width of the blocks found at the site of Tiwanaku. Once modelled on the computer and then made solid with a 3d printer, the authors then physically manipulated the blocks to reconstruct the site, trying out different ways in which they may fit together.

Dr Vranich said: "This effort represents a technological step back from recent methods that used computer modelling to recreate structures on screen, but the human brain continues to be more efficient than a computer when it comes to manipulating and visualizing irregular 3D forms. We attempted to capitalize on archaeologists' learned ability to visualize

and mentally rotate irregular objects in space by providing them with 3D printed objects that they could physically manipulate.”

## THIS MAJOR DISCOVERY UPENDS LONG-HELD THEORIES ABOUT THE MAYA CIVILIZATION

by Ben Guarino

from *The Washington Post* at <https://www.washingtonpost.com/science/2018/09/27/this-major-discovery-upends-long-held-theories-about-maya-civilization/>

September 27, 2018



*A photograph (above) and a reconstructed lidar image (below) of Maya ruins. (Luke Auld-Thomas and Marcello A. Canuto/PACUNAM)*

In the autumn of 1929, Anne Morrow Lindbergh and her husband Charles flew across the Yucatán Peninsula. With Charles at the controls, Anne snapped photographs of the jungles just below. She wrote in her journal of Maya structures obscured by large humps of vegetation. A bright stone wall peeked through the leaves, “unspeakably alone and majestic and desolate — the mark of a great civilization gone.” Nearly a century later, surveyors once again took flight over the ancient Maya empire, and mapped the Guatemala forests with lasers.

The 2016 survey, whose first results were published this week in the journal *Science*, comprises a dozen plots covering 830 square miles, an area larger than the island of Maui. It is the largest such survey of the Maya region, ever. The study authors describe the results as a revelation. “It’s like putting glasses on when your eyesight is blurry,” said study author Mary Jane Acuña, director of El Tintal Archaeological Project in Guatemala. In the past, archaeologists had argued that small, disconnected city-states dotted the Maya lowlands, though that conception is falling out of favor. This study shows that the Maya could extensively “exploit and manipulate” their environment and geography, Acuña said. Maya agriculture sustained large populations, who in turn forged relationships across the region.

Combing through the scans, Acuña and her colleagues, an international 18-strong scientific team, tallied 61,480 structures. These included: 60 miles of causeways, roads and canals that connected cities; large maize farms; houses large and small; and, surprisingly, defensive fortifications that suggest the Maya came under attack from the west of Central America. “We were all humbled,” said Tulane University anthropologist Marcello Canuto, the study’s lead author. “All of us saw things we had walked over and we realized, oh wow, we totally missed that.”

Preliminary images from the survey went public in February, to the delight of archaeologists like Sarah Parcak. Parcak, who was not involved with the research, wrote on Twitter, “Hey all: you realize that researchers just used lasers to find \*60,000\* new sites in Guatemala?!? This is HOLY [expletive] territory.” Parcak, whose space archaeology program GlobalXplorer.org has been described as the love child of Google Earth and Indiana Jones, is a champion of using satellite data to remotely observe sites in Egypt and elsewhere. “The scale of information that we’re able to collect now is unprecedented,” Parcak said, adding that this survey is “going to upend long-held theories about ancient Maya society.”

With support from a Guatemala-based heritage foundation called Pacunam, the researchers conducted the massive and expensive survey using lidar, or light detection and ranging. They mapped several active archaeological sites, plus well-studied Maya cities like Tikal and Uaxactun. Lidar’s principles are similar to radar, except instead of radio waves lidar relies on laser light. From an aircraft flying just a few thousand feet above the canopy, the surveyors prickled each square meter with 15 laser pulses. Those pulses penetrate vegetation but bounce back from hard stone surfaces. Using lidar, you can’t see the forest through the invisible trees.

Beneath the thick jungle, ruins appeared. Lots and lots of them. Extrapolated over the 36,700 square miles, which encompasses the total Maya lowland region, the authors estimate the Maya built as many as 2.7 million structures. These would have supported 7 million to 11 million people during the Classic Period of Maya civilization, around the

years 650 to 800, in line with other Maya population estimates. “We’ve been working in this area for over a century,” Canuto said. “It’s not terra incognita, but we didn’t have a good appreciation for what was really there.”

Archaeologist Arlen Chase, a Maya specialist at the University of Nevada at Las Vegas who was not involved with this survey, said for years he has argued that the Maya society was more complex than widely accepted. In 1998, he and archaeologist Diane Chase, his wife, described elaborate agricultural terraces at the Maya city of Caracol in Belize. “Everybody would not believe we had terraces!” he said. He gets much less push back now, he said. “The paradigm shift that we’ve predicted was happening is in fact happening” Chase said, which he credits to lidar data. He has seen lidar evolve from a “hush-hush type of technology” used by the military to map Fallujah streets to a powerful archaeological tool.

Chase, who previously used lidar at Caracol, where as many as 100,000 people lived, compares this technology to carbon-14 dating. Radiocarbon dating gives archaeologists a much more accurate timeline. Lidar is about to do the same for archaeologists’ sense of space, particularly in densely forested areas near the equator. Two years ago, researchers used lidar mapped dense urban infrastructure around Angkor, the seat of the medieval Khmer Empire in Cambodia. “We’re just getting started in so many major sites around the world, whether it’s Angkor Wat, whether it’s Tikal in Central America or major sites in Egypt,” Parcak said.

For all its power, lidar cannot supplant old-fashioned archaeology. For 8 percent of the survey area, the archaeologists confirmed the lidar data with boots-on-the-ground visits. This “ground truthing” suggests that the lidar analysis was conservative — they found the predicted structures, and then some. “There is still much more ground to cover and work to do,” said Acuña, who will continue to study the large ancient Maya city of El Tindal. Could you imagine, Canuto said, what might be found through a lidar survey of the Amazon? With technology like this, no forested frontiers are final.

## **OFFICERS AND BOARD OF DIRECTORS FOR 2020**

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***Find us on Facebook at Southwest Florida Archaeological Society!***

***Check out our website at <http://swflarchaeology.org/>***

## **SWFAS AND FAS MEMBERSHIP APPLICATIONS**

We encourage those interested in Florida archaeology to become members of The Florida Anthropological Society (FAS) and The Southwest Florida Archaeological Society (SWFAS). Annual dues are due in January and membership applications to both organizations are attached. Membership in the FAS provides you with four annual volumes of *The Florida Anthropologist* and occasional newsletters on anthropological events in Florida in addition to the annual statewide meeting. More information on FAS can be found online at: [www.fasweb.org](http://www.fasweb.org). Membership in SWFAS offers you a local series of talks on archaeological and anthropological subjects that you can attend. The SWFAS monthly newsletter keeps you up to date on local events as well as other important archaeological topics. We urge you to support both with your membership. All of the SWFAS Lecture Series are open to the public at no charge.





# JOIN US!

## The Southwest Florida Archaeological Society

<http://swflarchaeology.org/>

The Southwest Florida Archaeological Society (SWFAS) was founded in 1980 as a not-for profit corporation to provide a meeting place for people interested in the area's past.

Our goals are to:

- Learn more of the area's history
- Create a place for sharing of this information
- Advocate for preservation of cultural resources

Its members include professional and amateur archaeologists and interested members of the general public. Members come from all walks of life and age groups. They share a lively curiosity, a respect for the people who preceded them here, and a feeling of responsibility for the conservation of the places and objects they left behind.

The Society holds monthly meetings between October and April, attracting speakers who are in the forefront of archaeological and historical research. Occasionally members join in trips to historical and archaeological sites.

A monthly newsletter, Facebook page, and website keep members abreast of our events and happenings.

The organization is a chapter of the Florida Anthropological Society, a statewide organization that publishes quarterly newsletters and a journal, *The Florida Anthropologist*, and holds an annual conference.

**I want to help The Southwest Florida Archaeology Society preserve and interpret Florida's heritage!**

Name (please print) \_\_\_\_\_

Address \_\_\_\_\_

City/Town \_\_\_\_\_ State \_\_\_\_\_ ZIP \_\_\_\_\_

Phone \_\_\_\_\_ Email \_\_\_\_\_

Check One:

Individual (\$20) \_\_\_\_\_ Sustaining Individual (\$50) \_\_\_\_\_ Family (\$35) \_\_\_\_\_

Student (\$5) \_\_\_\_\_ Life (\$500) \_\_\_\_\_

Donation to Support SWFAS Speakers and Programs \_\_\_\_\_

Skills, training, interests: \_\_\_\_\_

I hereby agree to abide by the rules and bylaws of the Southwest Archaeological Society. I further release from any and all liability due to accident and injury to myself, dependents and any property owners cooperating with the society.

Signature: \_\_\_\_\_ Date \_\_\_\_\_

Please make your check out to SWFAS and mail to:

Charlie Strader  
SWFAS Treasurer  
27655 Kent Road  
Bonita Springs, FL 34135

REV. 12052017

# FAS Membership Categories

Membership in the Society is open to all interested individuals who are willing to abide by the Florida Anthropological Society Statement of Ethical Responsibilities, which can be found on our website [fasweb.org](http://fasweb.org). *Membership is for one year.*

Student *	\$15	Sustaining	\$100
Regular	\$30	Patron	\$1,000
Family	\$35	Benefactor	\$2,500
Institutional	\$30		

\*Student membership is open to graduate, undergraduate and high school students. A photocopy of your student ID must accompany payment. \*\*Add \$25 for foreign addresses.

Send Membership Form and Dues Payment to:

Florida Anthropological Society, P O Box 1561 Boynton Beach, FL 33425

*You can join online or pay Membership dues renewals via PayPal on our website [fasweb.org](http://fasweb.org).*

THE FLORIDA ANTHROPOLOGICAL SOCIETY, INC. IS A TAX-EXEMPT 501C3 ORGANIZATION. TAX ID#59-1084419.

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Name: \_\_\_\_\_

Membership Category: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ ZIP: \_\_\_\_\_

Phone: \_\_\_\_\_ Email: \_\_\_\_\_

FAS Chapter: \_\_\_\_\_

I wish to make a donation to:

\$ \_\_\_\_\_ Dot Moore/FAS Student Grant Fund    \$ \_\_\_\_\_ Florida Archaeology Month Account

\$ \_\_\_\_\_ Florida Anthropologist Monograph Fund    \$ \_\_\_\_\_ Florida Anthropologist Endowment Fund

Total Enclosed: \$ \_\_\_\_\_

\_\_\_\_\_ I agree to abide by the Code of Ethics of the Florida Anthropological Society.

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Signature

Date