

Settlers and farmers

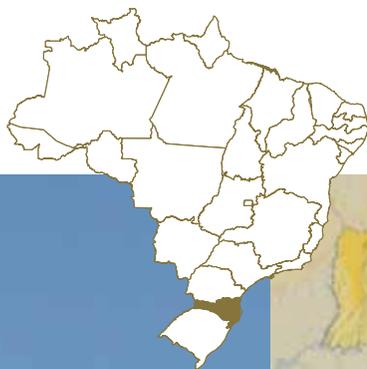
Ancestors of the Jê group lived in pit houses and cultivated cassava and beans in the Santa Catarina highlands a thousand years ago

Marcos Pivetta

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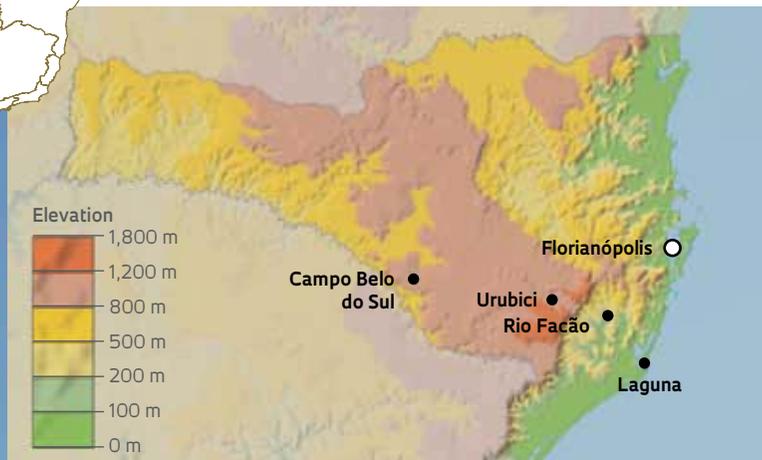
New archaeological studies have put to the test the traditional view concerning the indigenous peoples of the Jê linguistic branch who lived between present-day southern São Paulo State and northern Rio Grande do Sul state in the first half of the previous millennium. Recent excavations at sites in the highlands of Santa Catarina state indicate that these groups—ancestors of Indians of the present-day Kaingang and Laklãnô/Xokleng ethnic groups—were more than simply hunter-gatherers who led a nomadic life with a well-defined social hierarchy and no fixed residence. They practiced agriculture and were able to live for long periods in pit houses, most likely for protection from the cold climate of that region. A series of studies further suggests that the proto-Jê, as experts now call these pre-Colombian peoples, had considerable knowledge of their natural surroundings, knew to some extent how to manage the *araucária* (Brazilian pine) forest, and were capable of shaping the local landscape. The *araucária* tree, for example, supplied them with pine nuts, an important part of their diet.



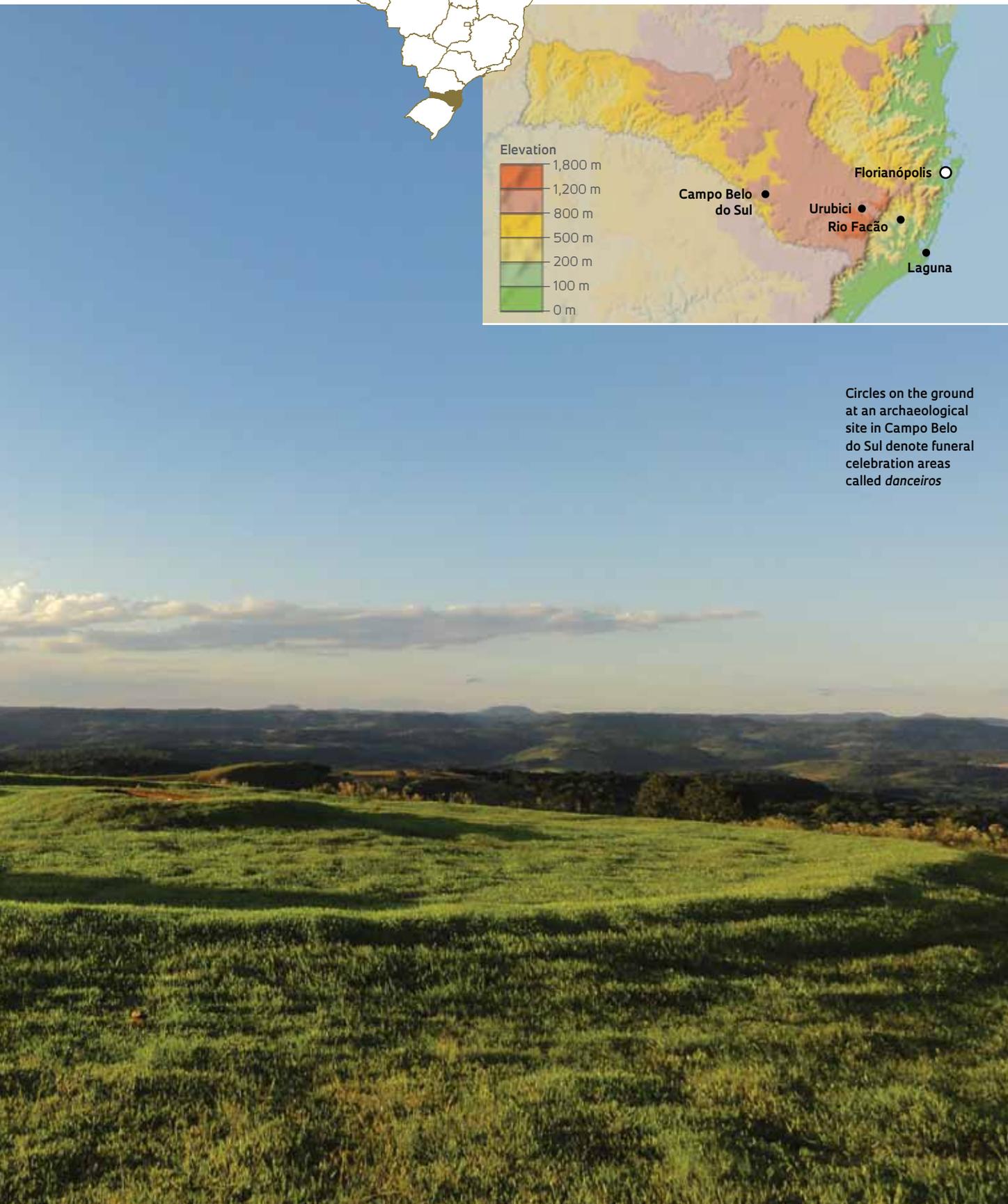


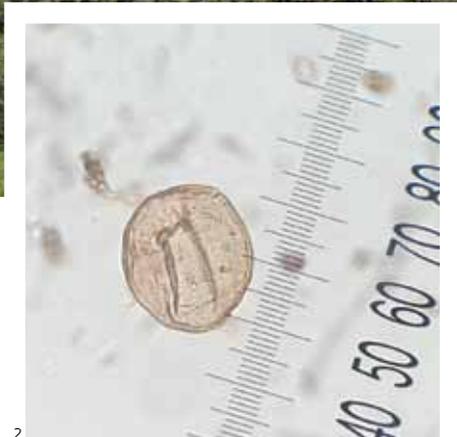
THE PROTO-JÊ CULTURE IN SANTA CATARINA

An international project excavates sites in four municipalities



Circles on the ground at an archaeological site in Campo Belo do Sul denote funeral celebration areas called *danceiros*





Remnants of plants that existed in the Santa Catarina highlands in the era of the proto-Jê, such as *araucária* pollen (at left), are studied for clues on forest expansion

Their extensive interaction with the southern highlands landscapes is an important indicator of the ancient way of life of the proto-Jê, who generally inhabited inland areas of Brazil and were adversaries of the peoples of the Tupi-Guarani linguistic family. The latter were a more populous group typically associated with coastal areas and the lowlands of the great fluvial plains. A paper describing an oversized pit house built by the proto-Jê, published in the scientific journal *PLOS ONE* in July 2016, illustrates some of the hypotheses concerning this new focus. In the paper, researchers from the Museum of Archaeology and Ethnology at the University of São Paulo (MAE-USP) as well as the University of Exeter and the University of Reading, both in the United Kingdom, describe a house with 12 archaeological layers of occupation at the Baggio I site in Campo Belo do Sul, in the highlands of Santa Catarina.

According to their analyses, the house was occupied continuously for approximately 250 years, between AD 1395 and 1650. The remains of the house occupy a circular area 16 meters (m) in diameter and up to 1.6 m in depth. “We have found no evidence that the house was abandoned for any lengthy amount of time,” comments MAE archaeologist Paulo DeBlasis, who heads an international project studying the southern proto-Jê,

in collaboration with the group headed by José Iriarte of the University of Exeter. “This fact contradicts the view that the proto-Jê had no fixed place of residence.” Construction of ancient pit houses of this type, also found at archaeological sites in other cold regions of the world, was begun by excavating a large rounded pit in the rocky ground. Large tree trunks inserted at different points on the excavated floor of the house functioned as pillars. With the help of these supports accompanied by wood framing, the Indians built a straw-covered roof that extended beyond the pit. An opening served as the entryway.

The international team used the carbon-14 method to date samples of charcoal found in each of the house’s 12 layers. Between the deepest, oldest layer and the shallowest, most recent layer of the site where the house was built, the chronology that they obtained is practically continuous. “The house shows evidence of periodic renovations, including roof-burning rituals,” says Brazilian archaeologist Jonas Gregório de Souza, who is pursuing his doctorate at the University of Exeter.

The deepest layer indicates an occupation that began in the late fourteenth century, and the twelfth layer provides evidence that the house was last used in the mid-seventeenth century, by which time European colonists had settled there. Remnants of five different collapsed and burned roofs made of plant fibers were found in the archaeological layers of sediments that contain the remains of the pit house. “It makes no sense to build a house with these features for a temporary home,” says archaeologist Rafael Corteletti of the Federal University of Pelotas (UFPel), who participated



Blackened fragments of ceramics indicate the use of containers for cooking food

in the project. “Additionally, an intervention of this size in the landscape indicates that the proto-Jê had a well-structured social organization after AD 1000.”

Surrounding the oversized house at the Baggio I site, which sits at the highest point in the area at an elevation of 1000 m, there are seven smaller pit houses between 2 m and 5 m in diameter. On the outskirts of this village are funeral sites, popularly known as *danceiros*, consisting of circular earthen structures and funeral mounds. The *danceiros* can exceed 150 m in diameter. In lower areas of the site, there is a group of eight houses with diameters of 2.5 m to 7 m.

In terms of artifacts, the site excavations corresponding to the period of the house’s early occupation reveal a large array of a type of ceramics that differs somewhat from the rustic Itararé-Taquara tradition, which features small, slender, dark-colored pieces typically associated with the proto-Jê groups. The greatest abundance of ceramic finds from the early decades of use are thicker and reddish. The interiors of many pieces are blackened and contain residues from burning—an indication that they were used to process foods. “Most of the pit houses were most likely used as residences but not necessarily by farmers. Hunter-gatherer societies also could

have occupied this type of house,” says archaeologist Silvia Copé of the Federal University of Rio Grande do Sul (UFRGS), one of the project’s collaborators, who has excavated nearly 60 proto-Jê sites in that state, located in Bom Jesus and Pinhal da Serra. “The pit houses also could have been used as silos.”

Another site in the Santa Catarina highlands that strengthens the hypothesis that the proto-Jê were not nomads and did not live from hunting and fishing alone is Bonin, in the municipality of Urubici, near Lages, which is currently one of the coldest places in Brazil. There, researchers found a village with 23 partially underground houses scattered across a 3-hectare area on the upper floodplain of the Canoas River. In a paper published in the *Journal of Archaeological Science* in June 2015, Corteletti, DeBlasis and their colleagues give the first report of the identification of remnants from the consumption of cassava, beans and perhaps yams at a proto-Jê site, in addition to the traditional maize and squash. They discovered residues of starch and phytoliths (microscopic particles of silica, formed in plants) associated with these plants in 14 ceramic fragments found in two underground structures that appear to have been used as “kitchens” at the Bonin site. According to the dating results obtained by the researchers, the site was occupied between AD 1300 and 1440. “These discoveries indicate that the southern proto-Jê had a diversified subsistence economy and that in addition to hunting, fishing and gathering, they produced their own food more than a century before the arrival of the Europeans,” Corteletti notes.

If they devoted time to some form of agriculture, the researchers say, then they most likely had settled in the region. When added to the evidence of a long, continuous occupation of some houses in the Santa Catarina highlands, as appears to be the case with the oversized house at the Baggio I site, the clues that the ancestors of the present-day Kaingang and Laklânõ/Xokleng cultivated the land are at odds with the more traditional idea that these native people remained nomads until they began to decline. That more widespread view holds that the proto-Jê had a seasonal economy, which forced them to alternate between the highlands and the coast to survive.

According to this model, the ancient Indian populations generally moved to escarpment areas and the coast in spring and summer due to the scarcity of natural resources in the highlands during the hotter seasons and returned to the mountainous areas in the fall, when pine nuts—their principal source of food—could be harvested. “However, our research indicates that the proto-Jê were also farmers and were able to

Discovery of the oldest archaeological site in São Paulo

Flakes indicate that Paleoindians inhabited the central part of the state, near São Carlos, 12,600 years ago

Identified two years ago on land in the municipality of Dourado, approximately 50 kilometers from São Carlos, the Bastos archaeological site holds remnants of humans' presence in the state of São Paulo that date back 12,600 years, according to a study published in the journal *Palaeoindian Archaeology* in December 2016. Researchers found 449 pieces forged by human hands, most of which were flakes of silicified sandstone. Six samples of charcoal and one of organic matter, removed from different geological layers associated with the lithic pieces, were dated using the carbon-14 method. "These data make Bastos the state's oldest site, equivalent to those in Lagoa Santa, Minas Gerais," explains Astolfo Araujo, the leader of the team that made the discovery and a researcher with the University of São Paulo's Museum of Archaeology and Ethnology (MAE-USP). "Little by little, we are showing that the state's interior contains important archaeological sites." A few other pieces are being analyzed using a different method, luminescence dating, but those results were not yet available. No human skeletons have been found in Bastos; thus, researchers still do not know whether Paleoindians settled in Dourado earlier than 10,000 years ago.

Since 2009, Araujo and his students from the MAE, such as master's candidate Letícia Correa, who participated in the excavations at Bastos, have been conducting systematic field trips to search for new evidence of the first human occupations in the state of São Paulo. The discovery of the site in Dourado, which is in an open-air location (and, therefore, lies outside of any cave or shelter), occurred almost by accident. Four years ago, the owner of a coffee plantation in that municipality contacted the researcher and offered his property to be used for excavations. "He had already found some archaeological material there, but he had no idea what it was," Araujo says.

The researchers made three trips to the area, identified the site and, upon dating the finds, were shocked at their antiquity. According to the data, Bastos was the locale of two different occupations in prehistory: an older occupation from approximately 12,500 years ago and another more recent occupation, no older than 9,000 years. In the 1980s, dating analysis of samples of charcoal from the Alice Boer site in Rio Claro yielded an age of 14,000 years, but those results are disputed by many archaeologists. In addition to Bastos, Araujo found another ancient site in Dourado: Lagoa do Camargo 1, also in Rio Claro, which dating analysis placed at 10,500 years old.

In the same issue of the journal *Palaeoindian Archaeology*, a team from the firm Zanettini Arqueologia reports the discovery of another locale with very old Paleoindian artifacts in inland São Paulo. The Caetetuba site in the municipality of São Manuel, 25 kilometers from Botucatu, yielded nearly 3,500 fragments and artifacts from a lithic industry of human origin that was established there nearly 11,000 years ago, according to dating analysis of charcoal samples taken from the site. Notable among the materials



Pieces from the lithic industry at the Bastos site in Dourado, now the oldest in the state



recovered are arrowheads made of silicite, in addition to plano-convex scrapers made of silicified sandstone, resembling snails.

"Despite all of the research already conducted, inland São Paulo has countless gaps that have sometimes been filled by preventive archaeology," says Paulo Zanettini, whose company specializes in developing programs designed to analyze and mitigate impacts on archaeological heritage as part of the environmental project permitting process. The Caetetuba site, for example, was located during excavations to calculate the effects of expanding a sugarcane plantation in the area.



Arrowheads found at the Caetetuba site in São Manuel, which were dated at nearly 11,000 years old

Project

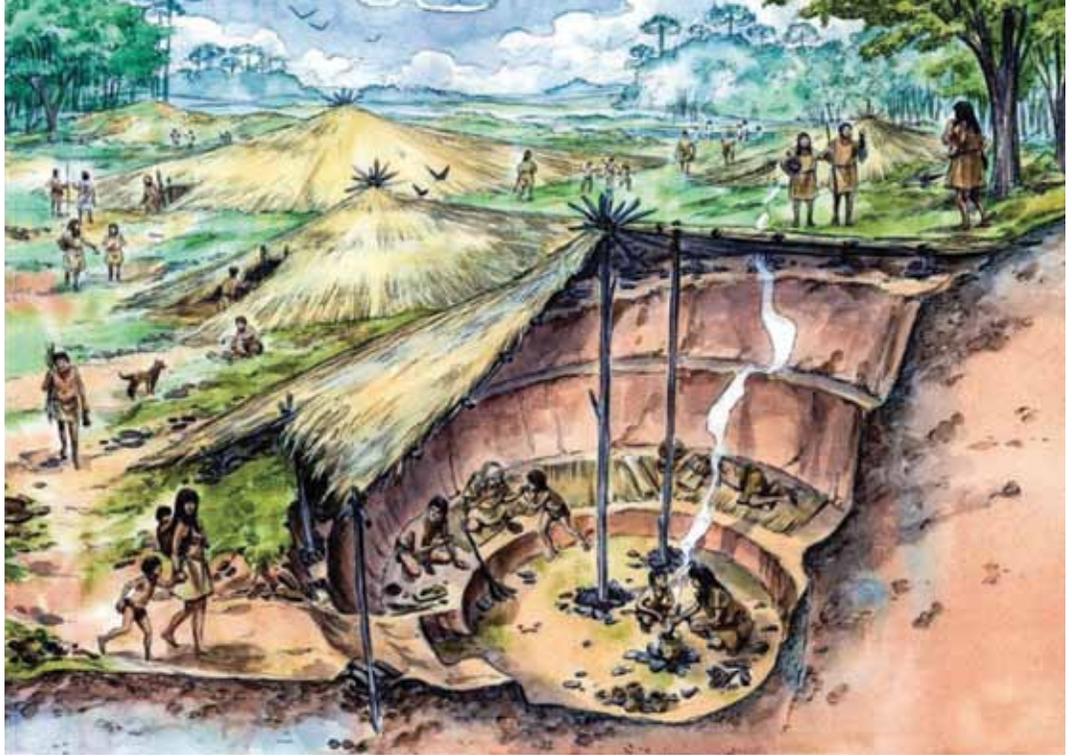
The Paleoindian occupation of São Paulo State: a geoarchaeological approach (No. 13/13794-5); Grant Mechanism Regular Research Grant; Principal Investigator Astolfo Araujo (USP); Investment R\$247,647.91.

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Artistic rendering of the pit houses built by the proto-Jê



The present-day Kaingang and Laklãnõ/Xokleng ethnic groups descend from the ancient southern Jê peoples

establish residence in certain places,” DeBlasis suggests. Depending on when they are planted, cassava and beans—two of the plants found at the Bonin site—can be harvested in spring and summer, which in theory clashes with the idea that resources were scarce during the hot season in the highlands. To study how these ancient peoples occupied sections of the coast and the escarpments of the Santa Catarina mountains, the international project is also conducting excavations at archaeological sites in two additional low-lying areas, Laguna, on the coast, and Rio Facão, on the slope.

The relationship of the proto-Jê to the *araucária* forest and pine nuts is an intriguing subject in the minds of archaeologists. The first pit houses associated with these peoples date back to 300 BC. But the development of this type of construction, which is found at approximately a hundred archaeological sites in the states of Rio Grande do Sul, Santa Catarina and Paraná, occurred circa AD 1000—precisely when the *araucária* forest was greatly expanding, according to paleobotanical data. One possible interpretation for this coincidence is that the growth of the *araucária* forest, which provided food for the native peoples and attracted the animals that

they hunted, made it possible for the proto-Jê to disperse. Some researchers raise the possibility that the increased coverage of the *araucária* forest may have been stimulated, at least in part, by the ancient inhabitants of that region. The Indians likely used selective tree-cutting and thereby promoted *araucária* propagation.

The Chilean paleoecologist Macarena Cárdenas, a postdoctoral researcher at the University of Reading, is investigating this hypothesis. She has collected samples of sediments from depths of up to 2 m at sites in the four areas where the project is conducting excavations. Using this material, which can contain preserved remnants (pollen, seeds, charcoal) of the vegetation that occurred over the past 8,000 years, she is constructing models of the growth of the area occupied by *araucárias* in Santa Catarina. “We are going to study the vegetation in different areas over time and compare it with the distribution of the proto-Jê people,” the researcher explains. “In Amazonia, there are indications that the management of palm trees promoted the expansion of human occupation in the past. Perhaps *araucárias* played an important role in the South.” ■

Project

Jê landscapes of Southern Brazil (No. 12/51328-3); Grant Mechanism Thematic Project; (AHRC, RCUK Agreement); Principal Investigator Paulo DeBlasis (USP); Investment R\$897,654.12.

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