



ANTHROPOLOGY

A monumental stone plaza at 4750 B.P. in the Cajamarca Valley of Peru

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We report one of the earliest known circular plazas in Andean South America and one of the earliest examples of monumental, megalithic ceremonial architecture in the Americas. The example presented here is constructed of large free-standing and vertically placed megalithic stones and is located in the Cajamarca basin of the northern Peruvian Andes. This construction method has never before been reported in the Andes and is distinct from other monumental circular plazas in the region. We present three radiocarbon dates associated with the initial construction of the plaza which average to approximately 2750 calibrated years before the common era (cal BCE), corresponding squarely to the Late Preceramic period, which saw the first monumental construction in the Andes. This is one of the earliest examples of monumental, megalithic architecture in the Americas.

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INTRODUCTION

Monumental architecture is central to many aspects of human social organization and the development of social complexity, yet the drivers of its origins remain poorly understood. This form of architecture is purposefully constructed to be larger and sometimes more elaborate than is needed given its intended function. The world's earliest ceremonial monumental architecture, whether represented by alignments of megalithic stones, large platforms and buildings, or bounded plazas, were the results of communal or corporate action, by groups larger than immediate households and often larger than the population of the local area. Early, well-known examples of ceremonial architecture of this kind include Göbekli Tepe in Turkey, Stonehenge in England, and the great pyramids of Giza of Egypt, which were constructed by ~9000 years before the common era (BCE), ~2900 BCE, and ~2650 BCE, respectively (Fig. 1). Göbekli Tepe is particularly important here as it was constructed during the Pre-pottery Neolithic by hunting-gathering-foraging peoples on the cusp of sedentary life and food production (1). Early examples of monumentality in the western hemisphere include Watson Brake and Poverty Point dating to approximately 3400 BCE and 1700 BCE, respectively (2, 3).

We recorded a megalithic stone circular plaza measuring 18 m in diameter in the Cajamarca basin of northern Peru as part of the Callacpuma Archaeological Project (Fig. 2). In 2018, charcoal fragments were recovered from the foundation of the monumental stone walls and the resulting radiocarbon dates produced a construction date for the circular plaza ranging from 2632 to 2884 BCE, placing its construction within the Andean Late Preceramic period (Fig. 1 and Table 1). This age range situates it early in the Andean circular plaza tradition (~3000 BCE to ~800 BCE). The megalithic circular plaza at Callacpuma may be the earliest example of megalithic, ceremonial architecture in the northern Peruvian Highlands. It is a critical early example of collective construction, place building, and social integration among people in the Andes.

Early examples of ceremonial and sometimes monumental architecture in the Andes have been suggested at the archaic site of Asana in the south-central highlands of Peru (4) and arguably at the site of Monte Verde in south central Chile (5), but monumental ceremonial architecture does not become fully established until the Late Preceramic period in the form of large platform mounds, such as those found at the coastal sites of Caral (~2600 BCE) (6), Cerro Lampay (~2400 BCE) (7), and Sechín Bajo (~3300 BCE) (8) and highland sites including Kotosh and La Galgada at ~3000 BCE (9). These platform mounds were constructed of stone-faced walls filled with cobbles and soil, sometimes placed within cordage bags. Over the course of the next 2500 years, extending through the Initial (ceramic) period and into the Early Horizon dominated by the spread of Chavín influence, the spatial complexity of these mounds increased substantially, presumably along with the scale of the corporate group labor invested in their construction and periodic maintenance. Some of the latest examples of this platform and plaza tradition were constructed at the famous site of Chavín de Huantar in the east central Andean highlands. A suite of architectural features in this built environment emerged, including one or more tall mounds and large open rectangular plazas, sometimes bounded by architectural "wings" emerging from the mound.

Beginning at approximately 3000 BCE, most of these platform and rectangular plaza complexes are joined by one or more distinctive, sunken circular plazas (although Sechín Bajo is an early example at ~3300 BCE). The number of these circular plazas at mound sites varies, and they are often characterized by two entrances with staircases facilitating access to the plaza. These plazas range in diameter from eight to approximately 21 m, with depths of 1 to 2 m. This circular sunken plaza tradition became widespread in the central Andes, a common aspect of the broader pattern of monumental architecture along the coast during the Late Preceramic period, Initial period, and Early Horizon. In contrast to the numerous examples along the coast, to date, the circular sunken plaza tradition is less commonly known from the Andean highlands. Previously, only three other highland examples have been discussed: La Galgada (~3000 BCE), Kuntur Wasi (plaza construction at approximately 800 BCE), and the Early Horizon site of Chavín de Huantar (9, 10). Plaza types have been organized in a number of ways, but perhaps the most important distinction is into two spatial forms; some are

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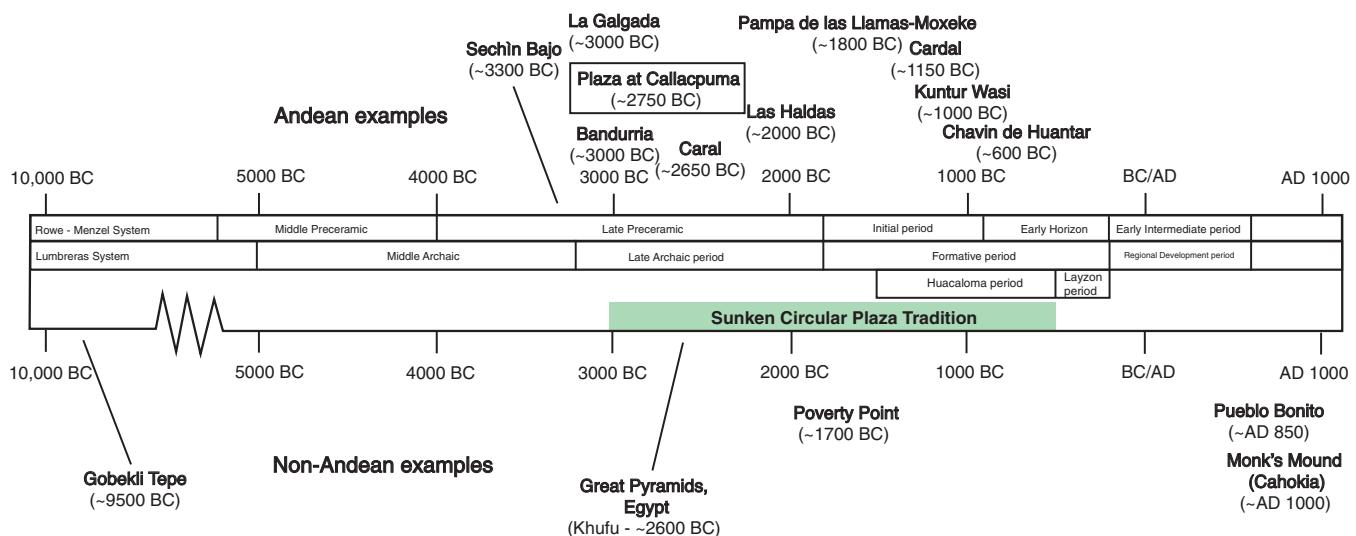


Fig. 1. Chronology of a sample of monumental constructions noted in the text. All Andean examples are sites where circular plazas are present. Non-Andean examples include early sites with monumental constructions.



Fig. 2. Overhead photo of the circular plaza. The circular plaza is at center with the modern city of Cajamarca in the background. View is to the northwest.

Table 1. Radiocarbon dates discussed in the text. Details of the samples, their contexts, and the dates produced from them. The dates are associated with the initial construction of the circular plaza. cal B.P., calibrated years before the present.

Lab code	Conventional radiocarbon age	Calibrated 1σ 68.2%	Calibrated 2σ 95.4%	1σ	2σ	Context	Material
Beta-587512	4240 ± 30 B.P.	2791–2890 cal BC	2634–2901 cal BC	4839–4650 cal B.P.	4850–4583 cal B.P.	Construction of the circular plaza UA100	Wood charcoal
Beta-587511	4230 ± 30 B.P.	2698–2886 cal BC	2632–2896 cal BC	4835–4647 cal B.P.	4845–4581 cal B.P.	Construction of the circular plaza UA100	Wood charcoal
Beta-587513	4150 ± 30 B.P.	2582–2852 cal BC	2505–2872 cal BC	4801–4531 cal B.P.	4821–4454 cal B.P.	Construction of the circular plaza UA100	Wood charcoal

axial to the primary ceremonial mound at a site, their location on a bisecting line, while others are peripheral to the primary mounds (11–13). Moore has pointed out that peripheral plazas are generally smaller in scale than axial plazas. This difference in placement and scale may indicate variability in function and the size of audiences, with smaller plazas dedicated to localized groups and larger axial plazas dedicated to more inclusive, community-wide events (11, 14), perhaps analogous to locational and scalar differences among the circular kivas of the American Southwest (15). Circular plazas are generally believed to have functioned as bounded ritual spaces, and occasional internal features include central offerings and small centrally located hearths; walls are often plastered and sometimes painted (16). In general, however, these plazas are very culturally sterile and clean as would be expected in a ritually charged, public space.

Early architecture in the northern, Cajamarca highlands is often interpreted as ritual in nature and occasionally monumental in scale. The earliest dated architecture in the region includes the mound complexes at Huacaloma (~1600 BCE) and Layzón (~500 BCE) in the Cajamarca basin, the mounds and plazas at Kuntur Wasi (~1000 BCE), Cerro Blanco, and other sites in the middle Jequetepeque river valley, and the northern mounds at Pacopampa (~1200 BCE) (10, 17–20). These Initial period and Early Horizon centers are characterized by high flat-topped platform mounds often associated with large open rectangular plazas and, in the case of Kuntur Wasi, a well-defined sunken circular plaza.

CALLACPUMA

The archaeological site of Callacpuma is located in the Cajamarca basin of the northern Peruvian Andes (Fig. 3). It has been the focus of archaeological interest for nearly 60 years (21–29). Early fieldwork at the site included surface collection (30) and test excavation (21, 27), though intensive work did not begin until 2015. The site is best known for its corpus of rock art panels (23–27), and recent work has systematically recorded more than 100 distinct mono- and polychrome panels including both naturalistic and geometric motifs and scenes. Pedestrian and drone-based mapping of the site indicates that it runs for 4 km east–west and is bounded on its north side by the famous Inca Road and on its south side by the southeast flowing Cajamarca River, and that it covers approximately 250 ha.

The site is composed of a large number of spatially discrete architectural sectors, including domestic and agricultural terraces, platform mounds along the ridge's summit, a large cave complex, and the circular stone plaza discussed in this paper. Systematic surface collection and excavation in several of these distinct sectors have recovered diagnostic ceramics indicating occupation of the site ranging from the Huacaloma period (Fig. 1), through the entire 1500-year development of the subsequent Cajamarca Tradition, to the Colonial period.

The circular stone plaza at Callacpuma was identified in 2015, tested in 2018, and further excavated in 2019 and 2022 (Figs. 2 and 4). The plaza is part of a spatially discrete architectural zone near the summit of Callacpuma (3060 m above sea level) which also includes an artificially leveled rectangular plaza to the circular plaza's northwest and a megalithic terrace-retaining wall to its southeast. The circular plaza is approximately 18 m in external diameter and 16 m in internal diameter and is formed by two concentric walls of megalithic, unshaped and unmortared, stones set vertically and closely spaced. The associated rectangular plaza is bounded by what seems to be a single-course, low wall. All other walls recorded at Callacpuma are of double-faced cut stone masonry set in mortar, the standard construction format for later time periods throughout the Cajamarca region.

Mapping and excavation indicate that two to three small, enclosed rooms are present on the interior of the circular plaza and abutted to the eastern plaza edge. These rooms are small, averaging about 4 m² in area, and have walls formed of upright standing megaliths with smaller stones between them. No mortar is present. This construction is distinct from the plaza's concentric walls, which do not have smaller chinking stones. Excavations also indicate that a low bench may have been present along the eastern edge of one of these small rooms.

Two entryways have been documented for the circular plaza, one at its south end and another at its western edge where a distinctive corner has been defined (Fig. 4). The southern entry did not extend all the way into the interior open plaza. A large megalith, part of the interior concentric wall, would have blocked movement and perhaps view of activities in the plaza for those entering from the south. Because this megalith impeded direct access, people entering here would have had to either turn right or left into a corridor between the two concentric walls. Thus, access to the interior of the plaza was controlled.

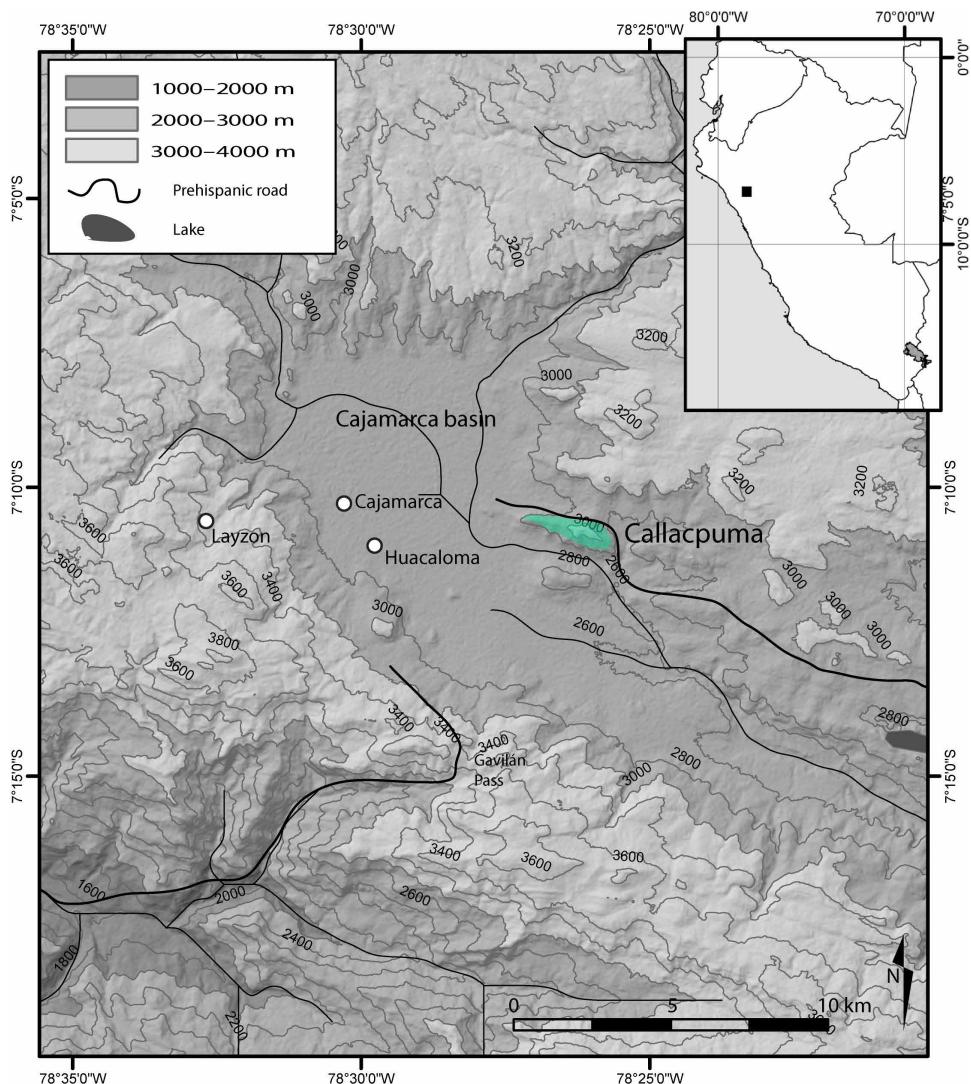


Fig. 3. Map of the Cajamarca basin. The map contains local archaeological sites noted in the text. The site of Callacpuma is highlighted in green.

Excavation indicates that, before the construction of the plaza, all or most of the soil was removed down to bedrock. This was followed by the placement of a thin, approximately 5-cm-thick layer of mixed soil, clay, gravels, and small charcoal fragments, laid directly upon bedrock where builders planned to erect stone walls. The large megalithic stones, probably taken from exposed bedrock areas approximately 50 m away, were then moved to the building location and tipped vertically into place atop the prepared soil/clay foundation layer (Fig. 4). This process ensured the secure placement of vertical stones and minimized the chances of settling and collapse later. The dated charcoal samples discussed in this paper all came from this foundation layer in direct association with the bases of vertically placed wall stones (Fig. 4).

Distinct artifacts and features were recovered from almost all the excavation blocks in the circular plaza. Although ceramic sherds were present in excavated contexts, all ceramics were from the uppermost levels and none were found in the lower-most levels, those directly associated with the initial construction of the plaza. There is no evidence for disturbance or mixing of deposits.

All form-diagnostic ceramic sherds represented serving vessels (bowls), and no cooking or storage vessels seem to have been used within the plaza.

Distinctive artifacts include two miniature cuplike vessels, one of a soft stone and another ceramic, that were recovered from both the area of small rooms in the eastern side of the plaza and the corridor or entryway at the west edge of the plaza. Excavation also uncovered 10 quartz crystals and a small unworked nodule of what is probably lapis lazuli from within the area of rooms, as well as two small fragments of worked anthracite probably representing small edge fragments of at least one mirror. Five small stacks of ceramic serving bowls were also found within the corridor, one associated with the southern entrance and four associated with the possible entrance on the western edge of the plaza. Features were formed by the stacking of three to five hemispherical shaped bowls. These were all encountered within contexts of jumbled rocky fill within these architectural zones, which represents an intentional filling of what had previously been a corridor. These ceramic stacks are believed to have been offerings associated with

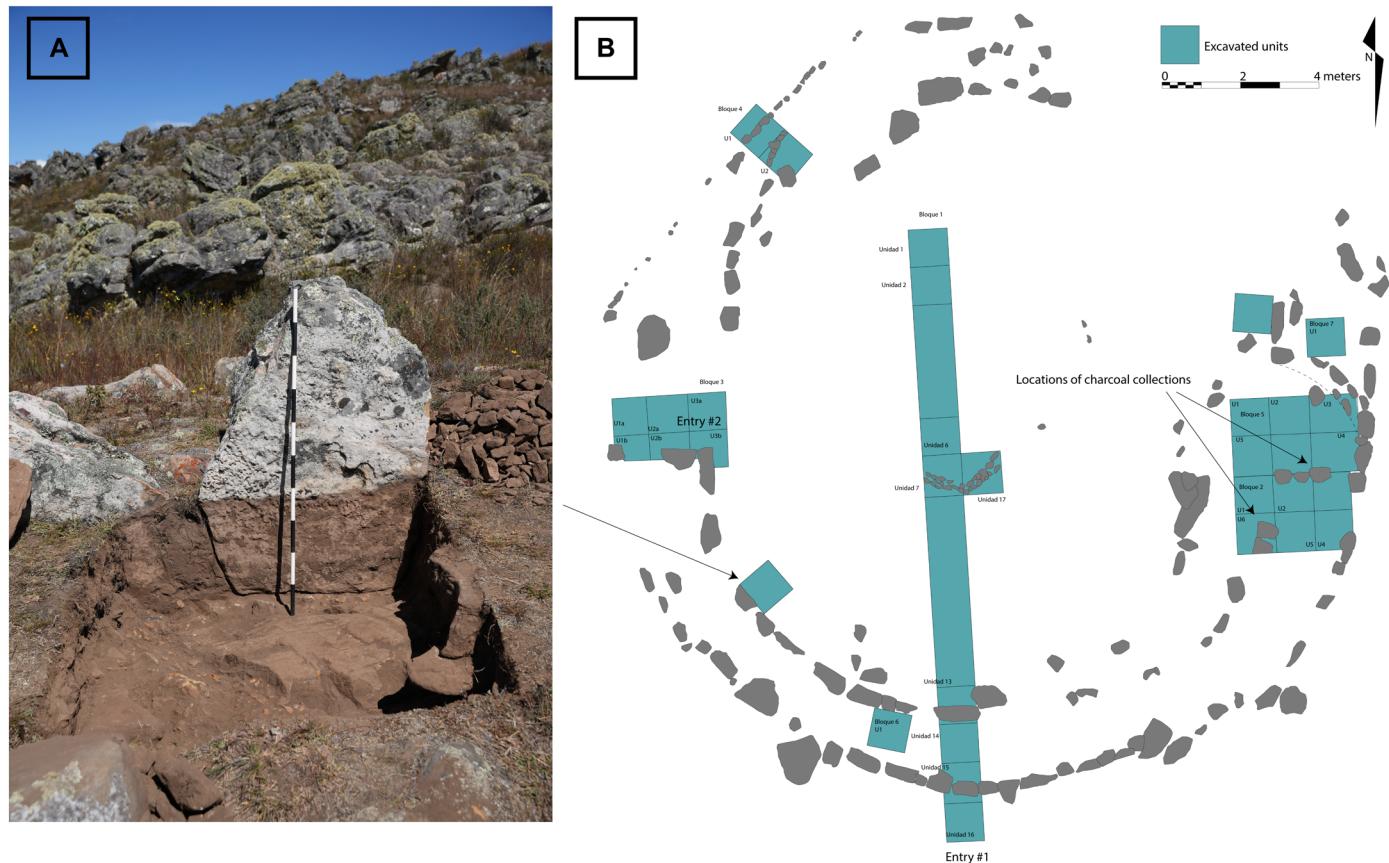


Fig. 4. Plan of the circular plaza and its construction. (A) Example of a typical upright stone forming the plaza perimeter walls. Also indicated is an example of the thin foundation layer at the base of the stone from which the dated material was collected. (B) Plan view of the circular plaza indicating the excavated units.

the formal closure of the southern entrance and perhaps of the corridor; they may in fact represent the closure of the circular plaza itself. Because of their lack of ring bases, these bowls likely date to the Layzón period (500 to 200 BCE), immediately predating the Cajamarca Tradition. The offering vessels are of very soft and friable caolin clay, possibly indicating insufficient firing temperatures. For all these reasons, we believe the closure activities and offerings date to sometime during the Layzón period (Fig. 1). They are all associated with upper levels and are not stratigraphically associated with the initial construction of the plaza walls.

THE DATES AND THEIR CONTEXTS

A very early construction date for the plaza is indicated by three lines of evidence. First, charcoal samples from intact deposits produced three dates ranging from 4150 ± 30 before the present (B.P.) to 4240 ± 30 B.P. (Table 1). The calibration curve at this time is characterized by both a plateau and an inversion causing the calibrated age ranges to be broad. A combined or averaged date range (combining the original three dates) results in a complex trimodal distribution. This combined distribution indicates a very small 3.9% chance that the construction dates to between 2653 and 2632 calibrated years BCE (cal BCE), a 70.7% chance that it dates to between 2823 and 2662 cal BCE, and a 20.8% probability that the plaza was constructed even earlier, between 2884 and 2830 cal BCE

(Table 1 and Fig. 5). OxCal v4.4.4 and the SHCal20 calibration curve was used in this analysis (31, 32). The samples were collected from contexts directly associated with the bases or foundation levels of upright stones making up the megalithic architecture (Table 1). All three samples were collected from a prepared ~5-cm layer situated immediately over bedrock and under the megalithic wall stones (Fig. 6). This layer was composed of soil, gravels, clay nodules, and wood charcoal fragments. This soil composition was different from soil above, and we believe it was a prepared base laid down just before the placement of the large stones. This layer contains no ceramics or other artifactual materials, but we believe it to be a cultural, architectural foundation layer.

Second, the megalithic style is rare in the region, and the plaza and the associated retaining wall are the only examples of this on the 250-ha site of Callacpuma, where all other construction is in the later style of double-faced cut stone walls. Third, while some ceramics are present in upper levels, no sherds are present in the lower levels associated with the construction of the plaza itself. There is no evidence of mixing or disturbance, which would compromise stratigraphy. The plaza was constructed before the production and use of ceramics in the region, which is known to have begun by about 1500 BCE (33). In addition, excavation has thus far not indicated the presence of fine, prepared clay or plastered floors and walls, a hallmark of later construction in ritually charged structures during the Early Huacaloma period (~1500 BCE).

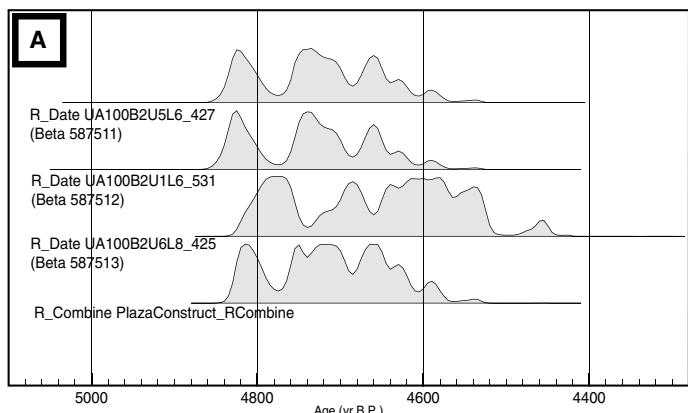


Fig. 5. Calibrated radiocarbon information. (A) Three radiocarbon dates followed by combined (averaged) date. (B) Details of the combined date. yr B.P., years before the present.

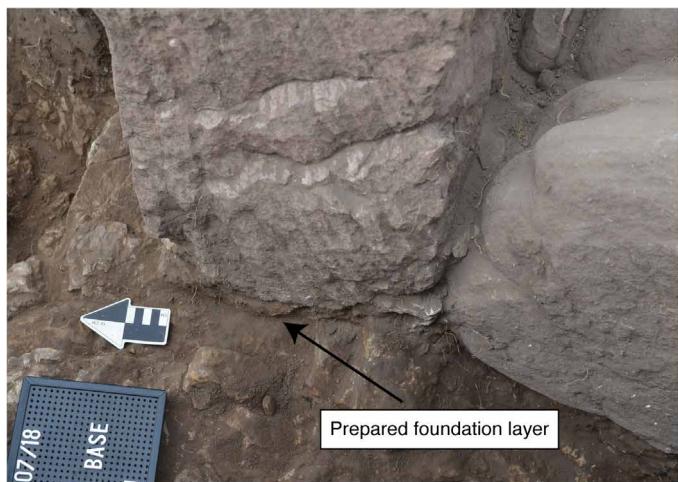


Fig. 6. Detailed example of stratigraphic layer from which the dated samples were collected. Image indicates the ~5-cm-thick prepared soil layer that was laid down directly on bedrock and onto which the megalithic wall stones were placed. This image is of the base of Block 2 Unit 6.

NORTHERN HIGHLAND COMPARISONS

Only one earlier Late Archaic example of monumental, ceremonial architecture is known from the Northern highlands. By 5300 BCE, the site of Cementerio de Nanchoc located just northwest of the Cajamarca basin was characterized by two low earthen mounds bounded by low stone retaining walls and may have been the ceremonial focus of groups in the area. More recent circular architectural features in the northern highlands include a large spiral arrangement of stones at the mortuary site of Montegrande, and smaller circular features at the Early Horizon monumental site of Layzón in the Cajamarca basin, each dating to approximately 700 BCE. All of these northern examples differ from the circular plaza at Callacpuma in that they do not create a bounded space. The Callacpuma plaza is unique for its time in the northern highlands.

The closest analog to the form and construction of the plaza at Callacpuma comes from a circular megalithic construction called the Rondán Circular Construction (RCC) at the site of La Pampa in

the highlands of Ancash to the south (34, 35). A major difference here is that its large upright standing megaliths are set on a foundation of a double-faced stone masonry wall, while the interior has a spoked arrangement of domestic rooms. The structure has been dated on the basis of ceramics associated with these interior rooms, not through dating of materials directly associated with the construction of the concentric circular walls. If radiocarbon dates exist for the original megalithic construction, they unfortunately have not been published. The authors believe that the RCC dates to the Early Intermediate period, much later than the plaza at Callacpuma.

DISCUSSION

Multiple lines of material evidence suggest that the circular plaza at Callacpuma is one of the earliest known monumental and megalithic structures in the northern Peruvian Andes and one of the earliest examples in the Western Hemisphere. The form and scale of the structure and the lack of domestic artifacts indicate that it was probably ceremonial in function. We do not suggest that the Callacpuma plaza is a classic example of the broader Andean sunken circular plaza tradition but instead that it may represent an early offshoot of this emerging tradition. It diverges from the broader tradition in its megalithic construction and lack of finely plastered walls, as well as in its placement near the summit of a highland landform.

It is likely that the plaza was constructed during the Late Preceramic period, as early as 2850 BCE. We believe that the plaza continued to be used as a ritual space, at least periodically, through the Initial period and Early Horizon during which ceramics were deposited. No ceramics diagnostic to the later Cajamarca Culture have been recovered from the plaza. Because of this, we suspect that for some reason, the plaza and its concentric corridor were ritually closed during the Layzón period.

The Late Preceramic, during which the Callacpuma plaza was constructed, was a time of socioeconomic transition in the Andes. On the central coast, the communities that came together to create the massive mounds at sites like Caral were not yet full-time farmers but engaged in complex exchange systems with coastal fishing communities. Inland communities grew some food and industrial crops but also depended on hunting and exchanged marine products. In the northern highlands of Peru, the people that built the plaza at

Callacpuma may have begun to experiment with food production, but they were also probably still relatively mobile hunter-gatherers. As at Nanchoc centuries earlier, Cajamarca groups may have engaged in the corporate construction of the plaza at Callacpuma and then repeatedly negotiated group identities there through integrating events and possibly feasting (36, 37). As with the case of early monumental collective architecture outside Andean South America, for instance at Göbekli Tepe, the construction of monumental ritual architecture in the Late Preceramic of the coastal and highland central Andes represented a shifting social world perhaps involving a change from small group-related belief systems to more collective and regionally focused belief and action.

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