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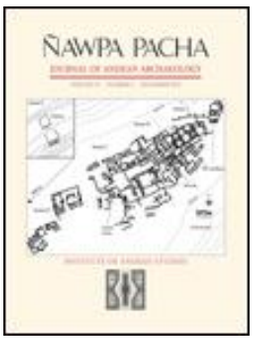

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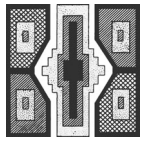

The Chincha lines

Charles Stanish and Henry Tantaleán

Recent research reveals a set of linear geoglyphs and structures in the Carmen Pampa in the upper Chincha valley of southern Peru. These geoglyphs are similar to others on the south coast in valleys such as Nasca and Palpa. We refer to these as the "Chincha lines," a complex of linear geoglyphs, small mounded structures, and larger platform mounds. This complex is securely dated to Paracas ca. 400–200 BCE, with a possible use of one set up of lines dating up to AD 100. In this article we describe in detail the Chincha line complex and place it within a larger regional context.

Nuestras investigaciones recientes revelan un conjunto de geoglifos lineales y estructuras en la Pampa del Carmen en la parte alta del valle de Chincha en la costa sur del Perú. Estos geoglifos son similares a otros de la costa sur como los de los valles de Nazca y Palpa. Nos referimos a estos como las "líneas de Chincha," un complejo de geoglifos lineales, pequeñas estructuras monticulares y grandes plataformas. Este complejo está datado con seguridad en los tiempos Paracas (ca. 400–200 aC) con un posible uso de las líneas hasta el 100 dC En este artículo describimos en detalle el complejo de las líneas de Chincha y lo ubicamos en un contexto macro-regional.

The Chincha valley is located approximately 200 km south of Lima and about 175 km north of Nasca (Figures 1 and 2). The Programa Arqueológico Chincha (PACH) was created in 2011 to investigate the archaeology of the Chincha and upper Pisco region. Since that time, we have surveyed a significant area in the upper Chincha valley and excavated at sites in the Chococota or Mono area, the site of Cerro del Gentil, the site of Casagrande, and the large platform mounds of Huaca Soto and Huaca Cumbe in the lower valley (Figure 3). This article describes the complex of geoglyphs and other small structures found in the upper Chincha valley in the desert pampas above the agricultural zone. This area is commonly called the Carmen Pampa, named after the modern and colonial town immediately adjacent to the area. Our work indicates beyond any serious doubt that the bulk of the Chincha lines date to the later Paracas periods, ca. 400–200 BCE, with one set most likely associated

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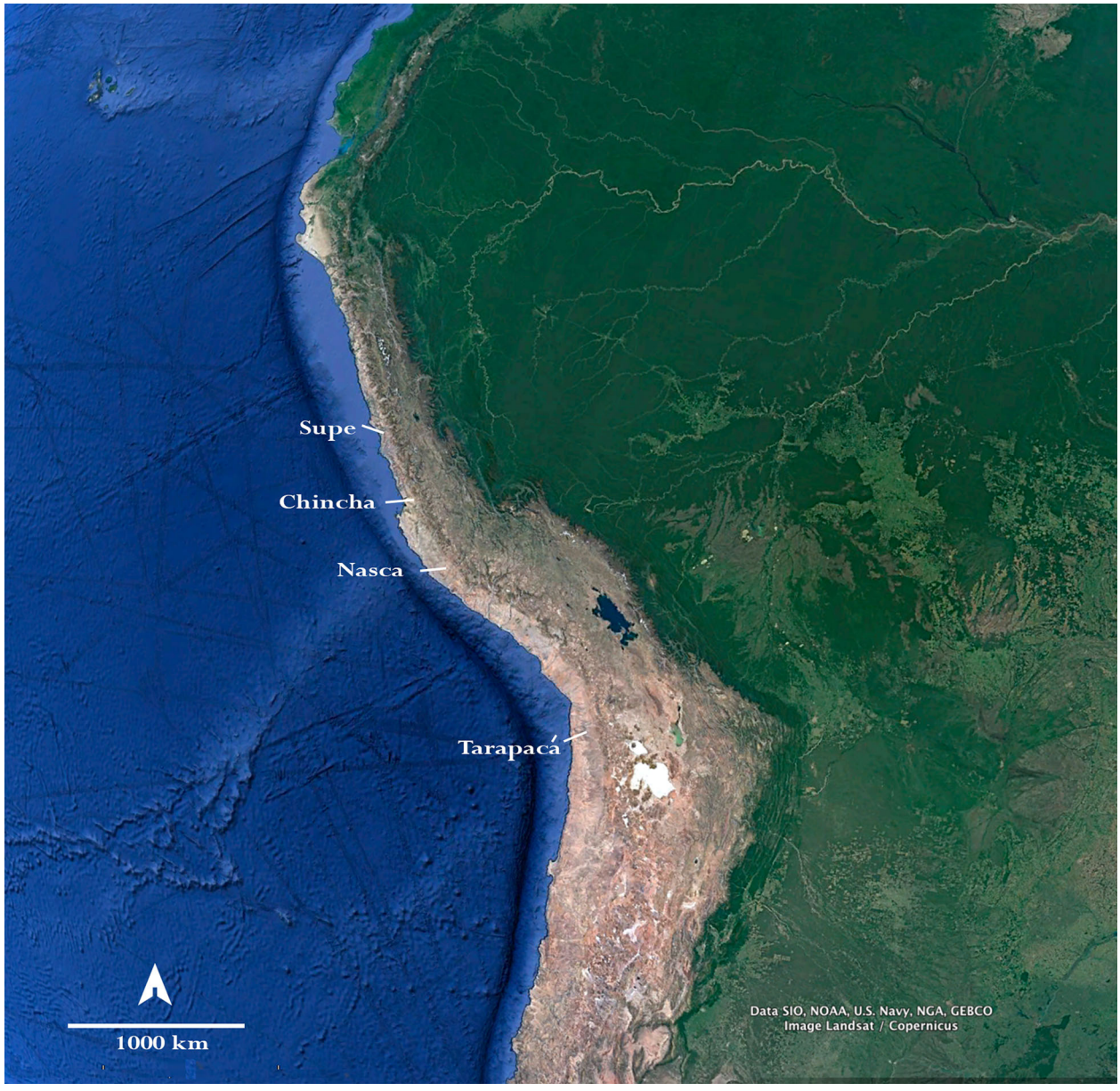

Figure 1. Map of the Central Andes (source: Charles Stanish).

with a Topará occupation post-200 BCE (Stanish et al. 2014). The Chincha lines are several centuries earlier than the more famous Nasca lines to the south. The date of the Chincha geoglyphs is consistent with one group of Paracas geoglyphs located in Palpa (Reindel et al. 2006a, 2006b), and therefore can be considered as an extension of this geoglyph building practice to the north of the Nasca/Palpa region. In Chincha, unlike the bulk of geoglyphs in other areas, the lines were created and abandoned relatively quickly and therefore largely lack the palimpsest effects seen in these other areas. As a result, we have cultural features that were used for at most a century or two and then abandoned. This gives us an excellent window on the nature of these features, uncomplicated by subsequent use or other prehistoric disturbances.

Apart from being intrinsically interesting, the Chincha lines are significant for understanding the

Figure 2. Map of the Paracas area and environs (source: Charles Stanish).

nature and use of geoglyphs on the Peruvian south coast in general. In Chincha, there are several sets of lines that converge on five Paracas sites located at the edge of the valley (Figure 4). There are scores of small but complex surface structures associated with the lines as well. These range from very modest 1 m-diameter circles up to larger ones measuring 15 m in diameter. There are also a number of architecturally complex platform mounds located at the western edge of Carmen Pampa just above the agricultural areas. Curiously, a number of these lines and mounds are oriented to azimuth 293° ± 3°. During the Late Paracas period, ca. 400–200 BCE, this azimuth and ground location would mark the June or winter solstice. In fact, the position of the solstice sunset has not appreciably changed in over 3,000 years (see Table 1). We suggest that the June solstice was used as a one-time marker for fairs and competitive feasts by the people who constructed these geoglyphs.

In earlier publications, we provided a broad overview of the Chincha lines, including a report of the carbon dates and a summary of excavation details (Stanish et al. 2014; Tantaleán et al. 2015). In this article, we describe in detail the nature of the lines and the structures constructed on this Paracas-period landscape. We also place this geoglyph-structure complex within a broader regional context.

Geoglyph Complexes from Casma to Northern Chile

Geoglyphs were very common in the prehistoric societies of the Andes. The majority of geoglyphs can be classified into two types. Figural ones are representational,

Figure 3. Map of the Chincha and Pisco valleys (source: Charles Stanish).

depicting humans, animals, insects, supernatural beings, and so forth. Other geoglyphs are geometric and are composed of lines, circles, spirals, trapezoids, and the like. Both types are found along the entire central Andean coast and may date as early as the Late Archaic period, ca. 3000–1800 BCE, along the north Peruvian coast. The Supe valley, for instance, has geoglyphs near the famous Late Archaic site of Caral in an adjacent pampa. There is also a large geoglyph at the nearby site of Chupacigarro (Shady Solis and Kleihege 2008: 144). Of course, the geoglyphs of Nasca are justifiably famous and need not be discussed in any detail here (see Aveni 1990a, 1990b, 1990c; Reinhard 1987; Silverman and Browne 1991). The Nasca lines all most likely date to the Nasca period and were therefore built after the Chincha lines had been abandoned (Silverman and Proulx 2002: 174–175). The entire Nasca pampa is covered in geometric lines and various figures (Figure 5). It is worth noting that the most famous of the Nasca geoglyphs are figural in nature; however, the bulk of the Nasca geoglyphs are in fact geometric, being composed of straight lines, trapezoids, and the like.

In the valley immediately to the north of Nasca—Palpa—the work of Johny Isla, Karsten Lambers, Markus Reindel, and others has documented numerous Paracas-period geoglyphs (Bendezú de La Cruz n.d.; Reindel and Isla 2013: 88). The majority of the figural geoglyphs are located on the sides of hills, while a number of linear geoglyphs are found on the pampas. The Palpa team demonstrated that there was a shift from Middle and Late Paracas (550–200 BCE) use of these hillside figural geoglyphs to geometric ones on the pampas later in the fifth through the seventh centuries AD during Nasca times (Reindel and Isla 2012, 2013: 88; Reindel et al. 2006a: 197).

In the far south, geoglyphs are found throughout the northern Chilean Atacama Desert. Briones et al. (2005) list several dozen sites with geoglyphs ranging from Arica to the Antofagasta region to the south. Pimentel and Montt (2008) likewise illustrate a number of figural geoglyphs from throughout the same region. They emphasize that the motifs on the geoglyphs in many cases match those on the rock art. Both figural and geometric lines are very common throughout northern Chile, with almost all being associated with pre-Middle Horizon sites.

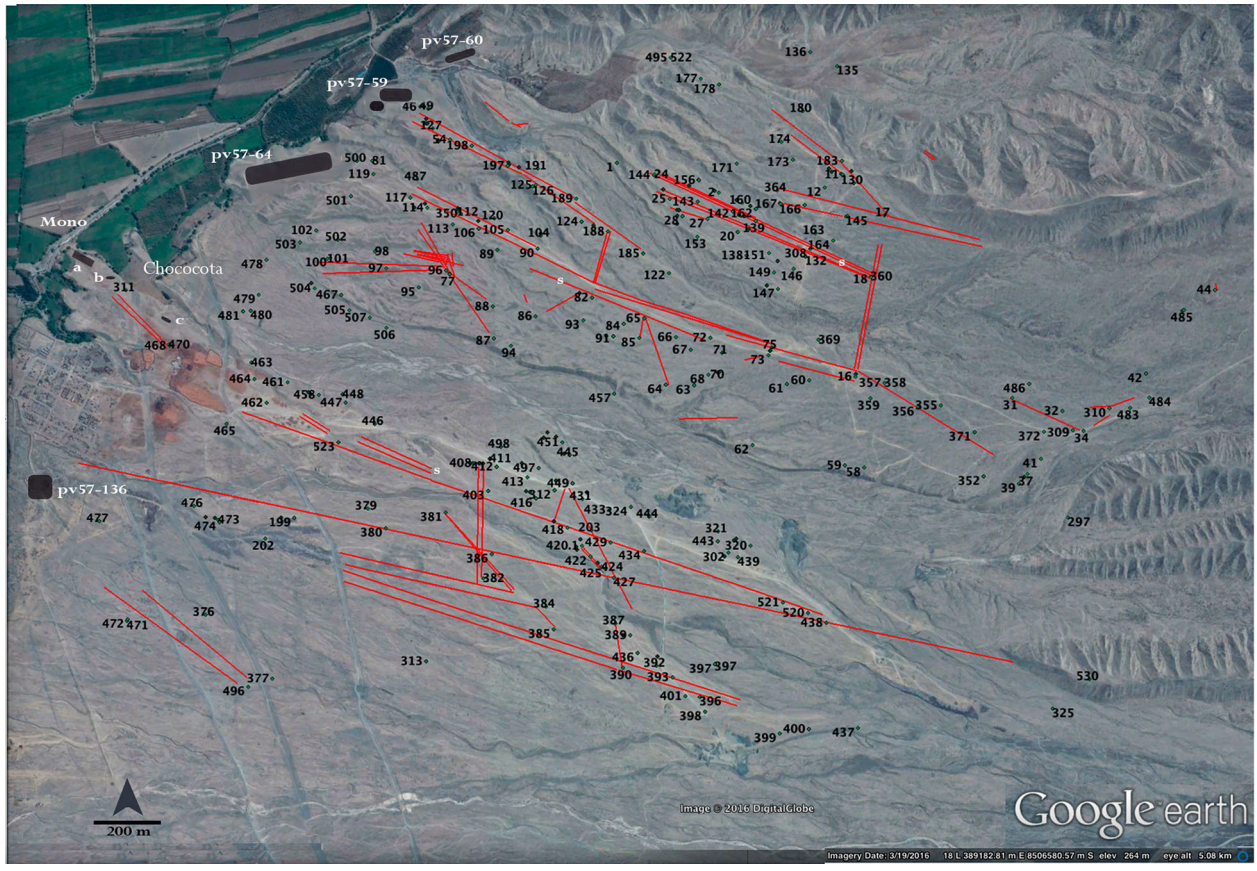

Figure 4. Sites with lines and with projections (source: Charles Stanish).

Another set of lines and associated figural geoglyphs are found in the Tarapacá valley of northern Chile. The glyphs are associated with sites that date to the earliest settled villages called Caserones and Pircas, in what is referred to as the Formative Period. Pircas is located opposite Caserones to the north on the pampa. Pircas structures are characterized by large, round plans reaching up to 12 m in diameter

Table 1. Azimuth and declination of winter (June) solstice from select points and dates in the Chincha lines

Name of Location	*Universal Transverse Mercator (UTM)*	*Year and Time at Winter Solstice*	*Azimuth*	*Altitude of Sun*	*Declination (JNow)*
Cerro del Gentil	387783 E × 8507912 S	333 BCE, 6:27 p.m.	294° 57′	2° 17.8′	23° 36′
Mono A	386523 E × 8507316 S	400 BCE, 6:27 p.m.	294° 50′	2° 5.3′	23° 37′
Mono B	388685 E × 8507209 S	333 BCE, 6:27 p.m.	294° 50′	2° 5.3′	23° 37′
Mono C	386903 E × 8507066 S	400 BCE, 6:27 p.m.	294° 57′	2° 17.7′	23° 36′
Mono D and E	386953 E × 8507026 S	400 BCE, 6:27 p.m.	294° 57′	2° 17.7′	23° 36′
Chococota area	Near 386903 E × 8507066 S	1000 BCE, 6:31 p.m.	294° 11′	0° 20′	23° 23′
Chococota area	Near 386903 E × 8507066 S	AD 100, 6:33 p.m.	294° 37′	0° 53′	23° 40′
Chococota area	Near 386903 E × 8507066 S	AD 2013, 6:33 p.m.	294° 11′	0° 55′	23° 13′

Note: Data derived from field observations and Starry Night Pro, checked against the National Oceanic and Atmospheric Administration (NOAA) Earth System Research Laboratory (ESRL) Solar Position Calculator. The NOAA data are calculated at AD 1. See: https://www.esrl.noaa.gov/gmd/grad/solcalc/azel.html

Figure 5. A view of the Nasca Pampa showing a figural figure in the foreground and linear geoglyphs in the background (source: Charles Stanish).

(Figure 6). Zori (2011: 733) describes these as "circular and linear rock features thought to have been temporary camps occupied by groups moving seasonally through the valley between the highlands and the coast." The pampa in which they are located has lines similar to those of the Nasca–Ica–Palpa areas. While many of the "lines" are in fact modern trails or late-prehistoric or modern agricultural features, a number of these geoglyphs are virtually identical to the lines found in the more famous valleys to the north. There are also geoglyphs throughout the zone around Pircas that include circles, animal figures, and humans. The very large and imposing "El Gigante" (Figure 7), for instance, is located on an isolated hillside in this pampa.

Núñez (1984) excavated some of the large structures at Pircas. These provided three widely separated carbon dates ranging from the middle of the first millennium B.C. to the middle of the first millennium AD The excavations revealed structures with multiple occupation levels and substantial archaeological remains including maize, cotton, camelid coprolites, large baskets, tropical feathers, turbans, wooden objects, paraphernalia, and rugs.

Other geoglyphs are found throughout the central Andean coast. Rosselló (1978, 1997), Rosselló et al. (1985) and Abanto Llaque (2003, 2008), among others, report abundant geoglyphs in the Rimac drainage between 500 and 2,200 masl and located a dozen or so kilometers above Lima. These included over 60 ground drawings, including figures, lines, trapezoids, and circles. Immediately to the north in Chillón, Rodríguez (1999) reports an extensive set of geoglyphs as well. Carlos Zapata Benites (2012) reports on geoglyphs in Huarmey and notes that they are also found in the Zaña valley in the far north. He properly refers to geoglyph making as a widespread prehispanic social practice. They are in

Figure 6. A structure at the site of Pircas in the Tarapacá valley (source: Charles Stanish).

fact common throughout the Andean coast as well as the highlands (Klokoèník et al. 2014; Rodríguez 1997).

Geoglyphs are such fragile artifacts on the landscape it is remarkable that so many survive. We may speculate that the construction and use of geoglyphs was much more common than the fragmentary evidence suggests, and that use of large-scale renderings of the landscape was an integral part of early complex Andean societies. In fact, there is a direct relationship between the "existence" of geoglyphs and undisturbed desert environments with favorable preservation conditions. This observation strongly suggests that, in antiquity, ground drawings were created in areas where conditions were not so favorable, and therefore they did not survive.

Even with the existing examples, we observe that geoglyphs are very common in the ancient Andes. They are found as far south as the conditions permit in the Atacama Desert up into northern Peru. They are also found in isolated instances in the higher Pacific coastal valleys and, in rare instances, geoglyphs are preserved in the Andean highlands. Geoglyph construction was a very widespread and important cultural practice prior to Middle Horizon times. Geoglyphs represent one of the most ubiquitous artifacts in the archaeological record that remain surprisingly understudied, both in the Andes and throughout the ancient world.

Lines and Structure Types

The Chincha lines must be understood as part of this widespread social practice on the southern Peruvian coast. The Chincha geoglyphs are not the oldest, the largest, or most complex of the geoglyph sites in the Andes; however, they are very well preserved. In the case of Chincha, we have been able to document

Figure 7. "El Gigante," a figural geoglyph located on the west side of the Tarapacá valley (source: Charles Stanish).

almost a complete set of lines and sites associated with the center of Paracas architecture and settlement (Tantaleán et al. 2015).

Line Types

The Chincha lines were not created by an extractive technique of scraping the surface and exposing subsurface soils like those in Nasca. Rather, all of the Chincha lines were built with fieldstones in what is known as an additive technique. Having said that, it is most likely that large areas in-between some lines and trapezoids were swept down to the subsurface to expose an underlying white substrate.

There are several kinds of stone lines. The simplest construction is simply a line of fieldstones as seen in Figure 8. In some cases, the lines can be quite wide as seen in Figure 9. Another very common construction technique is to create the illusion of a line with small mounds. Up close, these mounds are merely more or less evenly spaced piles of rocks (Figure 10), or circular piles of smaller rocks that are about 50 cm in height. From a distance, however, the tops of the mounds visually merge and become a "line" (Figure 11). Using these techniques, the builders of the Chincha lines created trapezoids, parallel lines, and single lines, and used these to create a complex ritualized landscape.

Mound and Structure Types

The Chincha line complex includes many small structures interspersed among the geoglyphs (Figure 4).

Figure 8. An example of the additive line construction technique in Chincha (source: Charles Stanish).

We created a typology of these structures, several of which have been reported elsewhere in the Andes.

Type A. These structures are characterized by a low circle of rocks. They are usually only slightly mounded, if at all, indicating an original height of 20 cm or less. A schematic drawing of this type is seen in Figure 12 and an example is seen in Figure 13.

Type B. These structures are composed of a mounded circle that is about 20–50 cm in height. A schematic drawing of this type is seen in Figure 14 and examples from the field are seen in Figures 15 and 16. Type A sites are built directly on the surface while type B sites are intentionally mounded.

Type C. This type is a larger mound with multiple structures. These can be as high as 100 cm and up to 15 m in diameter or length. One of several examples is seen in Figure 17.

Type D. These structures are small mounds, approximately 1 m in diameter. Some look like a basket load of rocks that have been set on the ground. Others, such as the one seen in Figure 10, are composed of larger fieldstones. Small mounds were used primarily to make the "lines" composed of regularly spaced small mounds as described above.

Type E. This type is what we call the split-eye shape (Figures 18 and 19). There are only two cases. In both, the direction of the secant line is oriented to 293° ± 3°.

Type F. These structures are built as a doughnut-shaped circle of rocks with a depression in the

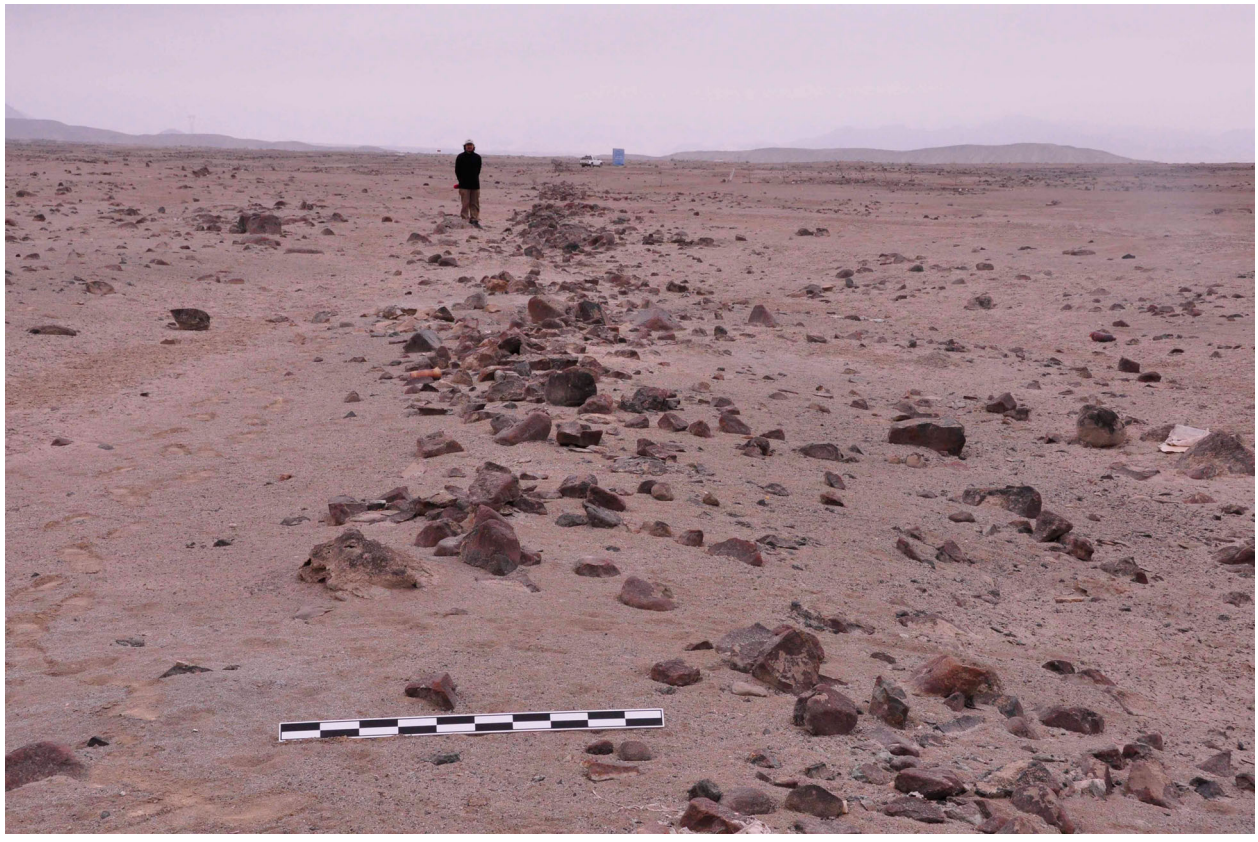

Figure 9. One of the largest lines in Chincha first reported by Dwight Wallace (source: Charles Stanish).

center. They tend to be more than 2 m in diameter, as seen in the example in Figure 20.

Type G. These sites are quite striking as well (Figures 21 and 22). They are very consistent in size, measuring about 2 × 5 m. They have internal walls in the rectangle that are intentionally oriented to slightly different directions. The short axis of the entire structure is always oriented towards the solstice. Several of the examples of this type that we have documented come in pairs about 10–15 m apart. The example in Figure 22 shows how the long axis is oriented to approximately 25°, which means that the short axis is oriented to 293° ± 3°. The structure is therefore built in such a way as to provide a platform for aligning the setting sun in the third week in June. The approximate orientations of the other lines within the structure may or may not be intended as a marker of some point on the landscape, but the short axis orientation of the entire structure is consistently 293° ± 3°. Of the 13 type G structures that we found, all were oriented in the same direction, without exception.

Type H. These sites are rare. They are what we call "arcs" and are seen in Figures 23 and 24. It would make sense to interpret these as some kind of directional marker but we were unable to see any pattern with a small sample.

Type I. We refer to "V-shaped" structures as type I sites (Figure 25). They are small and rare. Like the type H sites, they could be interpreted as directional, but again the sample is too small.

Type J. These sites are also rare (only four had survived in the survey area) but quite distinct

Figure 10. Example of a small mound or type D feature (source: Charles Stanish).

(Figures 26 and 27). They are characterized by an oval shape with a line through the center. There is no consistent pattern to the orientation of the interior line.

Type K. This type is effectively two type B mounds paired with each other (Figure 28). The mounds depicted here are quite large. Other pairs are as small as 1 m in diameter each. Paired mounds mark the beginning point of many linear geoglyphs. In other cases, they are found in the center of a trapezoid and appear to be some kind of viewing area or stop in a structured movement over the landscape.

Comparisons to Other Geoglyph Sites in the Andes

Like Chincha, the geoglyph complex in Palpa has structures in the pampa associated with lines (Reindel et al. 2006b). The minor structures in Chincha, however, are generally smaller than those discovered in Palpa. Palpa is similar to Chincha in that the landscape is a mix of largely geometric lines and trapezoids with small structures interspersed. Some mounded sites in the Tarapacá pampa in northern Chile are very similar to those in Chincha as well (Figure 29). On the other hand, the Pircas structures in Tarapacá are different from either Palpa or Chincha in that they are not generally interspersed in lines and they are substantially larger (Figure 6). Reindel et al. (2006a: 186) report on excavations of several of these structures in Palpa. Two types of structures dominate the landscape: elongated structures and quadrangular ones. A third type is composed of round, mounded structures. These latter structures are virtually identical to the Chincha ones. A fourth type is rectangular or circular; the investigators believe these were for personal use during the construction of the lines.

Figure 11. Aligned small mounds from a distance. Note how the perspective creates the illusion of a line in the background (source: Charles Stanish).

Like the Chincha structures, almost all are made of fieldstones, possibly from those collected during the cleaning of the pampa to construct the geoglyphs. At least one structure had river cobbles incorporated into its walls. Like Chincha, the structures in the Palpa pampas are architecturally and spatially associated with the geometric geoglyphs. That is, it is not a random placement but rather the structures are placed at the narrow ends of trapezoids, along areas of high visibility, and so forth. In one case—geoglyph 52—two structures were placed at either end of this trapezoid. It is almost beyond question that the structures and the lines in any particular section functioned as a single architectural unit on the landscape. The paired structures shown in Figure 5 in Reindel et al. (2006a: 188) are identical to the type K structures in Chincha. This Palpa pair likewise was built at the end/beginning of a major trapezoid geoglyph.

Excavations in one of the Palpa structures found domestic waste from what appears to be an early Nasca household. In another one of the structures associated with geoglyph 52, the investigators found the remains of wooden posts, adobe bricks, and a variety of artifacts. These included malachite, maize, spondylus, cuy remains, Nasca pottery fragments, and other objects most probably interpreted as offerings.

We did not excavate any of the small sites in the Chincha pampa. Quite a few had been looted and we did not find any artifacts; however, the Pircas structures had virtually no objects on the surface even though they also had been looted. Núñez (1984) excavated structures in Pircas and indeed encountered substantial quantities of objects, many of them rare and exotic to the region. This leaves open the possibility that the Chincha structures also had remains but we are not at this time able to evaluate this proposition.

Figure 12. A schematic example of a type A structure (source: Charles Stanish).

The line and associated structure described by Pimentel (2009: Figure 22) in the Río Loa of northern Chile are very similar to those found in Chincha. Likewise, the "oquedades" depicted in Pimentel's article (2009: Figure 5) for highland sites in eastern Chile near Machuca are similar to the type F sites in Chincha. Pimentel describes these features as part of a complex of ceremonial sites located along trade routes. He refers to them as places where rituals were performed exclusively by travelers. They are not necessarily associated with linear geoglyphs, but their function as a place of performing *challas* or *pagos* is similar. In some respects, the Chincha structures can be viewed as an extension of this concept, but packed together in a high-density location at the end of a long trade route. Likewise, Daniela (2004: Figure 7) illustrates a structure with an arc form similar to the type H described above. In this case, the structure does not appear to have a line through the center of the arc, but in other respects it is similar. In short, we know of at least three places on the Andean coast—Chincha, Palpa, and Tarapacá—where geoglyphs and structures were created as an integrated complex and used by pre-Middle Horizon populations.

Large Sites in the Chincha Geoglyph Complex

The Large Mound Complex at Chococota

A number of larger mounds are part of the Chincha line complex. All of these are situated at the far

Figure 13. An example of a type A feature (source: Charles Stanish).

western edge of the Carmen Pampa, immediately above the large canals that feed the fields below. One of the most significant of these mound groups is located in the Chococota area. It is also known as the "El Mono," as seen in Figure 30. (According to local lore and to Luis Lumbreras, the area was named this after a resident years ago who owned a monkey.) This site area is listed as mound group PV57–63 by

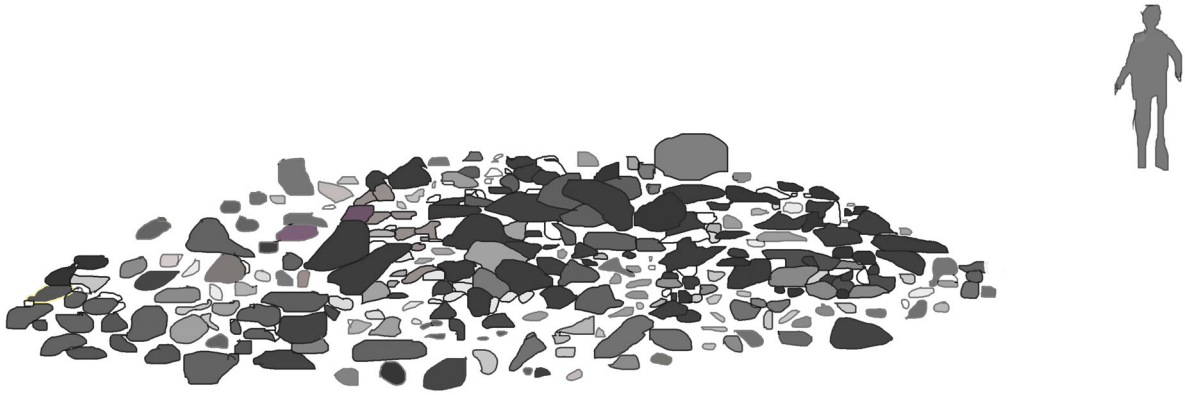

Figure 14. A schematic example of a type B mounded structure (source: Charles Stanish).

Figure 15. An example of a type B mounded structure (source: Charles Stanish).

Wallace (1991) and INDEA and is composed of five mounds (A–E). It is architecturally and spatially integrated into the linear geoglyph complex.

Mono A. Mono A is a large platform mound that has been substantially destroyed by agricultural and construction activity. Mono A measures ~30 × 100 m with a height of at least 6 m. It has a triple platform/sunken patio construction similar to other Paracas-period platform mounds in Chincha. Unlike these other mounds, which are cardinally oriented on an east–west axis (Canziani 2015), Mono A is aligned 293° ± 2°. The long axis of the mound matches the azimuth position of the sunset during the June solstice (Table 1). The disturbed areas of the mound expose several large cross-sections (Stanish et al. 2014). It is principally a Paracas construction with a later post-Middle Horizon occupation at the top. Carbon dates taken from these exposures confirm the Paracas date for this site (see Stanish et al. 2014: Table 1). The section of the mound that we sampled was built in one short time period ca. 410 and 365 BCE. Intermixed in the fill were some sparse amounts of midden but there was no evidence of intentional offerings.

Mono B. The mound of Mono B is an irregular structure with a U-shaped wall facing west and an addition on the east side. The arms of the "U" are precisely oriented to the June solstice. Figure 31 shows the sunset on June 20, 2012, with the cones on the surface demarcating the precise alignment of the arms of the mound. Like the other mounds in the area, Mono B was built with fill in what was almost certainly a single episode. The mound was built later than Mono A or C. Carbon dates indicate that it was constructed in a single episode sometime between 360 and 210 BCE (≥.95 probability).

Figure 16. A type B mounded structure from the Tarapacá valley, Iquique, Chile (source: Charles Stanish).

Mono C. The platform mound of Mono C is approximately 22 × 36 m with the long axis oriented at 280° ± 2° (Figure 32). All visible walls on the surface and in excavation units, in contrast, are oriented along 295° ± 2°. Previous excavations in a sunken court at the summit of Mono C by Isla (1992) uncovered Paracas materials of the Pinta substyle. Pinta is contemporary with Ocucaje 8. We excavated the outside southwest corner of the mound, near an intact visible wall. The results were consistent with Isla's. The data indicate with a high probability (≥.92) that the mound was built in one construction episode between 410 and 355 BCE, making it virtually identical in time to Mono A and earlier than Mono B.

Mono D. Mono D (referred to as Mono C2 by E. Isla) is an irregular-shaped mound measuring about 23 × 30 m at its base (Figure 30). It contains a long, rectangular structure that is oriented along 295° ± 2° (Table 1). Connected to this rectangular mound is a U-shaped section, facing the same orientation. We did not excavate this structure at the request of the landowner.

Mono E. Mono E (referred to as Mono C3 by E. Isla) is a rectangular mound measuring approximately 12 × 20 m (Figure 30). The long axis of the structure is oriented at 280°. All visible walls on the surface are oriented at approximately 295° ± 2° (Table 1). We did not excavate this structure at the request of the local landowner.

Other Large Sites in the Western Carmen Pampa

The Chincha line complex is composed of geoglyphs, small structures, the Chococota mounds, four

Figure 17. An example of a type C structure (source: Charles Stanish).

additional large platform mounds, and large habitation sites (Figure 4). Cerro del Gentil (PV57–59) is a large Paracas platform mound and constitutes one of the major sites associated with the Chincha geoglyph complex. We have published aspects of this site in Stanish et al. (2014), Tantaleán et al. (2016), Tantaleán and Stanish (2017), and Pérez et al. (2015). We have made available several unpublished reports (Stanish and Tantaleán 2014, 2015). In this body of work, we defined three phases that range in date from approximately 500–200 BCE, with a later Topará-period use of the sunken court area. Our excavations uncovered a very rich set of offerings in one of the sunken courts. There was a vast array of fine objects including baskets, textiles, engraved gourds, pottery, and other rare objects. Several mummies were also deposited in the court as well as food remains, wooden objects, feathers, and so forth. It is clear that Cerro del Gentil was a major focus of ritual, feasting, and intense social interaction during the late Paracas period.

Velarde (2006) excavated the large habitation site of Pampa del Gentil (PV57–64), located a few hundred meters to the south on the ridge above the pampa. The site is about 100 × 350 m in size, making it the largest one on the pampa. It was described by Wallace (1971: 50) and later by Canziani (2015) as being built on an orthogonal plane through accretion, not by planning. There is no evidence of monumental architecture except for a possible elevated platform mound in the center of the site. This mound was badly damaged. The bulk of the site is a very large village that dates to Paracas Cavernas and later periods (Canziani 2015; Velarde 2006). As Canziani says, the majority of the structures are late and include Chincha and Topará materials. As a result, we do not know the extent of the earlier Paracas occupation.

Figure 18. An example of a type E site (source: Charles Stanish).

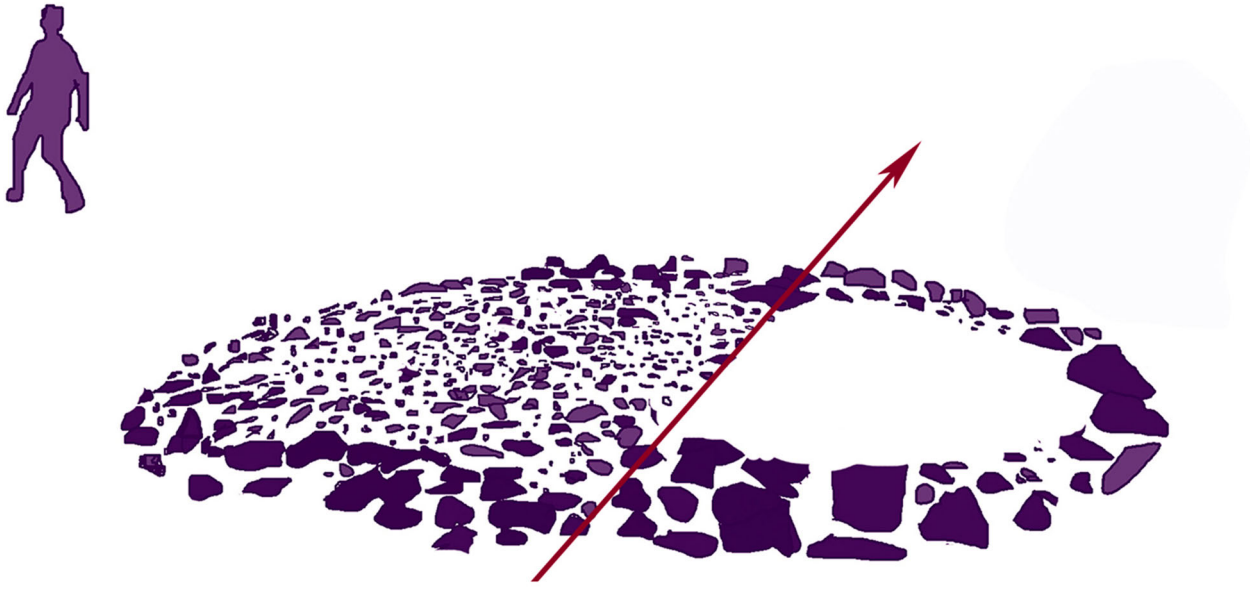

Figure 19. A schematic example of a type E structure (source: Charles Stanish).

Figure 20. A schematic example of a type F structure (source: Charles Stanish).

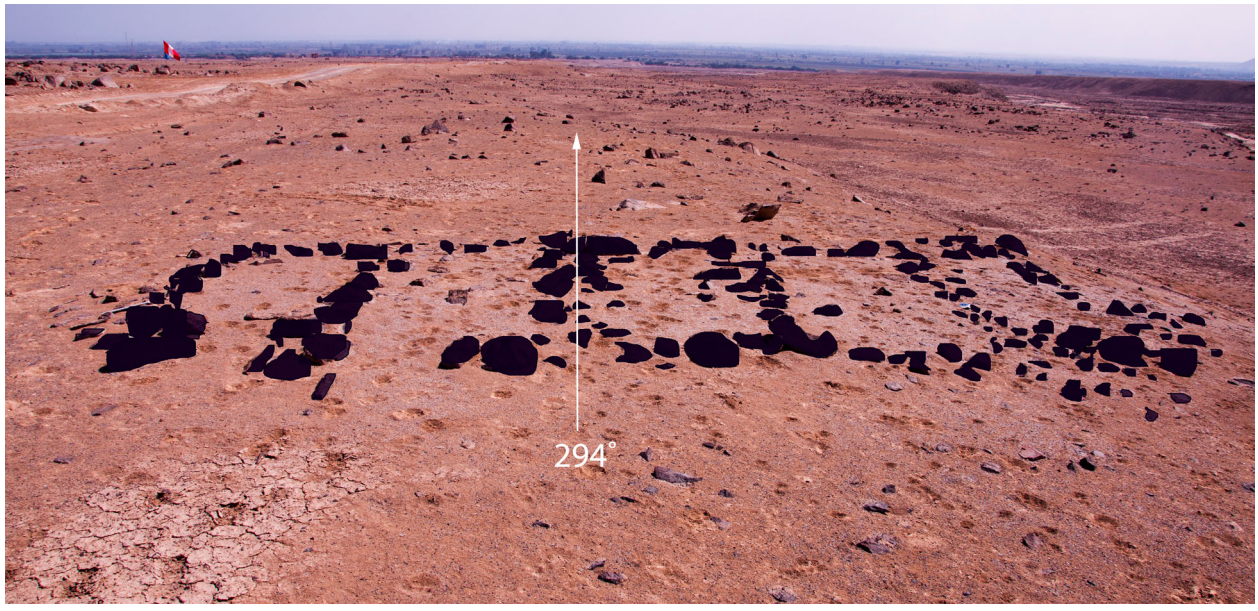

Figure 21. An example of a type G structure with the center alignment marked as 294°. At an altitude of 1.5° the declination of the sunset on June 21 in 333 BCE was 23.4° (source: Charles Stanish).

Figure 22. A schematic example of a type G structure (source: Charles Stanish).

The INDEA project registered a site numbered PV-59-136, located in the southern-most part of the Pampa. The site area has now been covered by debris from the 2007 earthquake and has been torn up by later construction of a new *pueblo joven*. We could not find any evidence of the site with the exception of a few walls with shaped stone blocks. INDEA listed this as a Formative Period habitation site, distinguished from other sites called "pyramid mounds," "mounds," and "cemeteries." The site of Pampa del Gentil is listed as a habitation site so it is safe to say that site 136 was likely similar.

The site of PV59–60 is located across a quebrada north of Cerro del Gentil. It was described by Wallace (1971) as a Paracas and possibly later site.

Figure 23. An example of a type H structure (source: Charles Stanish).

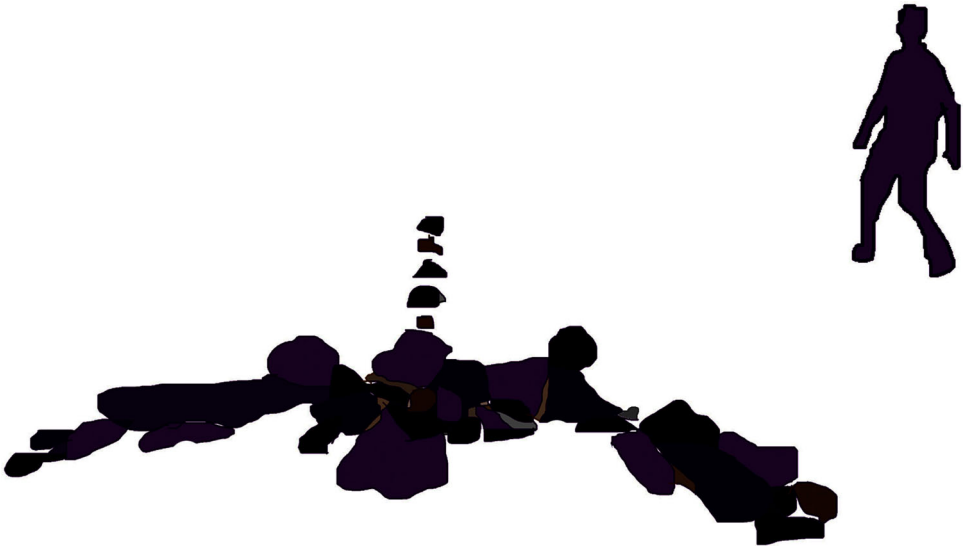

Figure 24. A schematic example of a type H structure (source: Charles Stanish).

We discovered that the site has Late Paracas diagnostics on the surface. Likewise, later Paracas materials were discovered in the eroding, disturbed middens. There is a small sunken court on the hillside that has been converted into a water tank for industrial agriculture in the valley below.

Lines as Framing Devices

In Chincha, at least, some of the trapezoidal or parallel lines were used to frame objects in the distance. It is important to realize that the Paracas people who constructed the lines used a form of perspective to create a certain visual effect. The concept is simple but very effective. When viewed from the air, two parallel lines are indeed parallel; however, when viewed from the ground, two parallel lines converge. Likewise, a trapezoid at ground level will, from the narrow end, appear to be a pair of parallel lines. Figure 33 depicts how two roughly parallel lines were used to frame a point of interest. From the ground, the two lines precisely frame the platform mound of Cerro del Gentil, or PV57–59, as a focal point on the distant horizon. It is curious that these geoglyphs were constructed on what today is a major road from the highlands. It is likely that the intent of this line set was to direct the person coming from the east towards the principal structure of Cerro del Gentil. We also noticed that, when the platform mound was cleared of the first few centimeters of surface soil, the base was white. If the entire platform was either made of cleaned adobe or was painted in a bright color, it would stand out very clearly as the end point of the parallel lines. The effect in fact was visually striking, particularly in the early morning and in the late evening as the sun was setting.

This same technique was used in several other places in the Chincha line complex. Slightly trapezoidal pairs of lines mark the sunken courts in Mono A and Cerro del Gentil from other directions. Lines also frame the site of Pampa de Gentil. It is important to note that, in the case of parallel or trapezoidal lines, it is necessary to measure the center of where they converge to determine what the "alignment" is. In this sense, the alignment refers not to the lines themselves but to the spot on the landscape that the architects intended to be the focal point. If, for instance, you find one line at 290° and its pair at 300°, the actual focal point is 295°. Assessing each line separately could obscure the intent of the geoglyph when it was built. This principle is illustrated in Figure 8 where the lines converge on a point in the landscape that marked the solstice.

Figure 25. A schematic example of a type I structure (source: Charles Stanish).

Solstice Marking

There are a number of lines, buildings, and walls within small structures that have alignments of 295° ± 3°. This aligns with the June solstice today and in the past. Throughout the first millennium BCE and into the first millennium AD, the azimuth and declination of the June solstice has not changed to any degree visible to the naked eye. Table 1 shows the data for the sun during the solstice sunset from 1000 BCE to AD 2013 in the Chococota area. There has been no significant change in this location from the perspective of an observer on the ground. We used an approximate 2° altitude to capture the view of the setting sun relative to the hill or mound features. All solstice observations were confirmed in the field from 2012 to 2015 on June 21.

Mono mound B is the most complex solstice marker and has been described above. At Mono B, based upon the distance and angles of the sunset, people would have been no more than 30 m away from the structure. Likewise, the large area in front of the elevated area would have accommodated many dozens of people or more. A number of other structures have prominent walls that mark the June solstice. It is significant that there is one and only one line set in three of the line clusters that are oriented 295° ± 2° (marked "s" on Figure 4). The fourth set in the south was too disturbed to determine.

All 13 G-shaped structures are oriented in the same direction at the June solstice. This is

Figure 26. An example of a type J structure (source: Charles Stanish).

obviously a non-random pattern. In the case of other types, the orientations show no pattern and are most likely random. It is therefore highly unlikely that the numerous features in the Chincha pampa that mark the June solstice are due to chance. Certainly, the construction of a platform mound with a U-shaped western side that perfectly frames the June solstice constitutes strong support for this interpretation, as does the construction of at least 13 rectangular mounds that also obliquely face the same declination.

Figure 27. A schematic example of a type J structure (source: Charles Stanish).

The issue of astronomical alignments in Andean archaeology is highly contentious. Maria Reiche (1968) and Paul Kosok's elaborate theories of Nasca astronomy have not been corroborated by subsequent research. We did not find any complex calendrical system in the Chincha Pampa, nor is there anything more complicated than merely marking a period of time for fairs or other kinds of regional social events. We agree with Helaine Silverman and Donald Proulx's general conclusions in this regard:

Figure 28. A schematic example of a type K structure (source: Charles Stanish).

Figure 29. A mounded site in the Tarapacá valley, Iquique, Chile (source: Charles Stanish).

Figure 30. The Chococota or El Mono site area with Universal Transverse Mercator (UTM) location data (source: Charles Stanish).

> The astronomical theory states that the Pampa geoglyphs graphically recorded an astronomical calendar necessary to the functioning of the seasonal agricultural economy of the ancient people. This calendar is said to be composed of sight lines marking the position of the sun at the solstices and equinoxes, the appearance and disappearance of important stars, and constellations such as the Pleiades; the figures would correspond to the constellations. The astronomical theory has been effectively debunked by astronomers Gerald Hawkins (1969) and Anthony Aveni (1990a, 1990b). Basically, an alignment between a celestial object and a ground marking is statistically insignificant because countless stars are visible in the clear night sky at Nazca. (Silverman and Proulx 2002: 166)

One source of confusion, we believe, rests on the level of precision suggested by these alignments. We argue that the solstice markers were used merely for "time marking" for festivals or other events. They were not used for precise calendrical calculations nor for recording constellations or other phenomena. This is much more like the case of the Inca towers that bracketed a period of time during the solstices in Cuzco and the Island of the Sun in Lake Titicaca (Stanish 2010; Stanish and Bauer 2007). The entire pampa and associated geoglyphs constituted a ritualized landscape on which festivals/fairs were held during the year. Given what we know from historical and ethnographic data, such periodic barter fairs lasted for several weeks. A level of precision of even a few days was all that was necessary for these to be effective means of organizing large gatherings of people from a number of different regions. This

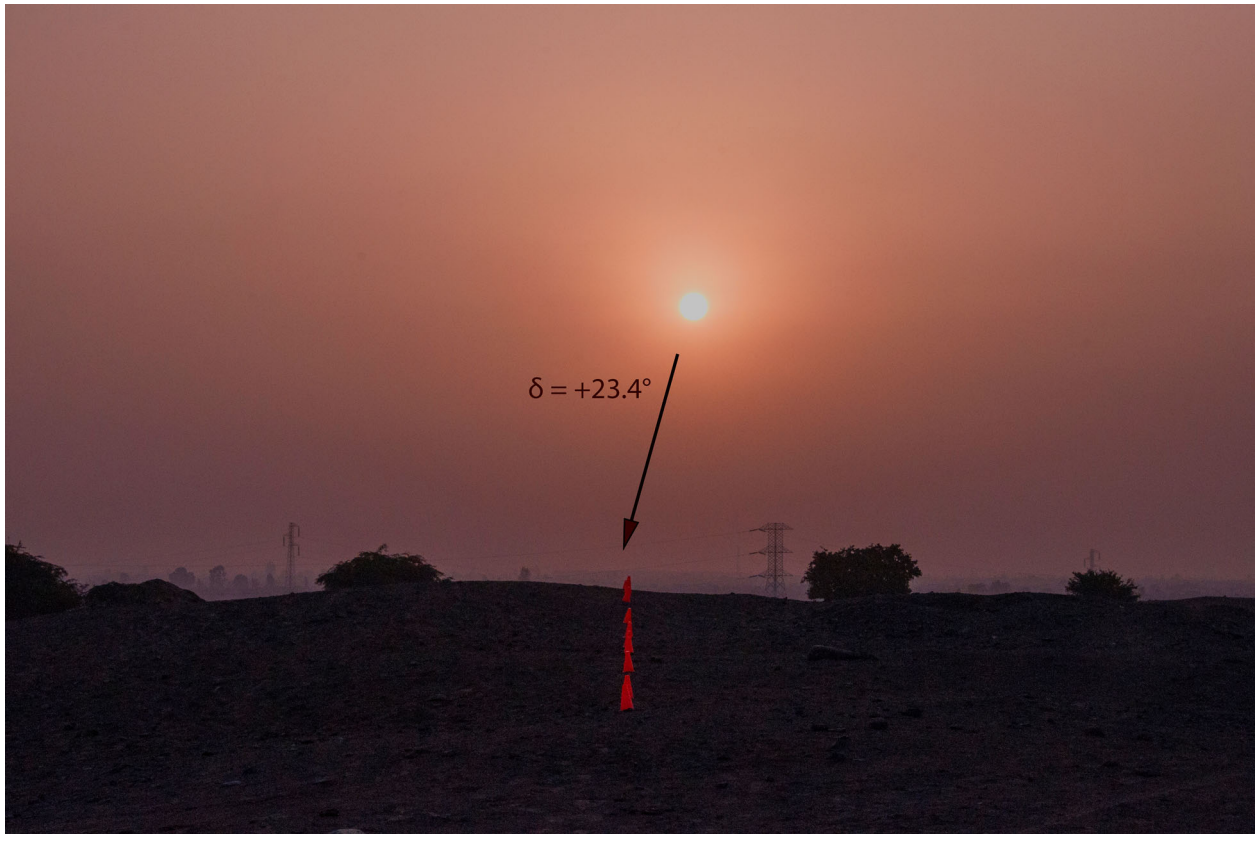

Figure 31. June solstice over the site of Mono B in the Chococota area. The orange cones mark the center and orientation of the U-shaped, western-facing walls. The declination is calculated at 333 BCE (source: Charles Stanish).

phenomenon is seen around the world at sites like Poverty Point, Caral, Chankillo, Stonehenge, earlier henge monuments, and the like (Stanish 2017). The use of solstices as a time marker is a characteristic of non-state regional centers in prehistory for probably no other reason than that it was an extremely convenient marker of the year.

Discussion

In 2011, when we first reconnoitered the pampa, the lines were in excellent shape, except for some disturbed sections. In 2012 and later, we had to race to collect as much information as possible while line segments and small mounds were being destroyed even as we watched. We were able to get the Global Positioning System (GPS) measurements of a number of the line segments. From these fragmentary measurements, we mapped the distribution of many of the Chincha line segments. It is unfortunate that we were not able to map all of the features in the line complex. The earthquake of 2007 caused substantial damage in the far-southwest zone of the pampa where the site of 136 was recorded by INDEA in the 1980s. The municipality transported the building collapse materials to a section on the southwestern side of the line complex. Likewise, a small *pueblo joven* was founded in the 2000s and rapidly expanded in the area after 2012, coincident with the construction of *granjas* to the south. Work began on the installation of large electric power transmission lines and towers in 2012. The towers themselves did not disturb many sites, but the construction equipment that drove over the pampa damaged many of the surface features.

Figure 32. Site of Mono C; view from the east (source: Charles Stanish).

We believe that our reconstruction incorporates the vast bulk of the Carmen Pampa, with the exception of the southwestern side near the site of PV57–136. Figure 4 depicts our reconstruction of the minimal original extent of the lines based upon analysis of earlier satellite photographs and traces on the ground that we documented in 2012–2014. As can be seen, the lines converge on the five Paracas sites in the pampa. If one considers the two sites of Cerro del Gentil—PV57–59 and PV57–60—as a single complex, then there are four sets of lines that converge on four separate site areas. Some of the lines are large and made with a continuous set of rocks. Others were built with the small mound technique. The majority of the geoglyphs are geometric. There is a handful of geoglyphs that appear to depict something other than a geometric shape, but it is impossible to determine what they represent, if they represent anything at all. These were also built with an additive technique, using fieldstones from around the area.

We believe that the conclusion reached by Reindel et al. (2006a: 179) for the Palpa lines also applies to the Chincha ones: "the slopes and plateaus formed part of an active social landscape, where geoglyphs became the scenario for important festive and religious activities." In the case of the Chincha lines, we would add that the focus of these activities was both the lines and large platform mounds, with the latter serving as the end point of these ceremonies. We likewise agree with Briones et al. (2005) that geoglyphs are connected with llama caravaners in the Paracas period. It is noteworthy that we discovered offerings of camelids in the Cerro del Gentil court.

In this light, we have presented very strong evidence that many of the lines discovered in Chincha were visually and physically integrated with specific settlements. This is not unknown in the region and we

Figure 33. Trapezoidal lines used to frame the site of Cerro del Gentil (source: Charles Stanish).

see parallels with other areas already studied. Grün et al. (2003: 164) report that, in Palpa: "geoglyphs formed an integrated part of these settlements." In another report we see that "at Los Molinos … four out of five trapezoids converge on an open area about 250 from the settlement" (Reindel and Isla 2001: 245–247). Silverman (1990) suggests that one large line connected Cahuachi with the large site of Ventilla in Ingenio. Masini et al. (2016: 268) describe lines and trapezoids converging on major structures in Cahuachi. Silverman (1993: Figure 22.2), in fact, first reported that these lines point directly to the major architectural features of Cahuachi. This pattern is very similar to that seen in Chincha.

Aveni (1990c: 83) argues that the "ray centers" were homologous to the *ceque* system of the Inca. In this case, linear geoglyphs either converged on, or radiated out from (depending on your perspective), a landscape feature such as a hill. Silverman (1994: 13) likewise argues that lines marked pilgrimages to and from Cahuachi and the socio-religious territory of social groups. This latter observation would be consistent with the Chincha case where lines and sites created an integrated landscape. The use of these lines is therefore consistent with Vaughn's (2006: 313) model, whereby production, exchange, and "materialized ideologies" were significant factors in the development of political power in the Andes, and fits well with Van Gijseghem and Vaughn's (2008: 117) characterization of the "Nasca lines as a form of technology of social integration" coincident with the rise of Cahuachi as a regional center (also see Kantner and Vaughn 2012). The Chincha lines are also consistent with the model proposed by Núñez (1976) as a component of extensive trade routes, but, in this case, the sites in the Carmen Pampa are the end point of these caravans.

In short, the data from Chincha indicate that lines were integrated into a much larger landscape, created to host a series of complex social events for large numbers of people who came from places outside of the Carmen area. The strong emphasis on solstice marking suggests that this phenomenon was a useful device to time these events. A survey of many

premodern cultures in history and early ethnography reveals that most peoples in stateless societies marked time with a number of techniques (Stanish 2017: 263–264). These time-marking phenomena were not intended to be precise calendrical devices, instead they were more rough-grained ways to mark significant events over a large area. (The solstice azimuth is virtually identical up and down the Andes, making it an ideal way to mark seasonal events over a very large area.)

Combined with theoretical insights from other Andean scholars, the strongest interpretation that we can offer is that the Chincha line complex was designed to host periodic feasts and barter fairs during the later Paracas periods (Stanish and Coben 2013). We suggest that the large habitation and pyramid or platform centers, such as Huaca Partida, Huaca Santa Rosa, Huaca Soto, and Huaca La Cumbe in the coastal plain of Chincha, built the geoglyph complex to attract people from around the region to these periodic festivals. As such, the Chincha line complex, like others along the Andean coast, is most profitably viewed as part of the elaborate strategies of alliance-building, intensive exchange, and political formation in Paracas culture at the end of the first millennium BCE.

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