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8. Results and conclusions

Summarizing the main topics treated in the previous sections, the present study has allowed us

- to accurately document and analyze a large body of hitherto neglected geoglyphs using up-to-date geomatic technologies in combination with archaeological fieldwork
- to clarify in detail which kinds of human activity related to the geoglyphs can be inferred from the archaeological record
- to assess the coherence and plausibility of the Andean model to explain the geoglyphs in their cultural and historic context.

In this concluding section some important results of the present study are highlighted that complement the discussion and interpretation in the preceding section. This refers to the cultural-historic development of the geoglyphs, and to our present perception of them. Furthermore, the methodology applied to study the geoglyphs, in many regards a new contribution to Nasca archaeology, is critically reviewed in order to identify starting points for future research both within the Nasca-Palpa Project as well as in follow-up projects.

8.1 THE PALPA GEOGLYPHS IN THE PREHISTORY OF THE NASCA BASIN

The Andean model as described in section 3.2 provides a solid framework for an understanding and explanation of the geoglyphs. According to this model, the Palpa geoglyphs were an important aspect of society and culture from the late Early Horizon to the early Middle Horizon. A marked landscape imbued with cultural meaning was created throughout this time period. The landscape markings integrated vast stretches of the desert into the cultural domain of the valley-based society, and opened up stages for activity involving large parts of the population. Social groups acted and interacted on geoglyph sites, thereby defining, demonstrating, or claiming their status within a wider social context. The near constant presence of people along with

construction and other activity meant that the geoglyph landscape was very vibrant and dynamic. Construction and use of geoglyphs was highly interwoven and significant in itself. Activity on geoglyphs, which may be termed ritual, was concerned with water availability and fertility in the valleys. The scale and stability of the geoglyph phenomenon through time indicates that they were important manifestations of world view and basic cultural concepts. Change through time is observable, but it was gradual in character and showed no major disruptions unlike the settlement pattern in the valleys. While the first geoglyphs were mainly made for viewing them, activity upon geoglyphs became more important through time and reached its peak during the Early Nasca period. Later, it became less frequent and varied, until during the early Middle Horizon the last vessels were placed on trapezoid borders.

Throughout their use, and in spite of some variation, the geoglyphs were a relatively stable element in Nasca culture that proved more long-lived than political organization. Geoglyphs may therefore best be understood literally as common ground for people making, using, and perceiving them in spite of changing socioeconomic, political, or even climatic conditions. Nevertheless, some variation occurred, and a closer look at the origin, development, and end of the geoglyphs helps to give an understanding of their cultural significance through time.

The starting point of the Palpa geoglyph tradition is apparently to be found in the petroglyph tradition of the Paracas period. During the Early Horizon, petroglyphs were carved on rock faces as well as large boulders on hillsides. The best known site is Chichictara, 11 km upstream from Palpa, with more than 200 petroglyphs (Hostnig 2003: 169; Orefici/Drusini 2003: 26 ff). However, petroglyphs can be found in the lower parts of the valleys as well. Isolated large boulders on hillsides and plateaus were often carved with petroglyphs. Among the motifs are biomorphic depictions (anthropomorphic and zoomorphic figures) with clear parallels in embroidered Paracas textiles and, less common,

geometric motifs (e. g. circles) similar to certain decorations on Ocucaje pottery. Clearly, during the Early Horizon petroglyphs were part of an iconographic repertoire applied to a variety of media.

A part of this repertoire, namely anthropomorphic figures, were at some point transferred from rocks on hillsides to a new medium – the surrounding desert surface. Just when this happened for the first time is as yet unknown because of a scarcity of associated finds that would allow cross-dating. A conservative estimate places the dating of this event around 400 B. C. during the late Early Horizon, although a much earlier date cannot be ruled out. Current investigations into Paracas and earlier (Initial Period) remains in the Palpa region directed by Markus Reindel and Johny Isla using the new high resolution OSL dating method are hoped to shed more light onto the beginning of the geoglyph phenomenon.

Whatever the exact date, the first geoglyphs remained very similar to petroglyphs with regard to their location, motif, and probable function. They were not suitable for walking, and the placement of ceramic vessels and other objects upon or near them was apparently not a part of their function. Rather, just like petroglyphs they were placed in locations such that they could be seen and perceived in their entirety from certain points in the terrain (not necessarily close-by). Contrary to later trapezoids there is no evidence that these early (mostly anthropomorphic) geoglyphs were ever left unfinished. Thus, their primary function was apparently to be seen, and to convey a message to their observers.

In spite of this initial continuity, the geoglyphs soon developed from an existing iconographic repertoire into an independent, versatile and powerful means of expressing cultural concepts. The possibilities offered by the new medium – large stretches of easily removable desert pavement – fostered this new development, although this was probably not the prime mover. New motifs and, even more important, different functions associated with the geoglyphs emerged and determined the geoglyph phenomenon throughout most of Nasca history.

Geometric geoglyphs like straight lines and small trapezoids were the first new motifs to be drawn on hillsides. The techniques necessary to draw these shapes on the surface, namely minimally carved lines and cleared areas, had already been employed earlier to render anthropomorphic figures. However, it was only when these

new motifs were transferred to flat terrain – *i. e.* the plateaus above the valleys – that people began to walk upon them on a regular basis, and a new set of activities associated with geoglyphs developed. This included for the first time the construction of stone structures as well. It is this complex of interconnected geoglyph related activities (geoglyph construction and remodeling, walking on geoglyphs, placement of offerings, food consumption) that left clear traces in the archaeological record of the Nasca basin and which the Andean model is tailored to explain.

Initial Nasca and then most notably Early Nasca were the periods when the geoglyph phenomenon flourished and reached its apogee in terms of quantity and variety. This development coincided with a demographic peak at least in the Palpa region. It also coincided with the heyday of minor centers like Los Molinos (Reindel/Isla 2001) and, on a regional level, of Cahuachi (Silverman 1993a). By this time the geoglyphs had become an important symbol of what Silverman calls “Nasca-ness” (Silverman 2002b: 122), and large efforts went into their construction and use.

The emergence of activity taking place on geoglyphs included the placing of objects that mirror a concern with water and fertility such as ceramic vessels containing food, field crops, crawfishes, and *Spondylus* shells. These concepts remained an important aspect of geoglyph related activity throughout the remainder of the Palpa geoglyph history. Recent paleoclimatic studies in the Nasca-Palpa region (Eitel et al. 2005) indicate that during the Nasca period, and especially in the 5th to 7th centuries AD, the climate became drier over time, and the eastern margin of the desert shifted slowly up-valley. These changing environmental conditions clearly influenced, and probably motivated certain geoglyph related activities.

Nevertheless, this is not to say that everything that happened on geoglyph sites can be understood solely within the framework of a fertility cult. Such a monocausal explanation would certainly underrate the social dimension of the geoglyphs. Throughout most of their history, the geoglyphs seem to have provided a spatial framework for negotiating and symbolizing the status of certain social groups within a changing sociopolitical system. How this happened in detail, and how groups were defined cannot be assessed on the basis of evidence from the geoglyphs alone. In any case, geoglyphs were most probably no less important for social processes within Nasca and earlier

societies than for responses of these societies to influences from outside like changing environmental conditions.

After its Early Nasca peak, Palpa geoglyph history entered into a slow and gradual decline. During Middle and Late Nasca times the variety of newly constructed geoglyphs was reduced little-by-little. Apparently, there was a need for standardization, and no new types were added to the existing repertoire. For the first time, certain geoglyph fields on Cresta de Sacramento and Cerro Carapo were abandoned, and new ones were not added. However, it has to be stressed that the principal characteristics of geoglyph construction, use, and social function remained intact until the Nasca/Wari transition. Important geoglyph sites from the Early Nasca period continued in use, new geoglyphs were still being added and existing ones altered and enlarged, and trapezoids were made even larger than previously. Unfortunately, geoglyph dating is so far not fine-grained enough to study this long process in detail. As for now, a constant but slow decline seems most likely.

There is no easy explanation for the end of the geoglyph phenomenon. It is still poorly understood what occurred when the social formation called today the Nasca culture came to an end. The Wari intrusion, whatever its nature, is archaeologically marked by changing settlement and burial patterns, a lower population density, and new ceramic styles (Silverman/Proulx 2002: chapter 11; Isla 2001b). It has been suggested that these changes were induced by an exchange of population (Schreiber 2001). Environmental change, specifically an increase in desertification, seems to have contributed as well to late Nasca societal stress (Eitel et al. 2005). In Palpa, there was a clear break in geoglyph related activity at some point at the beginning of the Middle Horizon, probably around the 7th or 8th century AD. Geoglyph use continued on a small scale into the Middle Horizon before it ceased altogether. Ceramic vessels (now in the new style) were still being placed on trapezoid borders at least during the early Middle Horizon. However, there is no indication that any new geoglyphs were still being constructed by that time, and Middle Horizon ceramics on geoglyphs are much fewer in number than earlier ceramics. Apparently, some parts of the population continued with the ancient traditions for a time but could not perpetuate them so they were lost. Settlements from the Late Intermediate Period were placed on geoglyph fields of the plateaus of Cresta de Sacramento and Cerro

Carapo, thus using them for totally different purposes. That these settlements obliterated and destroyed the ancient geoglyphs is a clear sign that already in pre-Inca times the geoglyphs were no longer valued or understood.

8.2 GEOGLYPH PERCEPTION AND UNDERSTANDING

Geoglyph construction and use during more than 1,000 years has changed the landscape in the Nasca basin on a large scale and forever. Large stretches of the desert were converted into cultural space. Yet this enormous and impressive work bears in itself the reasons why it is often misunderstood.

In order to understand the meaning that the geoglyphs had during the Nasca period a change of perspective is required. Our current perception is shaped by an aerial perspective. Tourists as well as scholars usually see the geoglyphs from above, and photos taken from an airplane are the dominant means of illustration in the literature. This modern perspective, however, is misleading since it disguises important aspects of the geoglyph phenomenon:

- Aerial photographs show even very large geoglyphs (*e. g.* trapezoids on the Nasca *pampa*) in their entirety, allowing a complete overview of the geoglyphs and their context. Such a view was not possible in Nasca times. Most lines and trapezoids on flat terrain were only partially visible from a ground perspective. Though the limited repertoire of basic forms and distinguishing constructional features allowed recognition of the overall shape of a geoglyph even on the basis of certain elements (*e. g.* parallel heaped borders), the entire form was usually not visually perceivable.
- Furthermore, what we see today on the desert surface is the static final result of many centuries of geoglyph construction and use. The geoglyph conglomerate as visible today is not, however, the outcome of a master plan that aimed at the resulting picture from the beginning. Rather, it is the final stage of a long lasting construction process during which the whole complex of drawings was constantly added to, and its elements were remodeled, obliterated, or changed by use.
- Aerial photographs furthermore show empty geoglyphs in the desert far away from inhabited zones. In the Nasca period, in contrast, there was an almost constant activity going

on upon and around the geoglyphs as groups of people frequently moved over the geoglyphs, performing codified acts meaningful to them and others. People and activities were integral parts of the ancient geoglyph reality that have since disappeared. They were easily visible from other geoglyph sites or from the valley. In fact, people on geoglyphs, rather than geoglyphs themselves, may well have been the main focus of common perception at least during the Nasca period. Without this dynamic element the geoglyphs cannot be understood.

These concepts have to be kept in mind when trying to interpret the geoglyphs. Only a small part of the geoglyphs were meant mainly as symbols, or signs, to be viewed and understood from far away. These were primarily the early anthropomorphic geoglyphs on hillsides. They were visible from a certain distance and repeated motifs known from other media (textiles, ceramics). They did not show signs of human activity around them, and they remained largely unchanged once drawn.

In contrast, many later geoglyphs in large complexes on plateaus were not visible in their entirety, their shapes were not repeated on other media, and they were constantly remodeled and otherwise used and altered. These geoglyphs cannot be understood as mere visual signs. Geoglyphs by themselves were probably not able to symbolize or convey certain cultural concepts. This is true at least for the geoglyphs from the Nasca period. Rather, they only made sense as an integrated part of a dynamic complex involving people and activities. All of these elements were indispensable parts of the geoglyph phenomenon. Any serious study of the geoglyphs has to keep this perspective in mind.

8.3 GEOGLYPH DOCUMENTATION: REVIEW OF APPLIED METHODS

The present study introduces several new approaches into Nasca archaeology. Modern aerial photogrammetry, 3D modeling, database and GIS technologies enabled for the first time the complete recording, visualization, and detailed analysis of a corpus of geoglyphs that had previously received little attention. The new dataset was used to test to what extent a recent model developed to interpret the geoglyphs was able to explain the archaeological evidence. New insights into the formal, temporal, and spatial

variety of geoglyphs were gained. It is hoped that the documentation carried out in this project will be used in the future to facilitate the protection and long-term preservation of the Palpa geoglyphs.

In spite of or possibly due to the novel approach pursued by this study, the work was not without methodological problems.

The geoglyphs of San Ignacio and Llipata, including the most complex geoglyph site in the Palpa area and the largest known trapezoid, could not be considered in the present study since time constraints did not permit documentation of them at the same level of detail as the geoglyphs north of Palpa. Although the photogrammetric mapping of the area south of Palpa was completed (supplements 1, 2), and some sites in that area were fully or partially documented in the field, it soon became clear that the available time and manpower to cover the whole area had initially been underestimated. Nevertheless, data already obtained from that area by this project may serve as starting point for future research.

Geoglyph mapping based on vertical aerial images offered the opportunity to document all Palpa geoglyphs at a high level of detail and accuracy. However, this approach reached its limits when it came to figural geoglyphs on hillsides. Although most of them could be detected in the stereopairs, they were usually not clearly visible to be mapped accurately. Verification on the ground often did not help to solve the problem since additional details found in the field could in many cases not be reproduced with an analytical plotter. The best way to document figural geoglyphs on slopes is with oblique aerial photographs in combination with field survey. This is currently being carried out within the framework of SLSA's Paracas Project. Thus, new insights into this important subset of geoglyphs can be expected in the near future. This will certainly complement and reshape some of the ideas set forth in this study.

Concerning data recorded in the field, a major shortcoming of the present study is the lack of a systematic recording or sampling of surface finds. This was at least partially inevitable due to legal constraints, but also due to limitations of time and manpower. In any case, the lack of quantitative information about ceramics impeded the investigation of several potentially interesting problems. These include the ratio of fineware to plainware ceramics, the percentage of various vessel shapes, a comparison of find inventories from geoglyph and other

sites, and how these parameters changed over time.

The functionality of the GIS could not be fully exploited in this study. This was due to the thesis completion deadline, and other features to which the geoglyphs may be related have not yet been studied in enough detail to be included in the present study. This refers to excavation and survey data from settlements and other sites in the Palpa region. The analysis of these datasets is underway, however, and it is hoped that they will be integrated into the GIS at a later date.

8.4 SUMMARY AND CONCLUSIONS

This project has pursued a rigorous archaeological approach to investigate the so called “mysterious” Nasca lines. Techniques from other

scientific disciplines were employed that helped to get a deeper understanding of these fascinating ancient monuments. This approach demonstrates that it is still possible to learn more about the geoglyphs in spite of all that has been written about them during the last few decades.

A great amount of credit should be given to the serious investigations by researchers cited in the present study that have led the way in recent years. A coherent explanatory model, though not as simple and straightforward as many a geoglyph *aficionado* would wish, is now available that provides a good starting point to understand the geoglyphs. A few methodological shortcomings notwithstanding, it is hoped that the results of this study will show that a serious investigation of the geoglyphs, laborious as it may seem, is worthwhile. There are still many geoglyphs in the Nasca region that have not received the scientific attention they deserve.