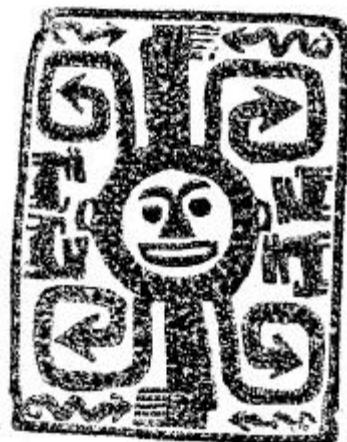


# Taraco Archaeological Project: 1998 Excavations at Chiripa, Bolivia



By

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Table 1:

Introduction - *Christine Hastorf*

This is a report on the third field season of the Taraco's Archaeological Field work at the site of Chiripa (Figure 1). This is an interim report of a two year project in our third phase of work in the region. Our earlier two seasons, 1992 and 1996 are reported on in Hastorf 1999. This document reports only on the on-site excavations that took place in June and July of 1998. We will report again on our work following the 1999 excavations, including the settlement survey material that is currently being completed. During June-August of 1998 the Taraco Archaeological Project (TAP), directed by Dr. Christine Hastorf and Matthew Bandy, conducted research at Chiripa, a site on the SW shores of Lake Titicaca in Bolivia. The core team members are Lee Steadman, ceramicist and laboratory director, Bill Whitehead, Kate Moore, Emily Dean, and Jose Luis Paz. Additional help in the field this year came from Rene Ayon, Rob Beck, Miriam Doutriaux, Kirk Frye, Rachel Goddard, Don Johnson, Juan Leoni, and Daniel Puertas.

The Formative Period in the altiplano of the south-central Andes was a time of increased human evidence on the high altiplano landscape. This is when we begin to see communities for the first time, evidence for plant domestication, new technologies of ceramics and metallurgy, trade, and public architecture. Why and how so many of these signs of domestication occurred in one place more or less at one time and how these processes related to the changing social world are fascinating questions. The site of Chiripa is significant to Andeanists because of its early ritual precinct overlooking the shores of Lake Titicaca, built in the Formative Phase of Bolivian prehistory (Bennett 1936; Browman 1978, 1980; 1991; Chávez 1988; Kidder 1956; Mohr 1966; Ponce 1970; Portugal Ortíz 1992). Our excavations are in search of a better understanding of the political creation of the Chiripa polity as well as issues surrounding the ritual-domestic world.

More specifically our project goals in this phase have been fivefold. This report only presents the first three parts of this phase of research.

1) To further refine our understanding of the chronology and function of the very early semisubterranean structure encountered in the Santiago area called Choquehuanca. This involved expanding the trenches excavated in this area in the 1996 season.

2) To determine the construction date of the uppermost semi-subterranean temple on the Chiripa mound. We know that this structure was built sometime in the Tiwanaku I or III periods. Minor excavations in the post-Chiripa period platform fill will enable us to date the construction of this last platform.

3) To further our understanding of the Formative Period occupation of the site. To do this, we completed test excavations in three of the still-unexcavated areas of Chiripa, identified in our 1996 surface collection program. This located two more Late Chiripa tone foundation enclosures. We excavated outside of the mound to unearth evidence for the lowest deposits under the mound. We also undertook a magnetometer and resistivity survey of the central part of the site's surface. This located some possible structures not visible on the surface and will ensure that we have a complete catalog of all Formative Period architecture at the site.

4) To conduct a systematic site reconnaissance of the Taraco Peninsula, with an interest specifically in clarifying the political and economic structure of Formative Period (Chiripa culture) society in this zone.

5) To conduct, in conjunction with the site reconnaissance mentioned above, small-scale test excavations in Formative Period sites discovered in the survey .

We began work in Chiripa on June 1, 1998. Excavations continued for six weeks, until July 15, 1998. A period of laboratory analysis followed, lasting until August 10, 1998. After these excavations, Matthew Bandy turned to the last two goals and began the systematic site reconnaissance of the Taraco Peninsula. This survey will last until June of 1999, and will include an extended period of laboratory analysis of recovered materials.

The previous regional studies provide us with an outline of the major cultural trajectories and phases. We now know that this area was the locus of early Andean political development during these early times. The inhabitants surely initiated many of the major cultural trajectories that have continued in the highlands up until today. More studies have been initiated recently in several areas within the Titicaca lake basin, including Tiwanaku and its valley (e.g. Kolata 1993, 1996, Albarracin-Jordan and Mathews 1990), Lukurmata (Bermann 1994), Wankarani (Bermann and Estevez 1995), and more recently on the Isla del Sol (Stanish and Bauer 1996), the Copacabana Peninsula (Chávez and Mohr Chávez, pers. comm.), on the eastern shores of Lake Titicaca (Faldín 1985; 1991; Lémuz pers. comm, Paz Soria nd.), on the western slopes of the lake (Aldenderfer, pers. comm.), Tumatumani in the Juli-Pomata region (Stanish and Steadman 1994), and Camata in the Chucuito region (Steadman 1995) of the Department of Puno, Peru. Curiously enough, it is for the Formative times, at the onset of these traditions, that we have the least amount of information pertaining to the political and social developments in the region. It is this Formative time period upon which we focus in our investigations on the Taraco Peninsula, where the earliest florescence of dense ritual centers are found.

It is through detailed excavation and recording that we hope to gain further insights into the development of what ultimately became the Tiwanaku polity by looking at the Formative precursors and their economic, religious, and social relations. What were the economic bases that were being developed in the region? How did the daily practice of production and consumption lead to the intensive agriculture seen later on the Pampa Koani for example? In what form(s) did the political structure develop? What might have been the cultural structures that channeled the history of the southern Titicaca Basin? What were the major activities associated with these ritual centers? Who lived at these centers and who used them? We would like to take a closer look at these anthropological questions by focusing on the structures and uses of these Formative centers on the northern Taraco Peninsula, beginning at the site of Chiripa.

Chiripa is one of the earliest sites with architecture in the region. How did such a large and long lived complex come about and what did it look like politically and socially? What did such early centers mean to the local inhabitants of the region? Were they used on a daily basis or only by select groups within the population? Did people live at centers like Chiripa or only arrive for ritual events? How were the local families organized in this Formative time? How broad were the networks of interaction? Were groups formed into nested ayllu structures or confederations, or were they only loosely affiliated with their neighbors? How did the ritual acts associated with these centers relate to economic activities?

This is the third field season of this project (the first was in 1992), although Bennett and Portugal Zamora in the 1930's, Kidder and Cordero in the 1950s, and Browman in the 1970's have excavated there previously. From their work at Chiripa, we know about the central mound of the site. The .36 ha mound has at least three levels of building and dated between 1500 B.C. on up through the Tiwanaku times of A.D. 1000. The "monticulo", as it is called today, visible on the surface, is a Tiwanaku III monolith-lined courtyard. Chiripa is especially important to Andeanists because it is close to the major imperial center of Tiwanaku, which became an important center for almost 1000 years and therefore has been considered one of Tiwanaku's precursors. Chiripa must have been an important center during the earlier Formative Phase of Bolivian prehistory, with a ritual center overlooking the shores of Lake Titicaca as well as a string of snowpeaked mountains. The Formative phase, as it is called in Bolivian archaeology was between 1500-100 B.C.

### **The Study Area - *Christine Hastorf***

The Taraco Peninsula (Figure 1) juts into the small, southern part of Lake Titicaca called Lake Wiñaymarka in its southwestern corner (16 degrees 15 minutes S latitude and 68 degrees 30 minutes longitude). This region sits below the eastern Cordillera Royal, the large glaciated mountain chain leading to the eastern Andean slopes. It is a peninsula bounded by water to the west, south, and north, and by the Tiwanaku Valley to the southeast and the broad Pampa Koani to the northeast. Both of these flat areas have evidence for prehistoric agricultural raised fields, making this region a focus for past intensive food production (Kolata 1996). The peninsula is built by a small mountain range called the Taraco mountains. The Taraco Formation is an eroded conglomerate with volcanics and a sandy-clayish matrix. This lies over the Miocene

Kullo Kullo Formation of conglomerates, red sandstone, clayish mudflows, and alluvial clays (Argollo et al. 1996:69). Lower down along the lake shoreline are recent alluvial fans eroding off the upper hills.

The peninsula is watered by springs evident at the break in slope of the Taraco Formation that flow into seasonal streams. There are springs as well at the high water table of the lake. Seasonal rains that can be torrential also provide water and rejuvenate the water table. Erosion is the major geomorphological action in the region.

The site of Chiripa lies on the northern shore of the peninsula, on a slope rising up from the lake basin; the slope formed by several older lacustrine terraces, still visible along the peninsula (Argollo 1996:75) (Figure 1). The site is now within the community of the same name, with evidence of the past hacienda amongst the prehistoric material. During the 1990's the Wila Jawira project has been conducting paleoecological studies of the region and provides us with important microenvironmental information (Binford and Kolata 1996). The lake shore elevation today is 3810 m. Thirty percent of Lake Wiñaymarka is less than 10 meters deep, which is mainly in the southern part of the lake, where the Peninsula is located. Just before the site seemed to be occupied, around 2050 B.C., the lake shore was about 1-2 km out from where it is today; the lake shore was approximately 10 meters below its present level (Binford and Kolata 1996:36-37). After this time the lake gradually rose to its present level by about 50 B.C. (Binford and Kolata 1996:37). Since then there has been a series of fluctuations, reflecting drier and moister conditions in the region.

With the earliest habitation at about 1500 B.C., people settled there during a time of increasing precipitation, although the lake shore must have been quite a bit farther away from where it is today. The altiplano climate is a two season regime of wet and dry. The significant fluctuations are diurnal with freezing night time temperatures during the dry season and milder temperatures throughout the rainy season. The precipitation comes mainly from the northeast, moving in from the Amazon Basin. The mean annual rainfall on the lake today is 690 mm, 581 mm at Guaqui along the lakeshore like Chiripa (Binford and Kolata 1996:26, 31). Most of the rain falls between December and March.

### **The Taraco Archaeological Project's Research - *Christine Hastorf***

This project's research has begun to address questions about the onset of political elaboration within the region by excavating several locations within the extant site of Chiripa. Our research plan builds on what we have learned from the house excavations by Bermann (1990 and 1994) and Janusek (1992, 1994) at Lukurmata, but also the Tiwanaku IV-V sequence at Tiwanaku itself (Janusek 1994). Furthermore we now have some detailed house and ritual comparisons from La Joya during the same Formative times (Bermann and Estevez 1995). It is hoped that our excavations will include earlier phases than the Lukurmata excavations, thus extending the habitation evidence back in time. The plan has been to sample intact Formative (early, middle and late Chiripa Phase) contexts in addition to the Tiwanaku I phase to link into Bermann's Lukurmata material, and Kolata's Catari Basin material, while collecting detailed spatial and temporal distributions that will allow us to chart social and economic changes.

We began this task in 1992 at Chiripa with excavations to the north and south of the mound and have found that the archaeological deposits are very complex and disturbed, making the task of exposing areas very challenging, especially uncovering formative domestic zones (Figure 3). We sought Formative domestic areas, but uncovered areas that had been completely excavated for wall building by the hacienda (the Escolar area). In the areas we did excavate, we found strata that span the earliest Formative material through Tiwanaku IV-V. For example in the Santiago area, due to the extremely complex stratigraphy, we identified the Formative levels after much post-excavation artifact analysis and absolute dating. We believe now that we have identified some of the better preserved areas at the site in which to continue our excavations.

In the 1998 field season we focused on five of the goals listed in our reserach proposal to DINAAR: 1) We wanted to complete a partial geophysical map that would define the extent of the Formative site walls under the modern day surface, 2) We wanted to excavate in the lower portions of the mound outside of the modern fence to learn what is there and its date 3) We wanted to return to the northernmost unit we excavated in 1992 called Choquehuanca and finish defining the extent of and exposing the floor of this Middle Chiripa semi-subterranean walled “enclosure”, 4) We wanted to sample some of the more promising Formative swurface concentrations from the surface collections completed in 1996 and 5) We wanted to test the upper part of the mound to gain sampls for a solid ending date to the final Chiripa phase.

In 1998 we concentrated on two main areas; the northern area of the site on the final slope down to the lake shore and the mound area. The northern work includes Santiago and Choquehuanca while adding three other small excavations, at areas called Alejo, Quispe, and Apaza, named after the land owners (see Figure 2 for their exact locations). Santiago has an Early Chiripa use-surface below the plow zone containing many Early Chiripa and later intrusive tombs and refuse pits. There are a series of layers seen in one deep sounding that suggest that there were many surfaces and dsposits here. These layers were cut to make a large Middle Chiripa enclosure that we have now named Choquehuanca. The retaining wall to this enclosure was first discovered in 1992 and was plastered when it was in use, and fragments of white and yellow plaster have been recovered. In the mound area we worked on top of the mound to uncover Late Chiripa midden material to gain absolute dates for the final phase. Also we worked outside to look at the lowest levels of the mound.

### **Excavation Methodology and Field Procedures - *Christine Hastorf and Matthew Bandy***

In the 1998 field season, we continued applying our previous excavation methods and notation. The areas we excavated were marked out with the units designated by their southwest corner, based on the grid system used in the mapping of the site (Figure 2). Excavation began within arbitrary 2 by 2 m *units* at 10 cm *deep* but switched to culturally defined areas as soon as the soil matrix was visible. All excavated soil was passed through a .635 cm screen in measured buckets of 10 liters, except for the soil collected as a bulk flotation or the smaller soil (pollen-phytolith) samples, which are processed differently and plotted on the locus plan. All excavated soil was therefore measured,



allowing us to calculate the density of the artifacts within each locus excavated. All artifacts were bagged and tagged by artifact type. These artifacts were then curated and labeled. Many photographs were taken. At the end of the season, all excavations that were opened were completely backfilled, creating the same contour and environment as before. The following is our system of field recording.

### **The locus**

We use the term *locus* to denote the smallest visibly-defined excavated unit in the matrix; that is, a unit of *provenience*. In this, the locus is to be distinguished from the *stratigraphic event*, which is a unit of stratigraphy. The stratigraphic event is a natural property of the matrix, resulting from the processes by which the site was formed. The locus, by contrast, is an *archaeological* unit, formed by the manner and sequence in which the site is excavated. Ideally, each locus should belong to only one stratigraphic event, although stratigraphic events can contain many (or no) loci. An event is a unit of homogenous soil linked to an activity or process; for example, an ash lens, an intentional fill level, etc.; or it is the cut of a pit, for example, or of a foundation trench. *Features* may also be assigned when identified. A *level* is defined by culturally identifiable breaks in the deposits. An architectural sub-division is an architectural feature such as a structure.

### **The importance of the stratigraphic event**

Every stratigraphic event is either a deposit or a cut. The second type of stratigraphic event refers to the removal of a certain amount of pre-existing matrix, forming a hollow, pit, trench, or similar feature. A cut is always accompanied by one or more depositional events, but deposition may take place outside of the area under excavation, and thus the depositional event corresponding to each and every cut will not always be evident in the area excavated. Each stratigraphic event was assigned a unique number. This unique designation has a binomial form, with the first component being a letter (from A to Z) and the second being a sequential number, beginning with 1 and going as high as is necessary. Thus, A-1 is a valid stratigraphic event number, as is T-75. Assignment of letters was according to excavation area. The Llusco excavation area had stratigraphic events beginning with A, Santiago with B, Yujra with C, and the Montículo events began with D. Within each excavation area, stratigraphic events were numbered sequentially in the order in which they were identified by the investigator.

It is apparent that stratigraphic events occurred in the past in a particular and determinate sequence. One of the primary goals of our excavation was to reconstruct this sequence. Reconstruction of a detailed stratigraphic sequence allows for fine chronological control, as well as a more detailed understanding of the processes, both natural and cultural, that are responsible for the formation of the site as it exists today. Thus, the event of a cut for a pit always precedes the fill for that pit, and the fill into which the cut is made always precedes the cut itself. While every locus must belong to at least one stratigraphic event, it is not the case that every stratigraphic event must contain loci. Cuts, since they are not defined by specific volumes of sediment - since they are *interfacial features* - contain no loci.

On our locus excavation forms we record the cultural context that we thought we were digging in (an example is in Appendix I). The decision as to the cultural context was determined by the excavators' ideas about the matrix that was being excavated and

how it got there. The main point was to describe and discuss the possible activities that were involved in the deposit. The cultural context codes are listed in Appendix II. It was very important to include what each locus was equivalent to, what it was above and below. This was used to construct the Harris Matrices that are presented below for each excavation area. These matrices allow for us to stratigraphically reconstruct the sequence of past events. We also describe the soil and photograph where appropriate. Appendix III presents each excavated 1998 locus and some basic information about it, including specific location, soil volume, and contextual data.

### **Collection and sampling procedures**

Point-located items were assigned a *slash number*. These numbers are unique within each locus and serve to identify the specific items plotted on locus or level plans. Flotation bulk soil samples were also assigned slash numbers and located on unit plans. They were collected from every excavated provenience (locus), optimally collecting a sample of 10 liters. A bulk flot means that one collects the soil blindly (including whatever is found in the soil, including sherds, lithics etc.) from a single area in the center of the locus. On floors or in occupation zones we intensified the collection, collecting bulk flotation samples at every .5 or every 1 meter across the whole area, with special attention to hearths and other features.

One soil sample (phosphate/pollen/phytolith) was collected for every locus, at the same time as the bulk flot. Each sample was collected with a large spoon which had been cleaned by insertion into the excavator's mouth. This technique removes any pollen that may have remained from collection of a previous sample, as well as any airborne pollen that may have accumulated in the interim. After scraping the sample location with a trowel, 2-3 inches of soil was quickly collected and placed in a zip lock bag. These measures were taken to prevent contamination of the sample by ambient or intrusive pollen material. All small soil samples received slash numbers and were plotted on the locus plan.

### **Artifact processing**

Each artifact type was processed differently. The ceramics were soaked to extract the salts and then washed in the field, as were the lithics and the bone. Ceramics that have any evidence of organic encrustations were set aside and scraped to collect the organic remains before washing. The flots were floated and processed at Chiripa. Each artifact type was stored in a separate box: botanicals, animal bone, human bone, metal, ceramics, lithics, sherds to be scraped, shell, pollen samples, flot samples, etc.

For large and well protected ground stone, we completed a pollen wash prior to normal washing. With distilled water and a clean tooth brush, the artifact was cleaned carefully, the resulting water being placed in a clean, sealed container. These samples were then stored for possible future palynological analysis.

## The 1998 Excavations

### Choquehuanca -- A Middle Chiripa Semi-Subterranean Enclosure: Excavations and Interpretations

William T. Whitehead

The structure Choquehuana is an approximately 14 m. by 14 m. square, stone lined, semi-subterranean structure with a prepared plaster floor, cut into underlying sterile soils and adjacent Early and Middle Chiripa deposits. It is located in an agricultural field adjacent to the main Chiripa road, across from the church at Chiripa (figure x). Choquehuanca is now the official designation of this structure to separate it from excavations immediately adjacent to the east which are called Santiago and from the previous interpretation of the structure as a terrace wall. The relation of the structure to the previous Santiago is not currently defined, so designating the structure with a different name helps to reinforce the separation between these two areas and give Choquehuanca a separate interpretive status.

The Choquehuanca excavations in 1998 consisted of two main excavation blocks, one to define the west wall with a shallow trench 17 m long running north to south and another 14 meter trench across the middle of the structure running east to west. 3752 buckets of soil were excavated from these two trenches making the volume approximately 37 square meters of matrix excavated and screened.

The current determination of the age of construction is the Middle Chiripa time period, based on the ceramic analysis of an assemblage recovered from the first construction events and soils in the bottom of the structure (see Steadman this volume). The plan of Choquehuanca (figure x) shows that three of the stone walls have been excavated with only the corners of the four excavated (the south wall). The east wall is the deepest and best preserved section of the structure with the north and west walls almost completely destroyed by erosion of the soil surface and modern agricultural activity. The state of preservation of the structure has however been good enough to describe the structure, measure its dimensions, determine the age range the structure was built in, and when it may have been abandoned. To describe this structure, a brief history of its discovery, excavation, and potential interpretations will be given.

#### History of Excavations

The discovery of the structure now called Choequehuanca was in the 1992 field season of the Taraco Archaeological Project at Chiripa.. At that time the structure was not formally defined but incorporated in the general excavation called Santiago and interpreted as a possible terrace wall, constructed for habitations (1992 Hastorf et al). The 1992 excavations excavated a four meter portion of the east wall, exposing the plastered surface, and giving an adequate enough ceramic assemblage to establish the structure was constructed in or close to the Middle Chiripa time period of the Formative. However, the ceramic assemblage from this first excavation pit was not adequate enough to be conclusive. In addition, due to mixing of several stratigraphic layers at the bottom of the excavation pit, further work was needed to establish the timing of the construction of the structure.

The second excavation of the structure as in the 1996 field season of the T.A.P. These excavations, under the interpretation that the structure was a terrace wall, reopened the 1992 excavation pit. The wall was then followed to the north by removing the

plowzone to expose the first course of stones still *in situ* after deep plowing. An intriguing finding was then uncovered, a square, stone lined pit next to the wall stones. At approximately the same time, excavations to the north uncovered a 90° turn to the west in course of the wall. Half of the square pit, termed the “box” was then excavated exposing the relationship of it to the stone wall, showing the box was indeed part of the general wall and incorporated into it during its construction and not afterwards, as a later time period pit would have been. The excavations of the first exposed corner of the structure continued to the west exposing more of the north wall. Approximately 10 meters of wall was then exposed with intermittent breaks encountered due to its superficial nature and modern agricultural activities. Excavations of the north wall then terminated due to a modern agriculture field boundary and the difficulties in opening a new excavation unit this adjacent field.

The measure from the center of the box to the first corner was almost exactly 7 m., and it was suspected by this time that the terrace wall may be a semi-subterranean structure similar to the Llusco structure uncovered in 1992 and further defined in 1996. A test unit centered 7 m. to the south of the center of the box was placed and excavated. Not far below the plowzone a second corner was found confirming that this was not an “L” shaped terrace but at least a “U” shaped enclosure or a structure similar to Llusco. One more test unit was placed at 10 m. to the west of this southern corner to see if the south wall continued as did the north wall. This test unit did uncover more of the south wall, but the southwest corner lay in the adjacent field. The final wall definition would have to wait until 1998.

The return to Chiripa in 1998 found the field boundary from 1996 now gone, and the Santiago field expanded to the west, creating one large field. Permission was now secured for the entire field and excavations could begin on finishing the wall definition and exploring the rest of the structure. As part of the research design defined in part in the 1996 report to DINAAR, several goals were outlined for further research of the Choquehuanca structure.

- A. Establish the existence of a west wall
- B. Determine the timing and chronological sequence of events of the construction of the structure
- C. Determine if the stones found abutting the wall in the southwest area are of a special structural nature

We now proceed with new information gained from the 1998 excavations, that have given answers to these research questions and shed new light on this structure.

### **The 1996 excavations**

The 1996 excavations will be discussed not in terms of the temporal order of excavations but in terms of the chronological sequence of construction events from earliest event to latest event. T.A.P.’s excavation techniques rely on grouping of smaller excavation loci defined in individual excavation units into larger interpretive elements called events. These events will be used here as the main structuring device, and with the use of the Harris matrix of events (figure x) presented by Event.

#### **B134-Sterile soil**

The sterile underlying the Chiripa occupations has not been geomorphologically defined; however, several field determinations have been made. The sterile soil in this area is extremely rocky, and in some cases seems to be almost entirely rock, with soil wedged in-between the rock matrix. This soil is easily recognized in the field by its rocky nature and lighter orange color, from the anthropogenically modified soils above it.

Munsell colors of the sterile place it in the range of 7.5 YR 4/2 (dry) to 10 YR 3/2 (wet). Further information about the sterile soils may come from micromorphological analysis.

#### **B70-Cut into sterile for structure construction**

The first construction event is the cut into the sterile soil and adjacent Early and Middle Chiripa occupation areas. This cut has completely obliterated the a section of Early and Middle Chiripa occupations excavated in the Santiago area and posses several important questions: Where was this earlier occupation matrix deposited? How deep was the cut, since the surface of the cut is not visible now due to centuries of erosion and agricultural activities. What did the earlier occupation zone look like before the cut? Obviously these questions cannot be answered now due to the loss of the information. These questions do create a noticeable gap in our ability to reconstruct the original height of the wall, how Formative Chiripaños may have used borrow soils, and what the surface of the area was like when the cut for the structure was created. Figure x shows the cut into sterile was not level but was a gentle bowl with the slope increasing more sharply as it approaches the side walls. This could have been for water collection and drainage, however a drainage canal or a slope to a corner has not been found because of the destruction of the corner to the northwest and the superficial nature of the deposits in this corner. However a drainage system would have been needed in a structure of this size, and the cut does give the impression one was planned for from the beginning of the project. The cut for the structure to the east abuts the earlier occupations, in the north is visible close to the wall stones and was not excavated below the plowzone, but to the west the cut into sterile soil is to close to the surface to determine if any earlier occupation soils may have been in this area. Therefore from what we now know from the cut the Early Chiripa and Middle Chiripa occupation area is only known from the Santiago excavations.

#### **B145-Wall Stones**

The wall of the structure is constructed of smooth, oblong river cobbles of quartzite. These have been placed in the east wall directly against the cut with little fill behind the wall, but in the west and north wall fill was placed between the stones and wall cut. This would suggest the wall was built little by little with stones fitted into easily workable fill rather than hard packed sterile soils or occupation surfaces. Mortar is present between the stones as a slightly darker soil than the general fill, and at least in the east wall a layer of plaster was placed over wall. This would suggest that the stones of the wall were not intended to be seen, even though the placement and general fit of the stones show a high level of skill and knowledge of stone work and are quite attractive to the modern excavators.

The height of the wall will never be know because the top of the structure is now at the surface. The area of the structure is not level either. The profile of the south wall of an excavation trench through the center of the temple shows an approximately 10 cm per 1 m slope to the west that has destroyed all but the lowest courses of stone to the west (figure x). At the present the wall can be said to be approximately 60 cm high at its highest. If the structure had a level wall in all four sides of its roughly square shape, then at least 40 cm of deposit have been lost to the west, with a more than likely chance that more has been lost.

#### **B142-Fill over sterile after placement of wall stones**

A grayish (10YR 4/1 dark gray), clay, very rocky fill was placed over the sterile soil and against the lower courses of stones in the structure. This soil in places had weathered green in contact with the sterile soil and was quite easily distinguished from the lower

sterile soil. This fill also contained very large pieces of llama bone, ceramic sherds, and rock, suggesting that after deposition very little had happened to this fill to disturb it or further break down the artifacts found in it. The ceramics in this fill are Middle Chiripa therefore making the earliest known event datable by ceramic analysis Middle Chiripa. The previously suspected Early Chiripa age is now disproved and does not fit well into the general knowledge that the deposits this structure cuts into are Early Chiripa. Little more can be said about this event except that it is not uniform across the surface but does extend from the east wall to the west wall.

#### **B141-Floor of structure**

The floor of the structure has not preserved well but we do know that it was a yellow plaster surface. This surface is now very thin and only occurs in patches across the surface. 12 m<sup>2</sup> of this floor has been excavated, with extensive sampling of the surface for pollen and archaeobotanical materials. The general thickness of the plaster surface was only a few millimeters, but a lighter grey (2.5YR 7/1 light grey), clay matrix makes up the bulk of the floor. This floor over the rocky, artifact rich fill, is less dense in artifacts and has much fewer stones and is of variable thickness between 10 and 2 cm. across the trench where it was excavated. This fill was more compact and had a much different feel than the fill above, with the fill above “popping off” the surface making it easy to define the floor versus the fill above. Analysis of the ceramics presented in this volume show it is also of a Middle Chiripa age.

#### **B10-Fill above floor, post abandonment fill**

The bulk of the excavations were to remove the fill above the floor across the 14 meter center trench. This fill was moderately compacted and of a gray brown color (2.5YR 5/2 gray brown). The fill shows no internal structure however in the areas close to the east wall, stones that are of the same general size and shape as the wall stones are abundant. This suggests that as the structure was being filled either the wall was collapsing into the fill or the toss distance of large rock into the pit was generally not very far. The fill does show one internal feature defined as B147-a clay lens with internal laminations. The fill runs the distance from the plowzone to the surface of the plaster floor and is 1.2 m. thick in the deepest excavation areas. The upper parts of the fill are defined as B2- a mixed, loose fill from plowing. Most of the ceramics from this fill are Late Chiripa? with Tiwananku? also present in low quantities. The superposition of Late Chiripa over Middle Chiripa is expected but does beg several questions: Were there substantial Late Chiripa deposits in the area of Santiago that either eroded into the structure or were placed into it? Were did the fill deposits come from? What was the time frame for the filling of the structure? When was structure finally abandoned? Answers to these questions will more than likely remain unsolved due to the difficulties in establishing a chronological sequence in undifferentiated fill and the loss on any deposits over the fill itself. We can say that the structure was in use in the Middle Chiripa period and that it was filled in during the Late Chiripa time period at the Earliest, or the fill was from Late Chiripa deposits.

#### **B147-Clay lens in structure fill**

A lighter clay lens was encountered in units N1092 E961-963 of the central trench above the floor well below the surface. This clay lens was approximately 1 to 10 cm thick with variable amounts of ash and carbonized material embedded in the structure. The lens was thickest in the center and seems to be from a general dumping event that spread and thinned away from the center. This internal clay lens shows that the filling of

the structure was in dumping events but any internal structure is now lost. Artifacts in the lens are from the Late Chiripa time period and are part of the general filling events.

**B146-Cut for pit with llama offering.**

The cut for this pit is marked by a ring of stones in the southwest corner of the structure (figure ?).

**B133-Llama offering**

The fill of this pit has the same texture and color as the B10 fill and B2 plowzone it rests in and is mixed with. The offering was almost totally destroyed by plowing and only a single course of stone was recognized as part of the offering. The position of the offering in the corner area of the structure may be a coincidence and it is of recent origin or it could be related to the wall building itself since it is right next to the wall and the wall cut and of ancient origin. However due to its terribly damaged nature little more can be said about this feature.

**B2-Mixed fill from plowing events**

This is the plowzone fill, it is of varying thickness and compaction due to tracker plowing. This soil is considered to be a mix of anything below it and any events around it. This soil was screened and artifacts collected however will not be used in analysis or interpretation.

**B140-Fill from B10 moved by plow over surface**

This event is similar to B2 however it denotes that soils have been shifted over the site by tracker plowing.

**B131-Pit cut for Rasgo 209-Historic stone cache**

The cut for this pit is not visible in the general fill but is inferred by the lack of large stone from the surrounding matrix (figure x). The inability to see a pit cut in the side wall profile shows that this area has either been extremely bioturbated or the pit was immediately filled in with the same soil from the pit excavation.

**B132-Pit fill for Rasgo 209-Historic stone cache**

The fill for this pit is the same color and texture as the B10 surrounding matrix except where it forms fine laminations in the air pockets produced by the placement of the stones in the pit. The pit is in units N1069 E959-961 (figure x). The pit is approximately 1 meter in diameter and of unknown original depth due to the lack of a clear pit cut and the plowzone. The stones in this pit are of a large size for the general fill and are either *batone* fragments or large stone from the construction of the temple. The presence of a pit fill with stones is not uncommon, and this pit was made in the historic period to clear the field of these large stones. A historic ceramic fragment was found in the bottom of the pit fill underneath the large stones and *batone* fragments dating this pit to the historic time period.

**B149-Pit cut for Tiwanaku cut stone cache**

The cut for this pit is defined by the difference in color and texture from the pit fill and the sterile soil it was cut into (Figure x). The pit cut was irregular in shape but is approximately square, with one larger corner.

**B148-Pit fill for Tiwanaku cut stone cache**

This pit was located by the geomagnetic survey of Dr. Don Johnson, which found a strong, localized anomaly in the excavated area. The anomaly was due to the presence of three anedsite, cut stones which look to be of Tiwanaku origin. Anedsite is a magnetically oriented rock because it forms from heated and cool metamorphic rocks and the iron content solidifies in the magnetic orientation of the Earth's magnetic field. This

makes it stand out almost as well as iron in the geomagnetic survey. This hot spot was also interesting because the

### **B1-Surface**

The surface of the Choquehuanca area. This was surface collected and all artifacts taken in a collection, however will probably not be analyzed.

### **Loci Harris Matrix**

A loci Harris matrix was produced to aid in the interpretation and analysis of the artifact and excavation information (figure x). This matrix is different than the event matrix in that it lists all loci excavated and shows their relative relationship to each other.

### **Discussion**

The 1998 excavations have touched on or directly addressed the three main issues raised in the 1996 excavations. We have shown that there is a western wall and at least one more intact corner in the southwest. The construction sequence and the timing of the construction have been determined to be from the Middle Chiripa period. Unfortunately, the area in the south wall was damaged by plowing events and the rock structure found in 1996 is no longer visible making interpretation impossible at this time.

(I need to think about this a little more after talking to Lee and Rene and Kate and Matt about what they are finding in their analysis.)

### **Future Work**

- A. Excavate the south wall to see if there is another "box" located in the center of this wall, and test the southeast corner to see what the overall depth of the structure may have been. The southeast corner lies in the area of Choquehuanca with the highest absolute elevation making this area the most likely to contain intact deposits that can give more information about the structures relation to the Santiago area.
- B. Probe the south wall to determine is this area is higher than the center suggesting a drainage function to the bowl like surface of the floor.
- C. Determine a plan of action for the conservation and interpretation of this structure for the public

### **Appendix**

#### **Events from Choquehuanca**

#### **Harris matrix of Choquehuanca loci**

### **Excavations on the Chiripa Mound**

Matthew Bandy

In the 1998 TAP field season, excavations were carried out in two areas associated with the Chiripa mound, or *montículo*. These were in the areas termed, in the 1996 field season, Montículo 1 and Montículo 2. Mont. 1 is located on the East side of the mound, near the South end of the exposed face, while Mont. 2 is located on top of the mound, near the Southeast corner (see Figure 3). Of these two areas, the excavations in Mont. 2 were conducted first, the ones in Mont. 1 subsequently, and they will be described in that order.



*Montículo 2*

A trench 4 meters North-South and 2 meters East West was excavated in this area, on the Southeast corner of the mound. The Southwest corner of this trench was located at the grid coordinates N967/E1026. The excavation was initiated with the intention of locating preserved walls of structures pertaining to the Upper House Level, thus confirming the presence of structures whose existence and location had previously been only hypothetical.

The root zone in this area proved to be only approximately 15 cm thick (see Figure 3, a profile drawing of the Mont. 2 trench. Below this level in the northern 2x2 m unit - the southern unit was not excavated further - was encountered a dark, mottled and relatively homogeneous deposit (D-13), which was interpreted as platform fill for the latest temple structure comprising the mound. Interestingly, analysis of the ceramics from this deposit produced only Late Chiripa ceramics with no Tiwanaku specimens, confirming the latest temple's early - Late Formative - construction date, and unambiguously disproves the hypotheses of Bennett and Browman, that it had been built in Decadent Tiwanaku or Tiwanaku III times.

Below this construction fill was encountered a layer of red clay with very high concentrations of large unmodified cobbles (D-15), with very little artifactual content. The upper surface of this deposit was observed to slope generally downwards from Northeast to Southwest. Its similarity to the wall encountered directly beneath (D-18) clearly indicates that it is a layer of rubble derived from the collapse of the upper portion of the House G structure.

Beneath this rubble deposit was encountered, as mentioned, a mud and stone wall. This wall clearly is the Southwest wall of House G, one of the Upper House Level structure. It has a width of 40-50 cm, and eventually proved to be preserved to a height of approximately 110 cm. The wall runs from Northwest to Southeast (Figure 4), and no corner was encountered. The corner of the structure clearly lies a short distance to the North and West of the excavated area, and is in fact noticeable on the surface as a slight topographic irregularity.

To the South and West of the wall, within the excavated area, and below the layer of wall rubble, was encountered a very dense and organic midden deposit. This midden, composed of a series of distinguishable layers (D-134, D-136, D-137, D-138) separated by ash lenses (D-135), proved to be approximately 100 cm in depth. It is clear that the midden accumulated against the exterior wall of House G, and it is equally clear that this accumulation took place during the occupation of the structure itself.

Below the midden lay a lightly-compacted, highly mottled surface that is almost certainly the original exterior occupation surface associated with the initial occupation of House G. The excavation was terminated at this point, without removing this surface. It should also be noted that the wall trench of House G was observable as a 30 cm wide band of relatively loose soil abutting the base of the wall itself.

The depositional history of this area is fairly clear. Within the spatial structure of the Upper House Level, the excavated area is located in the triangular space between Houses G and H (see Figure 6). The existence of this latter structure has yet to be substantiated by excavations, but is strongly suggested by surface topography and yet more strongly by the results of the magnetometry survey of this area. If we may assume that the corners of these two structures abutted, as did those of Houses 1 and 2, excavated

by Bennett on the opposite corner of the mound, then it is clear that this triangular space was, in fact, 'dead space', with no possibility of movement through it. This would seem to be suggested also by the very lightly-compacted nature of the external surface underlying the midden deposits, which displays no indications of heavy trampling or of regular use. I propose, then, that this 'dead space' was employed for the dumping of refuse produced by activities associated with the occupation of the Upper House Level itself, accounting for the meter of midden deposit accumulated against the exterior wall of House G. The analysis of the materials recovered from these deposits should therefore directly reflect the activities carried out within the circle of structures during their occupation, approximately 350-250 B.C.

Finally, the nature of the House G wall rubble deposit (D-15) is of interest. The topology of the deposit - sloping uniformly away from the wall itself, and of approximately the same thickness - indicates that it did not form by the gradual melting of the original structure. Rather, it reflects a single episode of collapse. Additionally, the original wall, as can be appreciated in the profile drawing (Figure 4), broke at the exact point where it was in contact with the upper surface of the exterior midden. I would suggest, therefore, that the collapse of the wall was caused by pressure exerted from within the structure, almost certainly of human origin. This indicates that the abandonment of the Upper House Level, or of House G at least, was not a gradual process but was a quite intentional destruction. Together with the lack of erosion of the rubble deposit, this would seem to be yet another indication that the construction of the latest temple on the Chiripa mound, represented here by the platform fill deposit (D-13), took place within a very short time after the destruction of the Upper House Level structures. This is yet another indication of a probable Late Formative date for that structure.

### *Montículo 1*

The Mont. 1 area is located along and near the southern section of the exposed Eastern face of the mound (Figure 2). This was the section of the profile that was cleaned in the 1996 season. Two small units were excavated in 1996, exposing the remains of Lower House Level structures. In the 1998 season, it was decided to excavate to the East of the modern fence surrounding the mound. The area just to the East of the fence used to be part of the mound, but was cut back during the hacienda period, probably sometime in the 1940s. Thus, by excavating in this area we hoped to obtain a sample of the deposits which originally lay below the mound, thereby avoiding the difficult, destructive and even possibly dangerous task of excavating through several meters of mound deposit in order to reach them.

With this end in mind, we opened a trench measuring 4m North-South by 6m East-West, with the Southwest corner located a grid point N974/E1040 (see Figure 3). Immediately below the humus zone there was encountered a quite thick modern - 20<sup>th</sup> century - deposit, with glass, metal, glazed ceramics, and other recent material distributed throughout (D-10) (see Figure 7). This layer was almost certainly formed primarily by wash and slump from the exposed mound profile, immediately adjacent. This deposit was removed without screening. Immediately below this layer we found a well-made stone pavement (D-152), extending across the entire area of the trench, also pertaining to the hacienda period, and also removed, together with a thin layer of disturbed deposits beneath it, without being screened.

Below the historic stone pavement and associated disturbed earth we entered undisturbed prehispanic deposits, pertaining to - in Kidder's terminology - the Sub-Lower House Level, or Bennett's Pre-Mound Stratum. The first stratum encountered was a thick - up to 50 cm - very compact and homogeneous deposit (D-160). The presence of small inclusions of red and mottled adobe, as well as the low artifact density and the very thickness of the deposit, indicate that it should be interpreted as intentional fill. These characteristics have been observed in what are clearly intentional fill levels elsewhere. I suggest that this level represents platform fill associated with the construction of the Lower House Level, located at a somewhat higher level in the nearby 1996 Mont. 1-A excavations. This would indicate that the Lower House Level structures were built upon a prepared platform, a possibility not previously considered by either this or prior investigators. The fill contained predominantly Late Chiripa ceramics, probably roughly contemporary with the terminal occupation of the Llusco structure to the South.

In this fill were encountered a number of pits which had been truncated by the cutting back of the mound and the construction of the cobble pavement (see Figure 6). These included Rasgos 216 (D-153, D-154), 210 (D-140, D-141), 211 (D-142, D-143), 212 (D-144, D-145), 213 (D-146, D-147, D-155, D-156, D-157), and 214 (D-148, D-149). All but one of these pits were relatively unremarkable, their fill consisting of midden probably unrelated to their original function. All of these pits contained Late Chiripa ceramics mixed with earlier material.

The exception to this was Rasgo 213, the fill of which consisted of four distinct layers (Figure 9). The lowermost (D-157), approximately 13 cm thick, consisted almost entirely of fish bone, with very little other artifact content. Above this was a very artifact-rich layer (D-156) containing the partially articulated remains of a camelid. Above this level the diameter of the pit widened from approximately 58 cm to approximately 114 cm. On the base of this wider upper portion of the pit, and covering the underlying fill deposits, was a thick cap of yellow clay (D-155), remarkably similar to that employed for the floor material of the Lower House Level structures excavated in 1996 in the Mont. 1-A area. And indeed, the pit is most likely contemporary with these Lower House Level structures. Overlying the yellow clay cap was a midden deposit (D-147), probably unrelated to the original deposits of the pit. The structure of the fill levels of this pit, together with the prepared yellow clay cap, seem to indicate some sort of formal offering context. It was the only pit of its kind encountered in the Mont. 1 trench.

Below the D-160 fill level was encountered the remains of an adobe wall (D-151). This wall runs North-South for the entire length of the trench (it must be remembered, viewing Figure 6, that our grid North is 5 degrees West of true North). This wall, approximately 70 cm in width, exhibits a peculiar construction technique. It is composed of very large adobes, 70 cm long by 20-40 cm wide, made of sterile red clay. These red adobes are in turn placed within a dark, organic mud matrix. Only the lowermost course of the wall was preserved, so it is uncertain whether the entire height of the wall was constructed in this manner. Nevertheless, this technique has not been observed in any other structure excavated at Chiripa to date, and in no other structure in the Titicaca Basin to my knowledge.

To both the East and the West of this wall were observed rubble deposits (D-161), undoubtedly originating from the unpreserved upper courses. These deposits seem to have resulted from slump and melt from the wall itself, rather than from a single episode of collapse. The presence of rubble on both sides of the wall indicates that this was not

the facing wall of a platform, but rather was freestanding. Beyond this, I am unable to determine the function of the wall or the type of structure to which it may have pertained.

Below the wall rubble deposits, an overlying a moderately compacted surface, were two moderate density midden deposits, both to the East (D-162) and the West (D-163) of the wall itself. These deposits seem to have accumulated while the wall was standing. As they contain Middle Chiripa ceramics, I conclude that the wall itself is Middle Chiripa in date. The Eastern deposit (D-162) is cut by a large pit (D-158, D-159), which is itself capped by the wall rubble, and is therefore contemporary with the wall itself. This pit is interesting, in that its fill consisted entirely of ash, carbon and burnt quartzite cobbles. It possibly represents an earth oven.

Beneath these midden deposits, and beneath the wall, were excavated a series of rubble (D-164), midden (D-166, D-168, D-169) and ash (D-165, D-167) deposits. In all of these layers, with a total depth of approximately 55 cm, no structural remains or features were encountered, though there were present several probable occupation surfaces (one at the D-165/D-166 interface, the other between D-167 and D-168). The uppermost (D-165, D-166) of these deposits contained Middle Chiripa ceramics, while the lower ones (D-168, D-169) contained only Early Chiripa material. The Mont. 1 trench, therefore, contains a column of the entire Chiripa sequence through the early Late Chiripa phase. This confirms the observations of previous investigators (Bennett, Kidder, Browman) of a long, uninterrupted occupation sequence beneath the mound proper.

#### Initial Excavations at Alejo and Quispe

*José Luis Paz Soria*

El presente informe constituye un reporte preliminar de las excavaciones de 1998 en el sitio de Chiripa, en las áreas denominadas Alejo y Quispe. Previamente, es necesario mencionar que ambos sectores fueron seleccionados para practicar sondeos por la alta densidad de materiales formativos y/o la presencia de fragmentos decorados de Chiripa Tardío, los mismos que fueron detectados con anterioridad en la recolección sistemática.

Los parámetros que sirvieron para ubicar las unidades de excavación fueron: A) pequeñas elevaciones en los terrenos, a menudo detectables en las zonas de arado, y B) la concentración de vegetales en la superficie. Ambos indicadores dieron resultados alentadores, debido a que descubrieron importantes rasgos culturales (un canal y parte de una estructura).

#### AREA ALEJO

La primera área excavada la denominamos Alejo, en retribución al propietario del terreno, y está ubicada a 200 metros al Este del Montículo. Los hallazgos más sobresalientes se remiten a un canal y una nítida superficie de uso que se asocian a Chiripa Tardío, además de un basural Chiripa Medio (Figura 1). Cabe mencionar que la asignación de estas periodicidades se basa en los análisis cerámicos de la Dra. Lee Steadman.

Con relación al primer rasgo, es decir, el canal (Evento E-5), este tiene una extensión visible de 7,20 m., 30 cm. de ancho, una orientación de 460 N.E. y una

inclinación de 90. Su técnica constructiva consta de una fina capa de arcilla como base, con paredes de tres o cuatro hileras de pequeños cantos rodados que están unidos por barro como argamasa, además de piedras largas y planas a manera de cubiertas en la parte superior. Interesantemente, el comienzo de este canal tiene forma de U y base de piedra, y encima se encontró un batin volcado con un agujero circular en el medio, el mismo que indudablemente servía para el vertido de líquidos y/o residuos (Figura 10). Este canal penetra en un relleno que contiene bastantes materiales Formativo Tardíos, pero en su interior también se encontraron varios fragmentos que corresponden a esta misma periodificación.

Respecto a la superficie de uso (Evento E-11), esta, es de color amarillento (2.5 YR 3/4), de textura arcillo limosa y su grosor varía entre los 0.5 hasta los 3 cm. Este rasgo es bastante horizontal, y se encuentra concentrado en las inmediaciones del canal. Cerca de su superficie se registró una interesante acumulación de materiales, pero no se han podido detectar fragmentos incrustados.

Un tercer hallazgo de esta área consiste en un pequeño basural sobre la arcilla estéril, a 60 cm. debajo de esta superficie de uso (Evento E-12). Este rasgo fue ubicado en un sondeo de 1 x 1 m., y tiene huesos de camélidos bastante completos que no fueron fragmentados por un uso posterior, además de ceniza y cantos rodados.

Otros llamativos descubrimientos son una acumulación intencional de piedras (Evento E-7), que en algunos sectores alcanza más de un metro de grosor, y una posible zona de erosión de adobes (Evento E-8) en el perfil Este.

## AREA QUISPE

La primera labor realizada en esta área (denominada así en retribución a la propietaria del terreno), fue un sondeo de 2 x 2 m. en las coordenadas N 1078 E 1117. Desafortunadamente, la estratigrafía de este sector consta de un solitario estrato que yace sobre el nivel freático que es común en toda la región. Este factor impidió la continuación de las excavaciones, pero en el fondo de la unidad se encontraron varios materiales Tiwanaku I que se asocian a un "relleno de piedras", muy similar al de las áreas Alejo y Apaza (ver informe de Rachel Goddard en este mismo artículo).

Una segunda excavación en las coordenadas N1066 E1125, descubrió la esquina N.O. de una estructura formativa, la misma que tiene un canal anexo y un nítido piso en su interior (Figura 11). El muro Oeste de esta edificación mide 4.4 m., pero los análisis de resistividad eléctrica (ver sección de Don Johnson en este mismo artículo) confirman su continuidad hacia el Sur. Con relación al muro Norte, este tiene 1 metro de longitud, y esta interrupción a dado lugar a dos interpretaciones: 1) este segmento abierto es la entrada de esta estructura, o 2) esta pared ha sido cortada por la construcción de una casa contemporánea derrumbada, cuya presencia ha sido corroborada por información oral y por los análisis electromagnéticos ya citados, aunque no se observan evidencias de disturbio en los perfiles.

Los muros de esta edificaci3n se caracterizan por tener grandes piedras que estn unidas por barro, y ocasionalmente se intercalan con una doble hilera de peque0os cantos rodados.

Este estilo constructivo tambi3n se repite en el canal que est cerca de la esquina, el mismo que tiene una orientaci3n de 2860 N.O., una extensi3n visible de 1.70 m. y un ancho de 40 cm. Este canal sin duda alguna servia para el drenaje de las aguas pluviales, y un peque0o sondeo en su interior revel3 la presencia de grandes cantos rodados que taponaron su funcionamiento, aunque no se pudo encontrar su base porque el corte de construcci3n de esta estructura ha disturbado todo este sector (ver lneas mas abajo).

No obstante, el descubrimiento mas significativo es un piso de color gris-ceo (Chart 2 for gley 6/1) (Figura 12; Evento F-6), muy similar al de la estructura Choquehuanca (ver informe de William Whitehead en este mismo artculo), que tiene 5 cm. de grosor promedio, aunque en algunos sectores presenta una interfase demasiado ambigua. Este piso est ligeramente inclinado hacia el norte, y se halla mezclado con una gran cantidad de gujarros grandes y casajo, por lo que presumimos que se trata de un muro colapsado que se acumul3 en la esquina interna de esta estructura por efectos de la gravedad (Evento F-5).

Interesantemente, un peque0o sondeo realizado debajo de este piso, evidenci3 que el corte de construcci3n para levantar esta edificaci3n es bastante abierto (Evento F-9; Figura 13), ya que en las inmediaciones del canal alcanza los 60 cm. de ancho y los 50 cm. de profundidad. Sin embargo, la excesiva humedad que es producida por el nivel freatico, impidi3 la continuaci3n de las excavaciones.

Por otra parte, los analisis ceramicos de la Dra. Lee Steadman, han identificado materiales Formativo Tardos en el interior de la estructura y en su exterior, e incluso en el relleno debajo del piso y en el corte de construcci3n.

## INTERPRETACIONES

El razonamiento I3gico nos indica que los hallazgos del area Alejo no estaban aislados, ya que indudablemente deben estar asociados a algun tipo de edificaci3n. Lamentablemente, no hemos podido hallar rastros de esta construcci3n, pero suponemos que el "relleno de piedras" debe su formaci3n a la destrucci3n de varios muros. Otra alternativa explicativa es la posibilidad de un area abierta, a manera de patio (Eduardo Pareja com. pers.) o superficie, y el canal solo cumpli3a las funciones de desague pluvial.

Sobre la presencia de materiales Chiripa Medio, este descubrimiento corrobora que la extensi3n de esta periodicidad es bastante grande, ya que no solo se restringe a las inmediaciones del montculo. No obstante, creo que es necesario ampliar las excavaciones en esta area para obtener un panorama mas claro de todos estos hallazgos.

Con relaci3n a la estructura del area Quispe, su estilo constructivo es muy similar al de otras edificaciones formativas, como la de Allkamari (Albarracin 1992), T'ijini Pata (Mathews 1992) y la del area LLusco en el mismo sitio de Chiripa (Hastorf et al. 1996). Sin embargo, los datos de esta temporada evidencian que estos muros de piedra son en

realidad cimientos, ya que su altura no excede los 10 cm. desde el nivel del piso; además, encima de estos alineamientos de piedra se encontraron terrones de tierra bien compactados que son restos de adobes. Otra particularidad de estas edificaciones es el corte de edificación bastante exagerado, y es posible que se trate de una técnica para darle mayor consistencia al cimiento.

Por otra parte, las estructuras de las áreas LLusco y Quispe muestran varias similitudes, como la ausencia de restos de techos y/o pilares, la gran extensión de sus paredes y la presencia de canales en las esquinas más bajas para drenar las aguas pluviales. Estas características denotan el carácter abierto de estas edificaciones, y es posible que en su interior existan áreas de actividad específicas.

Todas estas evidencias apuntan a que el montículo centralizaba todas las actividades ceremoniales, y el conjunto de estructuras de sus alrededores son edificaciones de carácter primariamente doméstico-residencial, aunque no se descarta que varias de ellas tengan alguna otra funcionalidad adicional (almacenaje, ritos familiares, etc.) por la presencia de materiales decorados. Además, es lógico pensar que los constructores de este complejo religioso vivían en sus inmediaciones.

Por último, un detalle interesante es que la mayoría de los eventos de destrucción de las áreas Alejo, Quispe y LLusco, se relacionan con materiales Tiwanaku. Al respecto, el refinamiento cronológico del hiato que existe entre el Período Chiripa Tardío y Tiwanaku Clásico, puede ayudar a clarificar esta apreciación.

### **Initial Excavations at Apaza Rachel Goddard**

During the 1996 surface survey, the Taraco Archaeological Project's Apaza area of Chiripa demonstrated a high density of Formative artifacts, and, as follows, there was interest in investigating the area further. Accordingly, two days of excavation during the 1998 season were spent opening up a 2 meter by 2 meter unit in the area. The unit lay to the north and east of N1084 E998, and excavation was supervised by Emily Dean, Rachel Goddard, and Christine Hastorf. Soil was excavated stratigraphically, removing loci according to the Harris matrix system. All matrix was screened through 1/8-inch mesh and all artifacts and bone removed. Flotation, pollen, and phytolith samples were taken from the loci beneath the root zone.

To begin our excavation, the sod layer and root zone were removed in three 10 centimeter arbitrary levels. The root zone ranged in thickness from 15 centimeters to 23 centimeters. The lack of visible plow scars within the strata, the substantial depth of the root zone, and the high degree of soil compactness suggested that the Apaza area had not been recently plowed. Beneath the root zone, a layer of cobbles was encountered. These cobbles formed no particular pattern, but they did seem to suggest some sort of deliberate filling event. The cobbles were clustered in the northern half of the unit. The surrounding matrix was a dark-brown silty clay loam with few inclusions.

The ceramic, lithic, and bone density in the sod layer, root zone, and underlying matrix was relatively high. Typologically, however, the recovered artifacts appear to be a mix of modern, Tiwanaku, and Formative materials.

After this preliminary investigation, excavations at the Apaza area ceased so as to return attention to the Santiago area. The excavations of the area have revealed possible evidence of activity, and this area may warrant additional investigation in the future.

Excavations at Santiago  
*Emily Dean and Rachel Goddard*

## REPORT ON THE 1998 EXCAVATIONS AT AREA SANTIAGO

Towards the end of the 1996 field season the Taraco Archaeological Project uncovered the remains of two stone walls, ASD 10 and ASD 17, in the far eastern units of area Santiago (Fig. 1). Preliminary analysis of the associated ceramics (Steadman, personal communication) indicated an Early Chiripa date for ASD 17 and a possible Middle Chiripa date for ASD 10 (although there was some mixing with Tiwanaku ceramics to the east of ASD 10).

When designing our excavation strategy for the 1998 field season we decided to pursue these two walls in the hopes of finding domestic structures. While our 1996 excavations yielded several meters of a dense Early Chiripa occupation zone, Event B-16, patches of melted adobe, Event B-13, and numerous artifacts suggesting domestic activities (see Hastorf et al. 1996), we had found no clear evidence of house walls and well defined structures. If ASD 10 and 17 were indeed walls of domestic structures we could, at long last, address inside and outside spatial patterning, as well as realize one of the Taraco Archaeological Project's long-standing project goals, discussing domestic occupations at Chiripa.

### METHODOLOGY

We began our 1998 excavations by opening up nine 2 meter by 2 meter units to the north and east of N1092 E978, the unit in which we had encountered ASD 10 and ASD 17 in 1996. Soil was removed in loci following Harris matrix system and was excavated stratigraphically whenever possible. All matrix was screened through 1/4 mesh. Bulk flotation and pollen and phytolith samples were taken from all loci beneath the plow zone. When loci seemed especially informative additional samples were taken. Particular artifacts of interest were point provenienced using an EDM. Excavations were supervised by Emily Dean, Rachel Goddard, and Christine Hastorf.

After removing the thick plow zone layer, which in some areas extended 40 cm beneath the surface, we began excavating relatively arbitrary levels of the cultural fill (Events B-28 and B-29) that lay beneath the plow zone and above the level of the ASD 10 wall stones. Once we found the top course of ASD 10 continuing north we divided units into multiple loci in order to spatially separate the fill on the eastern and western sides of the wall (Events B-90 and B-91).

In our second arbitrary level (Level E-2) of cultural fill in N1096 E978, ASD 10 appeared to curve to the east, forming an oval-esque wall (Fig. 2). Although these wall stones are not as intact as the ASD 10 stones to the south (the top course appears to have been displaced) their placement and relationship to the rest of ASD 10 makes a strong case for their incorporation into this structure. Once this wall curve was established we created a new arbitrary level, Level 3, to represent the cultural fill to the east and south of ASD 10 - in other words, the interior of ASD 10.



The fill of this interior area was difficult to stratigraphically distinguish from the exterior fill in our first three levels. The soil was a uniformly soft, loose, dark brown clay loam with numerous inclusions of clay, gravel, and cobbles. In general, the stratigraphy of this eastern area was very disturbed, indistinct, and difficult to dig.

After reaching the level of the bottom course of the ASD 10 wall stones, the matrix became less fill-like and began to get more compact, clay-ey, and orange in color. Although these orange clay patches were not continuous across the surface, they were frequent enough to convince us that we had the remains of the surface associated with ASD 10 (Event B-135). Additionally, we began to excavate discrete activity areas: patches of slightly burnt and ashy earth containing a high density of fish bone (Locus 2207) and a pit (Locus 2211). Unlike other features in the vicinity of ASD 10 (Features 202, 203, 205, 207, 208) which were clearly intrusive Tiwanku pits and burials from above, these activity areas did not appear to cut into ASD 10 and its associated surface.

We excavated this surface (Loci 2202-2210), peeling away approximately 5-8cm of the surface and fill underneath. Our goals were to excavate discrete areas of the surface in a controlled manner and to separate surface from any intrusive pits. We found several activity areas along the surface: 1) a high density fish bone area, 2) a mound of ashy-like soil that appeared to be an in-situ burning event (Locus 2207), and 3) and a circular area of lighter brown yellowish soil that appeared to be a unique feature (Locus 2211). Excavation of this surface ceased at this point, and additional investigation of these features was not pursued. Lee Steadman's analysis of ceramics from the excavation of this surface convinced us that ASD 10 was associated with a Tiwanku-era occupation.

We next turned our attention to ASD 17, the remains of the possible Chiripa structure, beginning by excavating the fill that lay below ASD 10 and above ASD 17, and defining the northern extension of ASD 17 in the N1094 E978 2 meter by 2 meter unit (Fig. 1). This investigation was relatively rapid, both due to the fact that the field season was nearing a close and to the fact that ASD 17 seems to disappear or turn to the west in this unit (N1094 E978). Rather than following the wall stones of ASD 17, it was decided that it would be more informative to excavate the fill that lay to the east of ASD 17. We excavated this fill to an arbitrary depth of 10-15cm below the top course of ASD 17 stones in hopes of seeing whether or not a surface lay below. No particular surface was found, cultural fill continued, and investigations of ASD 17 ceased. Lee Steadman's analysis of ceramics from this Locus (Locus 2213) determined that the fill is Ö.add Lee's analysis. No features were revealed in the excavation of this fill.

## CONCLUSION

While ASD 10 has been determined to be associated with a Tiwanaku occupation (L. Steadman, personal communication), ASD 17's close proximity to Event B-16, our Early Chiripa occupation (B-16 runs into the western edge of ASD 17), offers some hope that with further analysis and excavation, ASD 17 may turn out to be the architectural remains of a Chiripa structure.

In any case, the location of these two structures, adjacent to the wall of Choquehuanca, the semi-subterranean enclosure, is fascinating. As with our 1996 data, the implication is that ritual and domestic areas existed in close proximity at this Formative site, and that perhaps the division between the two domains was not so rigidly maintained during this time period as it was later on.

Moreover, given that ASD 10 is associated with Tiwanaku occupation, it is important to ask whether or not the presence of the semi-subterranean enclosure affected

the settlement of the Tiwanaku population: How did they build up the site in order to create suitable living space? How was the immediate landscape transformed between Late Chiripa and Tiwanaku occupations? These questions, and continued investigation into the nature of Formative domestic occupations at area Santiago, will be important directions for research in our 1999 field season.

## **The Data**

### **The Ceramics**

*Lee Steadman*

A total of 283 bags of ceramics were recovered from the 1998 excavations at Chiripa. In the field, these ceramics were washed and then transferred to the ceramic laboratory for processing, where they were logged in and the bag and provenience recorded. All of the diagnostic specimens (rims, bases, handles, decorated sherds etc.) were separated out from the body sherds, and placed in their own smaller bag within the larger tyvek ceramic locus bag. Body sherds of less than 1 cm<sup>2</sup> were culled and also placed in their own smaller bag; these sherds were weighed and counted, but will not be analyzed as they are generally too small to determine surface color or finish accurately. The diagnostics specimens were labeled with individual specimen numbers and catalogued. In charge of this phase of the ceramic processing, and of overseeing the washing, was Leonardo Laura. The ceramics from loci which were not destined for analysis, for example those from the plow zone, mixed levels, or, in this excavation season, material from the Tiwanaku occupation of Chiripa, were then counted, weighed and shelved. The ceramics chosen for further study were given one of two types of analysis, depending on the context of the locus. In cases where the locus was disturbed but it was necessary to determine which phases were represented, or the percentage of ceramics that were intrusive, the ceramics were categorized (and weighed and counted) by phase and ware only. This type of rapid phasing of the Chiripa material, of course, has only been possible in the 96 and 98 seasons, after the preliminary work and definition of the ceramic phases during the 1992 season.

Ceramics (both body sherds and diagnostics) from loci that were undisturbed, where the analysis of the materials would contribute to a comprehensive and detailed description of the ceramic assemblage from that phase in the Chiripa sequence, were given a more detailed attribute analysis. Attribute analyses have been used productively for the definition of ceramic sequences elsewhere in the Titicaca Basin (Steadman 1995; Chávez 1992; Chávez 1980/81), and involve the observation and recording of individual ceramic attributes (paste, finish, surface color, vessel shape, rim shape, diameter etc.) rather than the definition of a fixed set of attributes, such as is used in a typological classification (Rowe 1959; Shepard 1956:307-318; see Steadman 1995:48-50 for further discussion of these differences). Individual attribute analysis is a more sensitive and effective means of studying changes through time than a typological approach (Plog 1983:131-32; Plog and Hantman 1990:441-42), which necessarily stresses the similarities among ceramics rather than their differences. The attributes of the body sherds that were subjected to this detailed analysis were recorded on computer coding forms. Information on the diagnostic specimens was recorded on a more detailed form that allowed for

recording of information on surface luster, details of manufacture, design etc. About one half of the diagnostics, the larger and more interesting specimens, were also drawn in the space provided on the form. Unlike previous years, only two whole pots were recovered in the 1998 season, both small Tiwanaku handled jars.

The ceramic laboratory counted on three ceramic assistants during the 1998 field season; Leonardo Laura of Tiwanaku, Juan Leoni of the State University of New York, Binghamton, and Miriam Doutriaux of the University of California, Berkeley, both of whom worked on the attribute analysis of the body sherds and diagnostics, as well as on diagnostic drawing. The ceramic phasing, classification of the pastes, and the remainder of the diagnostic analysis was undertaken by the author. The analysis of the Chiripa ceramics is still in progress, to be completed over the course of this academic year. The following is therefore only a preliminary report on the ceramic artifacts.

### **Early Chiripa**

In the 1998 excavation season Early Chiripa ceramics from undisturbed contexts were found in the lowest level of the Montículo 1 excavations, and in an Early Chiripa burial in the Santiago sector. The ceramic sample in both cases is relatively small, and the ceramics recovered are consistent with the definition of the Early Chiripa phase as reported in Steadman 1999. The ceramic sample from the Montículo 1 excavations is the first Early Chiripa material obtained from the vicinity of the mound, and will serve as a useful comparison to Early Chiripa material from the rest of the site.

### **Middle Chiripa**

Undisturbed Middle Chiripa deposits were found on and below the floor of the Choquehuanca semi-subterranean enclosure, and in the lower levels of the Montículo 1 and Alejo excavations. The ceramics from the floor of the Choquehuanca enclosure are especially promising, as these are the first Middle Chiripa ceramics found in a special purpose context. The ceramic sample from the Montículo 1 excavations will provide not only a sample from the mound, which generally tends to be somewhat different in the popularity of certain attributes from the occupations in the northern area of the site, but also with a sample that can be compared to the ceramics recovered by Kidder (Mohr 1966) and Browman (1980, 1981, 1991).

The attributes of the Middle Chiripa ceramics from the 1998 excavations analyzed so far are again consistent with the Middle Chiripa ceramics from the 1992 and 1996 seasons (Steadman 1999). The Middle Chiripa assemblage is manufactured predominantly in a paste tempered with rounded translucent inclusions, either fine or medium in size. Most vessels are unslipped, generally brown, and are burnished on the exterior. The range of vessel shapes in the Middle Chiripa levels is again weighted towards the ollas. Forms with a neck height of 2 to 4 cm are the most common, and these generally have a slightly flared neck angle (fig. 29 c-f), with a lesser number of flared-necked (fig. 29 g) and straight-necked specimens (fig. 29 b). Short-necked ollas (fig. 29 a) and jars (with necks taller than 4 cm) are present but rare. Middle Chiripa ollas have almost exclusively plain rounded or slightly rounded rims. Contrary to what was stated in Steadman 1999, the increased Middle Chiripa ceramic sample obtained during the 1998 season indicates that some Middle Chiripa ollas in fact do have vertical strap handles, generally located just below the rim, and presumably connecting on the upper shoulder of the vessel. Finally, several further examples of Middle Chiripa bowls were recovered

from the 1998 season (fig. 29 h). Again these are mostly commonly vessels with plain rims, and straight, slightly flared walls.

### **Late Chiripa**

Late Chiripa ceramics from unmixed deposits were found in the fill of the semi-subterranean enclosure in the Choquehuanca area, in the Alejo and Quispe excavations in association with the structures in those areas, in a number of pits cutting the earlier Early/Middle Chiripa fill in the Montículo 1 excavation, and in the Upper House midden of the Montículo 2 excavation.

The Late Chiripa ceramics recovered in the 1998 season fall within the definition of this phase as presented previously. Late Chiripa ceramics are most commonly manufactured in a paste tempered with very coarse, chunky white quartz inclusions, easily visible to the naked eye on the broken edge of a sherd, and sometimes on the surface of the vessel as well. The popularity of burnished finishes is quite high in this phase, with a significant portion having a complete coverage burnish on both sides of the vessel. While most specimens continue to be an unslipped brown color, the percentage of slipped specimens is also at its highest in the Late Chiripa phase, with red the most common slip color.

Medium-necked ollas are again the most common vessel shape in the Late Chiripa assemblage (fig. 30 a-c). Jars are more common than in the Middle Chiripa assemblage (fig. 30 e-f), and include a new form with a neck over 6 cm appears (fig. 30 d). The majority of ollas continue to have plain rounded or slightly rounded rims, although a new red-slipped olla with an exterior thickened rim also appears in this phase. Bowls are considerably more common in the Late Chiripa assemblage than in previously. Of these, about two thirds are slightly flared forms (fig. 31 a-b) and one third have vertical walls, although percentages vary by provenience, with vertical-walled specimens being more common on the mound. Both bowl forms have flat bases and a variety of new exterior thickened rim shapes. Several other new shapes also appear in the Late Chiripa phase, including bottles, ceramic trumpets (fig. 31 d), and low ring bases (with a ring height of 3-6 mm).

Decorated ceramics are common for the first time in the Late Chiripa phase. In the 1998 season excavations, the Alejo and Quispe areas were found to have a significant percentage of decorated ceramics, although still less than that found in the Llusco enclosure and the Montículo. Decorated wares in the fill of the Choquehuanca enclosure are extremely rare. The most common decorated ceramics are specimens painted in cream over a red-slipped background (fig. 31 a-c), generally referred to as Chiripa cream on red, which form about 75% of the total Late Chiripa decorated contexts from all excavation seasons (variations include cream on dark red, yellow cream on red, and yellow orange on red). Second most popular of the decorated ceramics are those with black or dark brown and cream designs on a red-slipped background (fig. 31 e-f), although these represent only about 9% of the decorated sample from all recovered contexts (again with minor variations in slip color). Other decorative techniques in the Late Chiripa phase, although not all were necessarily found in the sample excavated in 1998, are incision on a single color background, either slipped or unslipped (fig. 31 d. This trumpet fragment also has white post-fire paint in the vertical incisions and alternating white and yellow post-fire paint in the horizontal incisions), black on red painting, black on red with incision outlining the color areas, dark brown on cream, and red on cream. Decoration usually occurs on bowls; the vertical-sided bowl with an exterior thickened rim has the

greatest percentage of decorated examples, but slightly flared bowls, both with and without thickened rims, are also often decorated, as is the occasional olla.

Finally, the excavations in the fill of the Montículo Upper Houses provide us with a sample which can now be used to subdivide the Late Chiripa phase which, spanning the period from 800 to 100 BC, is at present too long to be of optimum chronological value. This Upper House midden dates to the latter part of the Late Chiripa phase, in contrast to our previous Late Chiripa contexts at Chiripa, such as the Llusco semi-subterranean enclosure and the fill of the Choquehuanca enclosure, which date to the beginning of this phase. In addition, the Upper House midden ceramics can be expected to provide us with contextual information on the activities which took place within the Upper Houses, a subject which continues to be debated. Although analysis is still in progress, it appears that the ceramic assemblage from the latter part of the Late Chiripa phase, that contemporary with the Late Chiripa/Chiripa Mamani as defined by Bennett (1936), Chávez (Mohr 1966) and Browman (1980, 1991), has more burnished specimens than the earlier part of this phase, more of the micaceous paste (the same that was common in the Early Chiripa phase), and less of the paste with the chunky white inclusions. Cream on red painted ceramics are slightly less common than in the beginning of the phase, with somewhat more black on red and incised specimens, while the percentage of black and cream on red pieces remains the same.

## Archaeobotany

*William T. Whitehead and Rene Ayon*

### In the Field

Water flotation, to collect a systematic sub-sample of fragile charred plants, micro-faunal bones, and other small artifact types, was implemented at Chiripa as an integral part of our research. Our standard excavation methodology included the collection of at least one standard sized soil sample from every locus that would be processed in water to extract out the artifacts. Field excavators were instructed to sample each locus by collecting one 10 liter "bulk" flot sample, and in certain contexts, like use-surfaces or middens, we also collected a second 10 liter "scatter", or average soil sample. In addition, across certain surfaces, many bulk soil samples were taken, usually one sample every 50 centimeters. A "bulk" soil sample is a single 10 liter block of soil, with a recorded x, y, z provenience. A "scatter" sample is a collection of soil distributed from throughout the locus matrix to create an average view of what was deposited within the soil. These two strategies are implemented together to provide a fuller view of the artifactual material from a specific locations.

These procedures required that the excavator label each bulk soil flotation sample with a unique point provenience number and note this on the locus form. A tyvek tag with the provenience information was filled out and placed in the interior of the flot sample bag, and the bag tied with a second round, white labeled, tag. In small loci, especially from the mound excavations, the entire soil matrix from certain loci was floated to provide enough charred plant material to do an appropriate paleoethnobotanical analysis. Table 1 displays the total number of samples that were floated. We have chosen to use 10 liters of soil as our standard volume based on the range of charred plant

densities that we have had in the past from floated samples both at Chiripa and at Tiwanaku.

Small archive soil samples were also taken with each flotation sample. The excavators were instructed to take small samples from the center of each flot and to deposit them in small plastic bags. These samples were double bagged and labeled with the appropriate information. Some of the samples were then sent to U.C. Berkeley for pollen analysis, which will be examined by undergraduate student, Rene Ayon, for his senior thesis.

### **The Flotation System**

The mechanized water flotation system used at Chiripa is a modified SMAP setup (Watson 1976), with several additional processing techniques to increase the speed and amount of charred plant material recovered from each flot sample. This machine was built in 1989 for the Wila Jawira project by Christine Hastorf. We gratefully acknowledge the permission to use this machine by Alan Kolata. This flotation machine consists of a 50 gallon oil drum, 1.5 inch pipes, support bars, and an inner bucket with a .5 mm stainless steel mesh at its bottom and a pour spout on the topside. A shower head mounted in the 50 gallon drum is attached to pipes to bring fresh water into the oil drum and gently circulate it through the bottom of the inner bucket mesh. This motion loosens the soil, allows the finer silts and clays to sink to the bottom of the oil drum, and permits the lighter than water material within the soil to float to the surface. Charred plant remains have a lighter specific gravity than water and thus they tend to float if unattached to soil. The floating charred plant material pours out of the oil drum and into a light fraction catching bucket. This is suspended from the oil drum spout where it catches all material coming out of the inner flotation bucket spout. This bucket is lined with a fine .17mm mesh cloth.

The flotation team in 1998 was William Whitehead, Rene Ayon, Franz Choque, and Emeterio Choquehuanca. The flotation machine was operated by at least two individuals every day, and by three during training. At the beginning of a flotation day 18-24 samples were selected for processing, given a unique flotation number, and all provenience information for each soil sample was recorded in the flotation log. The 1998 season flotation numbers began with 12,000 and proceeded sequentially. A total of 354 samples were floated. The flotation samples, the flotation machine, and all accessories were taken to the flotation area, an open fresh water pond, replenished by spring water. The flotation machine was set up and the soil samples were arranged by their flotation number. Each bag of soil was transferred to a clean bucket, measured for volume, and all the information was recorded into a log book. The flotation samples were then pre-soaked with fresh water in the buckets for at least 20 minutes, usually the time it took to process the previous soil sample.

Every day one to four sample was selected at random to receive a vial of 50 charred modern poppy seeds. These poppy seeds were added to the soil and recorded in the flotation log. This procedure is done to test the efficiency of flotation by introducing a foreign seed of known count, which can be counted and a percentage of flot efficiency calculated (Wagner 1982).

Floating began with one floater gradually pouring the soil sample into the inner bucket that was nestled inside the oil drum filled with flowing water. The other attendant would spray the soil gently with water to minimize splashing and too speed up transfer. The bucket was then sprayed clean and set aside for the next flot sample. The water level and water flow was also monitored by the second floater to insure no charred plant material was being lost out of the catching bucket by overflow or splashing. The person who transferred the soil then began agitating the inner bucket up and down to increase soil movement and clay loss through the bottom screen of the inner bucket. Meanwhile the second floater sprayed the charred plant material in the catching bucket to keep the fine meshed cloth clean of any silts that may cause the loss of any botanical materials..

When no more charred plant material could be seen on the water surface, a fish-tank filter siphon was used to suck up all remaining charred plant material that was floating in the water but not on the surface (Gumerman and Umento 1978). This was done by holding the siphon tube six inches above the bottom of the inner flotation bucket, draining the water into the charred plant material catching bucket. When no more charred plant material could be seen in the transfer tube, siphoning was stopped. At this point the water pressure was turned off to let any thing left over to float to the surface. Once this was done, the water was then turned on to full force and let run for several minutes to aid any heavier items remaining in the water. A flotation sample was completed when no more charred plant material could be seen after a tea strainer was drawn through the water. The light fraction fabric was then removed from the charred plant material catching bucket and tied up to dry with the original labeled tag. The heavy fraction was transferred from the inner flot bucket to a large cloth laid on the ground with its samples tyvek tag placed with the sample. These heavy fraction samples were left in the sun to dry until the end of the day.

### **In The Lab**

Once dry, the light fractions were transferred to clean plastic bags with the original sample tag and further labeled on the outside of the bag with a sticky label. These have been exported to the University of California-Berkeley to be analyzed, with permission from DINAAR.

The dry heavy fractions were sorted in the on-site laboratory to remove cultural and ecological artifacts by a rotating crew of Chiripaño workers, supervised by one of the before mentioned flotation crew. Each heavy fraction was sieved through a series of brass geological sieves with meshes of 4mm, 2mm, and .5mm., with the remaining fraction caught in a pan. All fractions were sorted for bones, fish scales, charred plant material, lithics, metals, and all other artifacts. Ceramics were removed only from the 4mm fraction and burned earth and adobe was removed from the 4 and the 2mm sieves. Artifact and ecofact finds from all fractions were combined by type and placed in labeled plastic bags. These artifact bags were labeled with the provenience information from the tyvek tag that accompanied the heavy fractions. Each artifact type from each flotation heavy fraction was recorded in our heavy fraction log. The artifacts were given to the appropriate artifact specialists on site. Bags with charred plant material from the heavy fractions were attached to the outside of their corresponding light fraction bag.

The results from this year's 1998 flotation will be prepared over the next year as part of William Whitehead's dissertation work, Rene Ayon's undergraduate senior thesis, and Christine Hastorf's continuing research on the paleoethnobotany of the Formative at Chiripa.

### **Animal Bone - *Kate Moore***

Animal bones from all seasons of the TAP research program are being studied by Katherine Moore (University of Pennsylvania; mammal bone) Susan deFrance (University of Florida; fish) and David Steadman (University of Florida; birds). Research on animal use at Chiripa during the 1998 season followed the analysis of the Early Chiripa component at Santiago in 1997 and 1998. Our new appreciation for the role of aquatic resources and the new availability of dates and chronological assignments of features turned our attention to tightly controlled recovery of remains from primary deposits. In July 1998, Moore joined the TAP crew at Chiripa to monitor recovery of materials in the field and to engage in preliminary sorting of bone materials for further analysis.

A field trip in 1996 by colleagues of Steadman resulted in a list of the bird species in the area and an assessment of environmental change in the lake basin over time. In 1995 and 1996, deFrance collected fish from Lake Titicaca to compare to archaeological fish faunas. She collected specimens from 3 species of *Orestias* (killifish) and *Trichomycterus* cf. *rivulatus*.

In 1998, Moore engaged in a similar but more informal assessment of the mammalian fauna of the area around Chiripa. This farming region has experienced an almost complete turnover of domestic fauna since the time of Spanish conquest, however, with cattle, pigs, sheep, and donkeys replacing the native camelids, and Old World fowl replacing the native guinea pigs. Some basic observations would be applicable to either suite of animals, though. Herders today fodder their animals on a combination of barley from their fields and totora cut and carried up from the lake edge. It is clear that there is not enough natural pasture on the Taraco peninsula to support the numbers of animals that are kept there, at least on the northern side where the site is located. Soils are very thin and rocky on the hilltops along the spine of the peninsula, and where there are not cultivated fields, the pasture is overgrazed and in some places grown over with unpalatable composites. Herders in July (in the middle of the dry season) were bringing their cattle, pigs, and sheep from farmyards and hillside pastures each day to graze in the lake pampa on field stubble and totora. The pastures closest to the lake edge had been inundated during the rainy season.

Pressure upon pasture resources is typical in arid and semi-arid regions, suggesting several postulates for prehistoric herders in the Chiripa area: that the very limited upland pasture available along the narrow peninsula



would have restricted the scale of a pastoral component to the Chiripa economy, in comparison to lake edge or inland regions, unless there had been regular access to more distant pastures off the peninsula; second, that the lake edge and agricultural plots would have been essential resources for the foddering prehistoric camelids, particularly during the dry season; and third, that llamas, with their broader dietary tolerance, would have been better suited to the Chiripa region than the alpaca. In addition to these observations on herd animals, TAP crew members worked with local informants on the cultural ecology of the lake edge environment, specifically about fishing, fowling, and egg collecting.

Analysis of the faunal material collected in 1992 and 1996 led to slight modifications in recovery protocols for animal bone for the 1998 season. For all loci which were screened, bone was collected in 1/4 inch mesh along with ceramics and lithics and then washed after sorting. Dried samples were packed in tyvek bags to await analysis. In addition, bone was recovered to 1 mm in all of the heavy fractions of flotation samples. Sorted samples were packed in ziplock plastic bags to await analysis.

The screened samples were sorted into two categories: the first consisted of loci representing unmixed, primary deposits in well-understood contexts that could be dated to a single period using ceramics or absolute dating. Bone from these deposits will be analysed in complete detail including information about the relative abundance of different animals, the size or age and health of the animals involved, the preparation of meat and cooking practice, the structure of the herds, the means of fishing and fowling, etc. A limited number of loci were sorted for this level of analysis and the large mammal bone analysed. Fragments of large mammal bone were separated according to taxa, body part, and side of body and individually described and weighed. Detailed observations were made on the location of cut marks, impact cones, and burning as well as carnivore and rodent gnawing, weathering, root damage, and digestion. To aid in the reconstruction of llama and alpaca herds, the eruption and wear states of camelid teeth were recorded and all complete bones or bone portions were measured with dial calipers. Twenty of the first category loci were analysed in the field, and 110 more were shipped on loan to the U.S. for further study. The second category consists of loci from secondary or mixed contexts, including plowzone layers, mixed fill, intrusive burial fill, etc. A limited analysis of these bones will be oriented toward understanding their archaeological context, rather than using them to reconstruct diet or economic structures. Information gathered included the counts and weights of bone from major taxonomic categories (fish, bird, large mammal, etc.), evidence for burning or other heat treatment, evidence for surface weathering, trampling, carnivore damage, and other post-depositional changes. Within the large mammal category, typically the most bulky, major skeletal parts were sorted and weighed, in order that movements of body parts across the site may be traced. Bones from these units were analysed in the field as much as possible, to reduce the amount of material that

needed to be shipped to the U.S. Eighty-eight loci of the second category were analysed in the field, with bird and fish bone shipped on loan to the U.S.

Analysis of the bone tools that had been recovered during the 1998 season was completed in the field. Both bone tools that had been identified by excavators and smaller fragments that had been included in samples of bone scrap were studied with reference to the preliminary functional typology prepared for the 1992 and 1996 bone tool sample. Bone tools were cleaned and examined under 10x hand magnification for signs of manufacture, wear, damage, and heat treatment. One hundred-sixty bone tools were studied from 1998, the great majority made from camelid bone. Major categories of tools were for weaving, netting, and pottery manufacture. The majority of almost 600 bone tools from Chiripa have now been described; the final analysis will involve a consideration of their location within the sectors of the site and chronological position within those sectors.

The analysis of the screened bone from Chiripa will be completed over the next year. Accompanying this analysis will be the analysis of the bone from the heavy fraction of the flotation samples. Our team will be sampling among many hundreds of samples which have been processed. While there will be limited information on the utilization of mammals and birds from the flotation samples, we anticipate that these will be critical in an full appreciation of the role of fish in the Chiripa economy. Analysis at this point indicates that at least 2 species of *Orestias* are present, and that these small killifishes are more common than catfishes. A quantified picture of the density of fish remains across the mound and the various outlying structures should allow us to suggest how fishing was used to provision the site's inhabitants, and whether fish was a generalized staple or a food restricted to a certain season or part of the site's function. The final integration of information about the use of camelids, fish, and birds will allow us to address questions about the nature of the prehistoric diet overall, the environment surrounding the site, the productive economy of the site's inhabitants, and the way that the landscape of the site may have shifted over time as animals were prepared and their remains discarded in different deposits.

## **Geophysical Investigations**

### ***Don Johnson***

During one week in the 1998 TAP field season, geophysical investigations were performed at different areas around the Chiripa site. The geophysical investigations consisted primarily of magnetic gradiometer investigations. A resistance survey was also performed over a limited area. The objective of the geophysical investigations was to locate structures not visible on the surface.

All geophysical grids were tied directly into the site grid, with the exception of the

geophysical grids at the Alejo site. The grid at Alejo was reference to the excavation. Prior to collection of gradiometer data, stakes were set in the ground at 20-meter intervals, corresponding to the site grid. Stake locations were established using a total station.

### **Magnetometer Method Description**

The magnetometer measures the sum of the earth's field and a magnetic body's induced and permanent field. The earth's field is essentially constant over a site and is easily removed from measured values. Certain materials, when in the presence of an external magnetic field such as the earth's field, exhibit their own magnetic field. These magnetic fields are the variations from background (anomalies) that are measured and mapped by magnetometer investigations. The magnitude of this induced field depends on several factors, but primarily on the material's magnetic susceptibility, an inherent physical property. A susceptibility contrast between background soil and the target feature must exist for an induced magnetic anomaly to be present. The induced field is always in the same direction as the earth's field. Permanent (or remnant) magnetic fields are magnetic fields that a body has even when there is no external field and may be in any direction.

Many archaeological features produce magnetic anomalies because of induced or remnant fields. The magnetic susceptibility is related to the chemical composition of material. Some rocks, such as andesite, have a relatively high susceptibility, while soil generally has a low susceptibility. This makes it possible to map foundations, walls, and other concentrations of rocks. Properties of soil, primarily the physical state of iron mineralization (which affects the susceptibility), often change due to patterns of use. This allows for floors, pathways, pits, ditches and trenches, and similar features to be mapped with the magnetic method. Remnant magnetization of soils results from heating iron oxides in the soil above a critical temperature. This affects ceramics, hearths, fire pits and fire-altered soil, making their detection possible using magnetic methods. Ferrous metal (iron) has a very high susceptibility and often is a strong permanent magnet. Iron objects are easily mapped, but their strong magnetic fields will mask subtle anomalies often associated with archaeological features.

It is also important to note that variations in surface topography will also result in measurable anomalies. Features like small mounds or dirt, excavations, ditches, and even plow furrows can produce measurable anomalies as in apparent in some of the data collected at Chiripa.

Magnetic gradient values are determined by taking the difference between two simultaneous magnetic field values from different heights above the ground. Magnetic gradient values are very sensitive to near surface features (typically down to 1 meter deep), with makes it especially useful at archaeological sites. The gradiometer method eliminates the component from the earth's field, including changes exhibited by the earth's field throughout the day, including solar storms. Data collected at Chiripa were the magnetic gradient.

## **Resistance Concepts**

Resistance methods measure variations in the electrical resistance in the subsurface. This is accomplished by introducing an electrical current into the ground, measuring the corresponding voltage drop (or potential), and using these values to determine the electrical resistance of the soil. The method is used to map lateral variations in soil resistance across the site. Depending on local soil conditions and type of human activity at a site, various features can be mapped with resistance methods. Electrical resistance of soil is dependent on soil structure and moisture content. Generally, the resistance is higher when the moisture content is lower. The resistance of stone is typically higher than soil and sand is more resistant than clay. Foundations, wall, paths, pits, hearths, and graves are among the many archaeological features that can be mapped with resistance.

## **Instrumentation**

A Geoscan FM-36 fluxgate gradiometer was used for the investigation at Chiripa. The Geoscan gradiometer consists of two magnetic sensors maintained at a constant separation. The instrument uses the two sensors to automatically determine the gradient value. Data are stored electronically and periodically transferred to a computer for processing.

A Geoscan RM-15 soil resistivity meter was used for the investigation, using a “twin probe” configuration. In this configuration, one of the current electrodes and one of the potential electrodes are inserted into the ground at a location outside the area being surveyed. These are called the remote electrodes. The other current and potential electrodes are called the mobile electrodes and are moved together across the site and wherever they are inserted into the ground, a resistance measurement is made. Each reading was automatically recorded in the instruments electronic memory and periodically transferred to a computer for further processing. The separation of the mobile electrodes determines the depth of investigation. For this investigation, the separation was 0.5 meter, which can typically map features to a depth of 1 meter.

## **Field Procedures**

Most of the data were collected over 20 by 20 meter grids. Some data were collected over 10 by 10 meter grids, but procedures were the same. Measuring tapes were laid out along the north and south sides of each grid being surveyed and ropes marked at 1-meter intervals were stretched between the tapes. The operator used the marked rope to determine his grid position during data collection. The gradiometer was set up to take readings every 12.5 centimeters. Every eight readings the instrument would sound a short tone, allowing the operator to adjust his walking speed so that the tone occurred at each meter mark on the rope. The operator would first collect data by walking up one side of the rope, then returning down the other side. Then the rope would be moved and the process repeated.

Gradiometer data were initially collected along traverses 0.5 meter apart; however, in order to investigate more area in the allocated time, the line spacing was

increased to 1 meter. There was a slight loss in resolution, but the loss was negligible.

Resistance data were collected using essentially the same procedures as the gradiometer data. The measuring tapes and marked ropes were positioned in the same manner. Resistance measurements were made at intervals of 0.5 meter while moving up one side of the rope, then taking measurements every 0.5 meters while moving back down the other side of the rope. The line spacing for the resistance survey was 1 meter. Data were recorded using the resistance meter's internal digital data logger.

## Results

The gradiometer surveys over the Choquehuanca, Santiago, Apaza, and Quispe areas covered contiguous survey blocks and are presented as a single map. Most of the data were collected with a line spacing of 1 meter, although some of the area was surveyed using a 0.5-meter line spacing. Figure 32 shows the extent of the survey and show the areas covered with the different line spacing. The north edge of the survey grids in the Santiago area stopped short of a full 20-meter interval at the request of the landowners. Gradiometer data is presented as contoured data in Figure 33.

### Choquehuanca Results

Data collected over the Choquehuanca enclosure show primarily the topographic effects of the excavation walls, especially the east-west trench that extends from approximately N1093 E960 to N1093 E970. A distinct magnetic low defines the south edge of the trench and an equally distinct high marks the north edge. A linear magnetic high extends north from the Choquehuanca enclosure and appears to connect with a relatively strong high at N1104 E962. This suggests an additional structure is adjacent to the excavated structure. The excavations and their associated dirt piles have made detection of additional features difficult. The data from a 10 by 10 meter grid over Choquehuanca was lost, resulting in a gap in the coverage.

### Santiago Area Results

Numerous anomalies appear to define buried structures, either walls or foundations, in the Santiago area. The anomalies define short (less than 4 meters) linear features that join with others at approximate right angles. The most distinct are located along a slightly arcuate line (concave to the east) between coordinates N1100 E955 and N1125 E945. There is further indication of structures out to the field edge at N1133 E932. The best defined of the interpreted structures are located within a 10 by 10 meter square with grid coordinates N1110 E940 at its southwest corner. Other relatively strong, localized magnetic anomalies are scattered around the area, and many appear associated with the interpreted structures. At least two of these anomalies are related to modern structures: a swimming pool accounts for the anomaly at N1168 E980 and a small concrete structure is at N1137 E947.

A poorly defined, weak, linear magnetic high is present from approximately N1170 E970 to N1180 E979. There is a suggestion in the data that this feature may extend farther southwest, but it is not clearly defined. It may also extend northeast

beyond the survey limits. This feature does not appear to define a structure, but may instead reflect land use patterns, such as a path or trail.

Other features readily apparent in the Santiago gradiometer data are due to visible surface features. The magnetic low along the north edge of the survey area, oriented approximately east west at N1175, is due to the abrupt elevation change there. Similarly, a more gentle elevation change at approximately N1135 has also caused an east-west trending magnetic low. A particularly deep plow furrow is the cause of a distinct linear anomaly between N1124 E932 and N1118 E985. Other weaker furrow responses can be seen in the data to the south of and parallel to this feature. The field edge is apparent in the data along a portion of the west side of the survey area.

There are a couple of reasons why the (interpreted) structures could be delineated by magnetic methods. If the structures were of adobe construction, there would be little or no physical difference between melted adobe and the surrounding soil and therefore anomalies might not be detectable. If the adobe has been subjected to fire, then the baked clay in the adobe may exhibit enhanced magnetic properties, making it possible to map it with gradiometer surveys. Another possibility is that the walls, or portions of them, were constructed with magnetic rocks, such as andesite. The localized, relatively stronger anomalies may also be due to localized fire hearths or due to magnetic rocks, such as the cut andesite stones excavated at B148. Piles of fieldstones, primarily quartzite, exhibited little or no magnetic response. This suggests that the magnetic andesite is not common to the area, and if present, may have been imported. This makes the stronger, localized anomalies interesting targets for future investigations. Small pieces of modern steel or iron may also be the cause of some of the anomalies.

### Apaza Area Results

The gradiometer data from the Apaza area have identified fewer features than encountered in the Santiago area. One area was identified that may contain structures. They are located within an approximate 20 meter square with southwest corner at N1130 E990. Within this location, there are linear features suggesting walls or foundations as well as localized strong anomalies from smaller objects. One such feature is a north-south linear anomaly at E1005. Visual inspection of the surface provided no evidence of the source of the anomalies within this square except for the north-south linear anomaly at about E992, which is due to the field edge.

A wide, poorly defined magnetic low crosses the Apaza area from N1122 E990 to N1105 E1030. This feature is too wide to be due to a structure like a wall. It is roughly parallel to a modern ditch that is located about 25 meters to the south (the cause of the most distinctive linear anomaly at Apaza). The indication is that the poorly defined magnetic low may be related to an older, filled ditch or possibly a terrace edge that has eroded away and flattened out.

The most distinctive magnetic feature at Apaza is due to a ditch extending from N1100 E 990 to N1085 E1012. A small topographic terrace is responsible for the magnetic anomalies between N1105 E990 and about N1100 E1010. A rock pile is corresponds with the anomaly at N1081 E1004 and a dirt pile is located at the anomaly at

N1096 E1020. The east field edge is the source of a roughly north-south linear feature running from about N1095 E1023 to N1150 E1030.

### Quispe Area Results

The Quispe area is virtually magnetically featureless compared to Santiago and Apaza. The strongest magnetic anomaly is located at N1105 E1060. A large stack of cut weeds was present at this location that must have concealed some metal objects. Magnetic anomalies at N1115 E1115 correspond with a pond and are probably due to the operator jostling the instrument while trying to avoid the water. A dirt pile is located at the anomaly at N1082 E1124. Anomalies are also associated with excavation units at N1077 E1116 and at N1069 E1123. A concentration of small discrete anomalies is located in the southeast corner of the survey area that is related to current and former dwellings at that location. Modern metal scrap was visible scattered over the surface in this area.

The most distinctive unexplained anomaly is a thin linear anomaly that is visible from N1098 E1065 to N1089 E1085. Additional weak anomalies suggest this feature may extend in either direction along the same trend. A stone-lined well along the trend of this feature (at approximately N1105 E1052) suggests this feature is a conduit for water. Another narrow linear feature extends from N1070 E1125 to N1077 E1135. An excavation unit is located at the southwest end of this feature.

Resistance data were collected over a 20 by 20 meter grid within the Quispe area. The location of the area covered by the resistance survey is shown in Figure 32. The data are presented in Figure 34. The excavation unit is centered at N1070 E1105 and clearly shows up as an area of low resistance values surrounded by high resistance values. (The data were processed with a high pass filter creating the negative resistance values that are otherwise not possible.) The dirt pile from the excavation unit is the cause of the high resistance values at N1068 E1112. The south half of this survey grid was located up a hill towards the road. Observed resistance values sharply increased uphill making the high-pass filtering necessary. The numerous anomalies in this area are questionable and may be an artifact of the processing.

One area of high resistance extends north-south along the east side of the excavation unit. There is no visible explanation for this feature and may reflect a buried structure.

### Alejo Area Results

The gradiometer data from the Alejo area are presented in Figure 35. This set of data was not tied into the existing site grid. Instead, it was referenced to the excavation unit: the southeast corner of the excavation unit is at coordinates N10 E10. The large anomaly at about N11 E7 is probably related to the topographic effects of the excavation wall, as is the linear anomaly extending west of that location. A linear anomaly extends from N25 E11 to N25 E20. It possibly extends farther east and west, beyond the limits of the investigation. A series of weak anomalies suggest a rectangular structure. (This may be more the imagination of this interpreter than a real feature.) The coordinates of the

corners of this possible feature are at N15 E10, N20 E13, N17 E20, and N11 E16. Higher confidence could be given to this interpretation if the coverage were more extensive to put these anomalies into a larger perspective. A distinct anomaly is located at N3 E18. The cause of this anomaly is unknown. A strong anomaly at N1 E7 also has an unknown cause. It is located at or near the field edge, where additional weaker anomalies are also present.

### Chiripa Mound Area Results

Gradiometer data at the Chiripa Mound area were collected on top of the mound where the area between the inner courtyard and the outer edge was large enough for 10 by 10 meter gradiometer grids. The area covered by the gradiometer and the plotted data are shown in Figure 36.

Two anomalous areas indicate possible structures, maybe indicating mound house locations. One is centered at N973 E1001, and the other at N972 E1007. The data at each of these locations indicates a feature about 4 meters long and 2 meters across. The western of the two features appears to be oriented approximately northwest southeast, while the other is oriented east west. Another anomaly that may indicate an additional structure is centered at N972 E1022. The steep drop at the top edge of the courtyard wall, just to the north of this anomaly, is probably contributing to its size and shape. The anomaly appears somewhat farther from the wall than what would be expected, so an additional source for the anomaly (ie. a buried structure) is suspected. A similar argument can be made for the anomaly centered at N973 E1018. The anomaly at N974 E1014 appears too far off the suspected alignment of possible structures and is could be topographic effect.

The distinct linear anomaly that extends from N969 E995 to N966 E1024 is due to stone wall. A depression is centered at about N985 E998 and its edges are the cause of anomalies a couple of meters north and south of that location. A linear anomaly centered at about N987 E1004 is possible related to earlier excavation units at the site.

The block of data collected at the north portion of the mound is dominated by the response of a section of pipe that is the remains of a signpost. The extremely strong magnetic response from the pipe has affected much of the data collected in this area. A possible weak linear anomaly appears to be present from N1005 E1026 to N1005 E1032. There was nothing observed on the surface to explain these anomalies.

### Conclusions

Gradiometer data appears to have successfully identified numerous structural features, particularly in the Santiago area. There is no surface expression of these features and their true nature cannot be determined from the geophysical data alone. Proximity of some of the anomalous features to the Choquehuanca enclosure suggests additional similar structures. Additional investigative methods would be needed to further identify these features.

Comparison of gradiometer across the Santiago, Apaza, and Quispe areas show significant differences in the amount of magnetic activity across the site. The highest



concentration of anomalies is located in the Santiago area and generally decreases in numbers and intensity to the east. If the magnetic anomalies are related to Formative Period structures, then the gradiometer data indicate the highest concentration of these structures is in Santiago with additional possible structures in the Apaza area. It may be possible that the distribution of magnetic anomalies may not accurately represent the distribution of structural features. If the features are apparent in the gradiometer data because fires have heated clay (in adobe) to sufficiently high temperatures to become magnetic, then the geophysical investigation may have only identified features that have burned.

Numerous relatively strong, discrete anomalies were detected at the site. Excavations at one of the anomalies near Choquehuanca encountered three cut andesite stones. Similar anomalies are concentrated mostly in the Santiago and Apaza areas, and many of these anomalies correspond with the locations of the interpreted structures. This suggests that more similar artifacts may be found, mostly in Santiago and Apaza.

Gradiometer investigations appear to be a useful investigative technique in the Chiripa area. The resistance data appear to provide useful data, however, not enough were collected to draw any strong conclusions.

### **Conclusions - Christine Hastorf**

Our research goals are several. While trying to understand the Formative phase in the south-central Andes, we are especially interested in the early evidence for increasing political scale and agricultural systems. We are trying to uncover evidence of the domestic areas and activities, but this is proving difficult. We also realize that the Formative world included ritual as central and thus are integrating the ritual evidence into our views of Chiripa. We have excavated in two areas, above and below the mound, looking for domestic houses and middens. In both areas, Llusco and Santiago, we have instead found large (approx. 13 by 13 m) semi-subterranean stone-walled enclosures. At this stage in our research we believe these to be ceremonial (gathering) areas rather than habitation. The Llusco enclosure dates to the early Late Chiripa phase, we believe dating to about 800-600 B.C. It has patches of white plaster on the floor and a drainage canal in the lower, northwest corner. The area of Santiago to the east of the enclosure directly overlooks the lake shore. This zone is a complex of use and rebuilding layers throughout all of the Formative times and into the Tiwanaku phases. While there are surfaces, they seem to be fairly clean and in some cases plastered with yellow or white, with burials throughout. Their use is not clear, but although the rubbish suggests daily life tasks were performed, there is no evidence for houses as we understand them in the Andes. At some point the walls were collapsed and a mound of rubble was formed running north-south in this area. What these different surfaces mean is still very hard to determine. This area of the site is extremely important yet still quite mysterious as to the types of activities that occurred there. More excavation must be done there to explain this sector.

To the west of these surfaces and cuts, at the end of the 1996 season, we discovered a 14 by 13 m stone-walled enclosure that we think is another of these semi-subterranean ritual areas. This one could date as early as 1500 B.C. Because we only outlined this structure in the last few days of excavation, we do not know the details of its

construction, but we do know on its east wall there is a small stone niche that had nothing visible in it. This could be what we see in later Tiwanaku and even Inkaic enclosures, niches that held important sacred objects. We also know that part of the inner stone wall was plastered.

The research on the mound provides us with a much better view of its history. We now know that there were a series of house and floor rebuildings during the Formative times, as well as several reorientations of the structures. The painstaking work on the profiles has led to a map of the actual measurements as well as an understanding of what is left of the Formative site. Sadly, no structure remains untouched, although some are in quite good shape. With our final report, we will be able to recommend which structure would be best restored for visitors to see.

The Llusco and Santiago enclosures are the earliest in this region. Previously investigated structures such as these have dates in the 400-200 B.C. range. This evidence suggests that Chiripa had some of the earliest ceremonial sectors in the region. Its importance is further seen in the systematic surface collections that were completed this year. The Formative site now seems to be about 7 ha. in size. Given that these ceremonial areas, Llusco, the mound, and Santiago only make up less than 1 ha. in area, there seems to have been substantial residence surrounding this central precinct, much larger than other Formative sites found in the nearby regional surveys.

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**Appendix I: Example of TAP's locus form**

## Appendix II: Cultural context codes: T.A.P. 1996

### Superficie y sub-superficie moderna:

000 Colección general superficial  
 010 Zona de humus con raíces. No combinar en el análisis  
 020 Colección de superficie arada  
 021 Superficie arada-raspado con pala  
 030 Colección superficial de tierra en descanso  
 031 Tierra en descanso (superficie) raspado con pala  
 040 Colección superficial natural/salvaje  
 050 Zona arada  
 060 Colección superficial excavada  
 061 Prueba de pala  
 070 Pared moderna o apilamiento de rocas  
 071 Guano  
 080 Zona de humus con raíces, ok combinar en análisis con nivel de abajo  
 090 Area moderna quemada  
 091 Entierro animal moderno  
 092 Entierro humano moderno  
 093 Pozo de excavación arqueológico moderno  
 094 Tierra zarandeada de excavaciones moderna arqueológicas  
 095 Pozos de wakeadores  
 096 Tierra de wakeadores  
 097 Madriguera animal  
 098 Capa carretera moderna  
 099 Detallar no especificados, disturbados

### Muros:

100 Muro posible  
 110 Muro de roca, sin mortero  
 120 Muro "Pirka"  
 121 Patilla de soporte externo  
 122 Patilla de soporte interno  
 125 Pared de roca, con una línea de piedras  
 130 Pared de piedra trabajada  
 140 Muro de roca caído  
 141 Muro de adobe caído  
 142 Muro caído de roca y adobe  
 143 Techo o tombado de roca caído  
 144 Techo de adobe caído  
 145 Techo de roca y adobe caído  
 150 Pared caída, NO combinar en análisis  
 160 Relleno de trinchera de muro  
 161 Trinchera de muro  
 163 Yeso del muro no caído  
 170 Muro caído de recontenido  
 180 Muro caído, ok combinar en análisis con el nivel de bajo  
 190 Muro de barro/adobe  
 191 Base de muro de piedra, de un muro adobe  
 192 Muro de adobe o roca  
 193 Techo caído

### Basural Culturalmente Depositado:

200 Basural  
 201 Basural de bajo densidad -- deposición primaria  
 202 Basural de bajo densidad -- deposición secundaria  
 210 Basural de media densidad  
 211 Basural de media densidad -- primario  
 212 Basural de media densidad -- secundario  
 220 Basural de alta densidad  
 221 Basural de alta densidad -- primario  
 222 Basural de alta densidad -- secundario  
 230 Basural de bajo densidad con ceniza  
 231 Basural de bajo densidad con ceniza -- primario  
 232 Basural de bajo densidad con ceniza -- secundario  
 240 Basural de densidad media con ceniza  
 241 Basural de densidad media con ceniza -- primario  
 242 Basural de densidad media con ceniza -- secundario  
 250 Basural de alta densidad con ceniza  
 251 Basural de alta densidad con ceniza -- primario  
 252 Basural de alta densidad con ceniza -- secundario  
 260 Zona arada derivada de un basural  
 280 Basural esparcido con muro  
 297 Basural con carbón  
 298 Basural -- detallar no especificados  
 299 Nivel de basural -- estratificado

### Superficies de "Uso" y sus Depósitos:

300 Superficie  
 301 Superficie interna de la estructura  
 302 Superficie externa de la estructura  
 310 Zona de ocupación, matriz depositada durante el uso  
 311 Zona de ocupación, matriz depositada durante el uso -- interno  
 312 Zona de ocupación, matriz depositada durante el uso -- externo  
 313 Zona de ocupación densa  
 314 Zona de ocupación con tierra perturbada quemada  
 320 Area de actividad  
 321 Area de procesamiento de metaler  
 322 Area de procesamiento de la comida  
 323 Area de producción cerámica  
 324 Area de almacenaje quemado "in situ"  
 330 Contacto con el piso (material en superficie del piso)  
 340 "Con cascara", superficie compacta  
 342 Superficie compacta dentro de la estructura (piso verdadero)  
 343 Superficie compacta fuera de la estructura  
 344 Piso de arcilla dentro de la estructura  
 345 Piso emplastado dentro de la estructura  
 346 Relleno entre pisos dentro de la estructura  
 351 Piso pavimentado dentro de la estructura  
 352 Piso pavimentado fuera de la estructura  
 360 Sub-piso de roca, construcción de drenaje  
 361 Sub-piso de cascajo  
 370 Zona de ocupación con techo o muro caído  
 380 Zona arada derivada de zona de ocupación  
 390 Posible zona de ocupación  
 391 Posible zona de ocupación dentro de la estructura  
 392 Posible zona de ocupación fuera de la estructura

Rasgos Culturalmente Depositados:

- 400 General
  - 409 Ofrenda de pesca
  - 410 Relleno de pozo
  - 411 Pozo cortado
  - 412 Relleno de pozo con basura
  - 413 Relleno de pozo con cascajo
  - 415 Relleno de pozo con ceniza
  - 416 Relleno de pozo con arcilla
  - 417 Pozo con huesos de camelidos
  - 418 Pozo con huesos de cuyes
  - 419 Ofrenda de llama
  - 420 Fogón (quemada "in situ" con límites bien definidos)
  - 421 Fogón cortado
  - 422 Area quemado in situ efemera (no asociado con un corte claro)
  - 423 Fogón de piedra y alineado con adobe
  - 424 Area quemada del piso -- sector interior
  - 425 Horno
  - 430 Canal de drenaje sub-piso
  - 435 Relleno dentro un muro
  - 437 Relleno de pozo de agua
  - 440 gradas
  - 450 Otro rasgo quemado
  - 451 Concentración de arcilla quemada -- no in situ
  - 460 Deposito de ceniza (sin lentes claro o pozo)
  - 470 Relleno del hueco de un poste
  - 471 Corte de un hueco de un poste
  - 480 Relleno de piedra (cultural) propósito indefinido
  - 490 Rasgo posible
  - 495 Ofrenda en pozo de cerámica con huesos trabajados
  - 496 Ofrenda de cerámica
  - 498 Relleno de dentro de una vasija de cerámica
  - 499 Relleno de un pozo en forma de campana
- Entierros:
- 500 Entierro en el sub-piso -- primario
  - 510 Entierro en el sub-piso -- secundario
  - 520 Entierro en basural -- primario
  - 530 Entierro en basural -- secundario
  - 540 Entierro en el patio -- primario
  - 550 Entierro en el patio -- secundario
  - 560 Entierro en una caída del muro
  - 570 Entierro saqueado
  - 580 Entierro del animal
  - 590 Entierro en pozo
  - 591 Corte de bajo del entierro
  - 592 Entierro de una matriz natural con artefactos
  - 593 Entierro en lajas -- tumba cista con piedras
  - 594 Entierro en forma de campana -- pozo tumba
  - 595 Entierro dentro de vasija cerámica
  - 596 Entierro secundario en pozo, aveces con ofrendas
  - 598 Entierro no especificados

Relleno depositado a proposito pero que contiene artefactos con localizacion no relacionada:

- 600 Humano en matriz natural con artefactos
  - 601 Matriz depositada por agua rapida con artefactos
  - 602 Matriz depositada y erosionada sobre un largo tiempo con artefactos
  - 603 Roca madre descompuesta con artefactos
  - 604 Suelo con artefactos -- no especificados como cultural o natural
  - 605 Suelo de actividad cultural que esta depositado naturalmente
  - 610 Basural usado como relleno
  - 620 Relleno cultural
  - 621 Corte de bajo del relleno
  - 622 Relleno de contrucción de una casa, dentro de una casa
  - 623 Relleno de contrucción de una casa, debajo de una casa
  - 624 Relleno de rocas (a proposito)
  - 625 Relleno de grava (a proposito)
  - 626 Relleno entre pisos
  - 627 Relleno sobre el piso
  - 628 Piedra de actividad cultural que esta depositado naturalmente
  - 629 Relleno sub-piso
  - 630 Relleno de una plataforma
  - 631 Relleno de construcción de un montículo
  - 680 Relleno de una posible zona de producción cerámica
  - 690 Relleno posible
  - 699 Relleno de grava como base de un camellon
- Lentes Depositados Delgados (Depositos Culturales, Depositos naturales o retrabaja de depositos):
- 700 Lentes de ceniza, ceniza blanca-gris
  - 710 Lentes de grava
  - 720 Lentes negros y quemados
  - 730 Lentes de matriz natural, depositados de agua
  - 740 Mancha orgánica
- No buenas evidencias para interpretación de la historia deposicional:
- 900 Suelo indiferenciado
  - 901 Trenchera de prueba/ mezclado
  - 910 Loca indiferenciado
  - 911 Estéril
  - 920 Lugar no excavado
  - 999 Lugar mezclado o información perdida, o notas incorrectas -  
-ver notas ante analizar



**Appendix IV: Cultural Context log of 1998 excavation****Table 3. List of Plant Taxa from 1992 Flot Samples**

<i>Chenopodium quinoa</i>	unidentified tubers
<i>Chenopodium</i> spp.	
<i>Verbena</i> sp.	Wira Cola leaf fragments
<i>Plantago</i> sp.	Kiana seed
<i>Relbunium</i> sp.	Kochia
<i>Rubus</i> sp.	Wood fragments
<i>Lepidium</i> sp.	Dung fragments
<i>Cereus</i> sp.	
<i>Galium</i> sp.	Cruciferae
<i>Nicotiana</i> sp.	Malvaceae
<i>Portulaca</i> sp.	Cyperaceae
<i>Amaranthus</i> spp.	Solanaceae
<i>Conopus</i> sp.	Asteraceae
<i>Oxalis</i> spp.	Boraginaceae
<i>Salvia</i> sp.	Labiata
<i>Opuntia</i> spp.	
<i>Potomageton</i> spp.	

Grass seeds

*Stipa* spp.

Hordea tribe

Panicoid tribe

Three general size ranges of grass seeds Large, medium, and small

Unidentifiable plant remain types

Starchy cell lumps not discernable to tuber or woody plant types

7 unidentified seed types

**Table 4. List of Identified Animal Species**

Identified from the site at Chiripa site excavations, Taraco Peninsula, La Paz Province, Bolivia. Identifications by D.W. Steadman, E. Sandefur, K. Weinstein. For birds, an asterisk (\*) means that the taxon was not recorded within a two km radius of Chiripa in June-July 1996 by A. Kent and T. A. Webber.

Order	Family	Common Names	Species
Fish	cf. Cyprinodontidae	killifish.	cf. Orestias spp
Amphibians	Atelopidae	toads	Atelopus sp.
Reptiles	cf. Tropiduridae	tropidurid (lava) lizards	cf. Tropidurus sp.
	cf. Colubridae	colubrid (harmless)	snakes speices 1
Birds	Tinamidae	tinamous	species 1 (large)
			species 2 (small)
	Podicipedidae	grebes	*Podiceps sp. (large)
			Rollandia sp. (small)
			Rollandia cf. micropterum
	Phalacrocoracidae	cormorants	*Phalacrocorax cf. brasilianus
	Ardeidae	herons	Nycticorax nycticorax
	Phoenicopteridae	flamingos	species 1
	Anatidae	swans, geese, ducks	*Choephaga sp.
			Anus sp.
			*Oxyura sp.
	Accipitridae	hawks	cf. Buteo sp.
	Rallidae	rails, gallinules, coots	Rallus sp.
			Fulica sp. 1 (large)
			Fulica sp. 2 (small)
	Charadriidae	ploers, lapwings	Vanellus sp.
	Laridae	gulls, terns	Larus serranus
	Columbidae	pidgeons, doves	cf. Metriopelia sp.
	Psittacidae	parrots cf. Bolborhynchus sp.	
	Strigidae	owls	<i>Bubo virginianus</i>
		*cf. Ciccaba sp.	
Picidae	woodpeckers, flickers	cf. Colaptes sp.	
Passeriformes		songbirds	Suboscine spp.
			Oscine spp.
Mammals	Dasypodidae	armadillos	species 1 (small)
	Caviidae	guinea pigs	species 1
	Cricetidae	cricetid rodents	Akodon sp.
			cf. Phyllotis sp.
	Camelidae	camelids	species 1