GUIDE TO THE ARCHAEOLOGY AND ANTHROPOLOGY MUSEUM

V. Edmundo Salinas Camacho
Dr Diura Thoden van Velzen*

**This booklet is an adaptation of the Spanish guide "Manual del Museo Antropológico"*

UNIVERSIDAD MAYOR, REAL Y PONTIFICIA DE SAN FRANCISCO XAVIER DE CHUQUISACA

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INTRODUCTION

The Archaeology and Anthropology Museum of the San Francisco Xavier de Chuquisaca University was founded on the 25th of May 1944 with the aim of investigating, recording and preserving the heritage of the Chuquisaca Department. Since its foundation it has been part of a cluster of University Museums called "Charcas", housed in a 17th century colonial mansion on the Calle Bolivar. The museum includes an archaeological collection with objects that range from approximately 1600 BC up to the Spanish occupation in 1532 AD, as well as physical anthropology and modern ethnography sections. To enhance the visitors' enjoyment and understanding of the collection all archaeological materials are displayed chronologically and according to artefact type.

At the heart of the museum's activities is its research, which is undertaken by the CIAR (*Centro de Investigación Arqueológica*), its research branch. The CIAR works in close collaboration with local authorities and communities, and enjoys the support of national and foreign universities and research institutions. Over the years the focus of research has shifted from collecting artefacts to reconstructing the dynamics of past societies. Current interests include, for example, the social and spatial organisation of prehispanic societies, and their technological development. This reconstruction is entirely based on the material culture remains of these people, as written sources for this period are not available. The results of the investigations are presented through events and publications, as well as temporary and permanent exhibits.

This book follows the organisation of the exhibits to present an overview of Chuquisaca's rich prehispanic past. It contains a chronological overview of local prehispanic cultures based on the study of pottery, a discussion of other artefacts such as arms and tools, an overview of the region's rock art, as well as presentations on the museum's current archaeology and physical anthropology research.

A BRIEF HISTORY OF ARCHAEOLOGICAL RESEARCH IN CHUQUISACA

Although scholars such as the philosopher Rafael García Rosquellas and lawyer Felipe Costas Arguedas took a keen interest in Chuquisaca's prehispanic past and started important collections, it wasn't until the 1940's that the study of the region's archaeology seriously took off. Scientists, such as the Austrian archaeologist Leo Pucher, the Slovakian geologist and palaeontologist Leonardo Branisa and especially the Argentinean anthropologist Dick Edgar Ibarra Grasso, started the systematic study and classification of Chuquisaca's prehispanic cultures. They also laid the foundations for the Archaeology and Anthropology Museum. On many occasions they worked together with the *Misión Arqueológica Alemana*, directed by Heinz Walter and Hans-Dietrich Disselhoff.

In the 1970's INAR (*Instituto Nacional de Arqueología*), Bolivia's National Archaeology Institute based in La Paz, undertook some fieldwork in the department and published a brief account of the main sites. At the same time the documentation of rock art began, particularly in the area immediately surrounding Sucre.

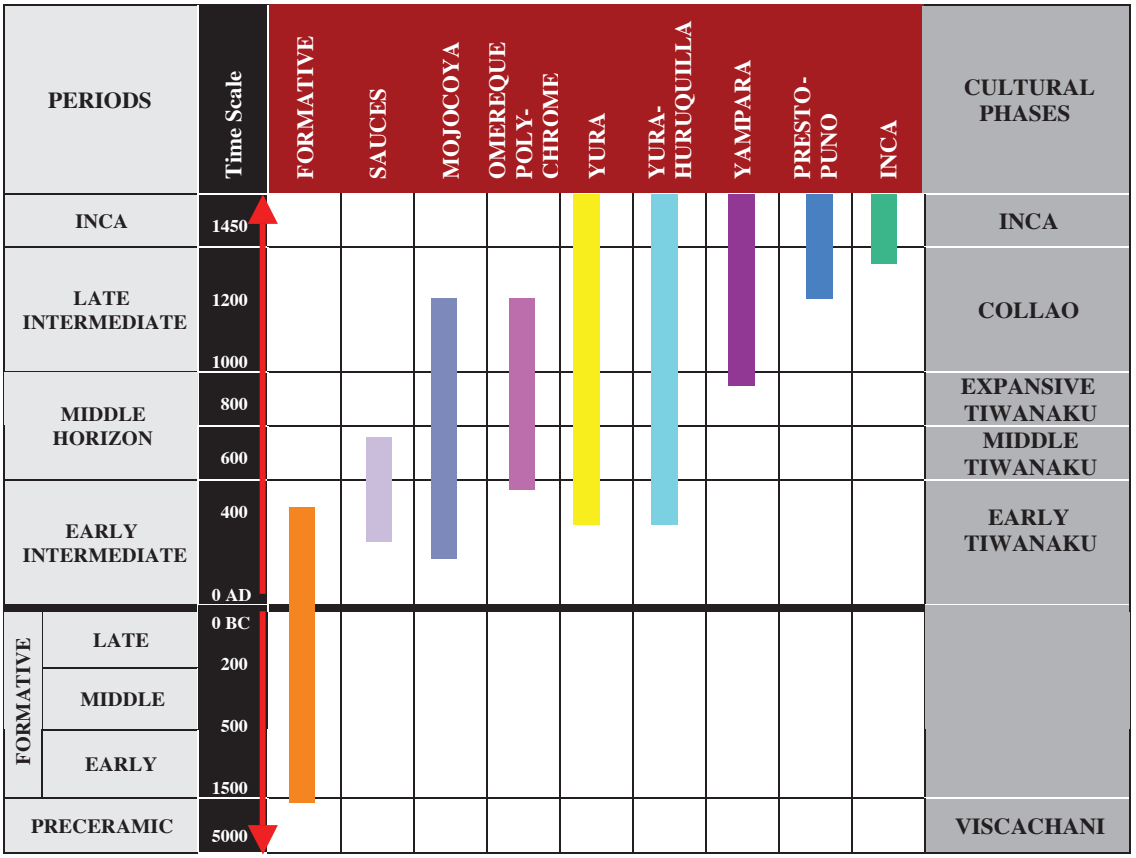
The 1980's saw the launch of the *Taller de Investigación Arqueológica de la Corporación de Desarrollo de Chuquisaca* under directorship of Edmundo Salinas with the aim of undertaking a programme of systematic and methodological research across the region. Despite its brief existence a number of projects were undertaken and the results have been published in *Informes de Investigación*. In 1987 the Bolivian Rock Art Society or SIARB (*Sociedad de Investigación del Arte Rupestre de Bolivia*) was founded. Since then it has played a key role in recording and preserving Chuquisaca's rock art sites under the guidance of Roy Querejazu.

During the 1990's a range of institutions and individuals made important contributions to reconnaissance and survey work, such as the *Unidad de Investigación Arqueológica del TIFAP* (*Taller de Formación Académica y Popular*); the Anthropology Department of the University of San Simón in Cochabamba, directed by Donald Brockington and David Pereira, who focused on the Formative Period; the *Misión Boliviano-Finlandesa*, directed by Martti Parssinen, Edmundo Salinas and Juan Faldín; Jimena Portugal who worked in Kila Kila; Pilar Lima with her project in the same area; John

Janusek, Sonia Alconini and their team with their work in the region of Icla, Cuzcotuyo and Oroncota and a team of the University of San Andrés in La Paz, who undertook survey work in the region of Los Cintis in collaboration with DINAR (*Dirección Nacional de Arqueología* previously called INAR) and directed by Claudia Rivera.

At the end of the last century the CIAR (*Centro de Investigación Arqueológica*) was established as part of the Archaeology and Anthropology Museum under the directorship of Edmundo Salinas. Its objectives are to advance the study of prehispanic Chuquisaca and its zones of interaction by undertaking and coordinating research projects. The work of CIAR is sometimes driven by a research agenda, sometimes undertaken as contingency operations in case of pending natural or human destruction. The results of some of these investigations are on display in the museum and include for example survey work in Maragua and Pucarillo, as well as the analysis of skulls and mummies using methods from physical anthropology.

CHRONOLOGY: PREHISPANIC CHUQUISACA



CHUQUISACA'S NATURAL ENVIRONMENT

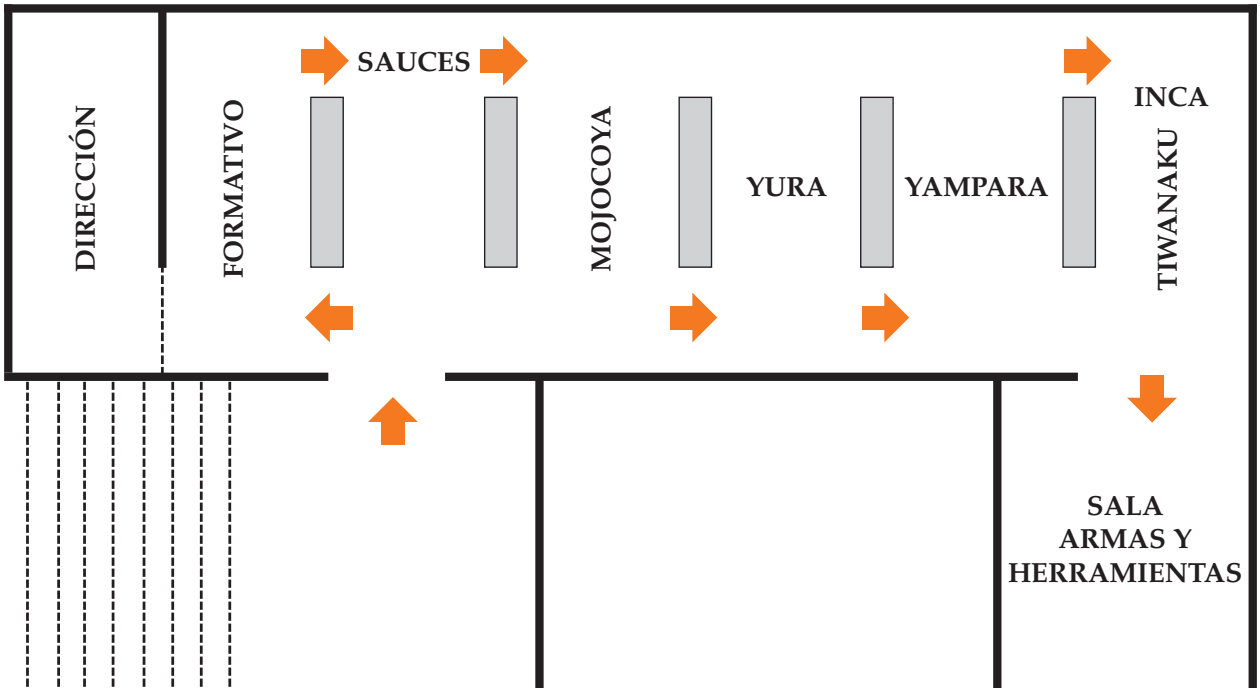
The Chuquisaca Department is situated on the eastern edge of the Cordillera Blanca and presents three distinct environments: the area known as the subpuna or the valleys (between 2000 and 3700m above sea level), the Andean fringe (between 500 and 2000m), and the low and dry plains (between 200 and 500m). Due to this tremendous variation in altitude Chuquisaca contains many different microclimates, often in close proximity of one another. Such diverse environments offered diverse opportunities for exploitation but also required different forms of adaptation, likely favouring the rise of distinct cultural groups. Unfortunately, however, little is known of the cultural diversity in the department, as archaeological research has concentrated on the valley area, leaving the other zones poorly understood.

The Chuquisaca landscape is very different from that of the neighbouring altiplano; the 800 km long river basin in which Lake Titicaca is situated (4000-4500m). These broad plains were inhabited early on and were a centre for the domestication of high altitude plants, such as potatoes and quiñoa (a grain grown at high altitude). The domestication of animals, such as llamas and alpacas, members of the American camelid family, followed suit. Other early innovations of the altiplano include the introduction of pottery and metallurgy. Much of the terrain of Chuquisaca on the other hand consists of mountain ridges and hills, separated by rivers and streams, leaving only small pockets of land suitable for agriculture. Settlements in this environment were scarce and of modest dimensions. Excess agricultural production was limited, offering little scope for specialisation and technological development. Places in which such developments did take place and complex cultures flourished tend to be situated in locations with relatively ample opportunities for agriculture and animal husbandry such as:

- The lowlands of Yamparáez and Tarabuco, where important Yampara settlements are situated.
- The plain of Pampa, where the Mojocoya Culture flourished.
- The lowlands of Sopachuy and Carmen along the River Milanis, where the Incas built numerous settlements and colcas (storage structures for cloth, weapons and agricultural products).
- The volcanic crater of Maragua, which acted as an important prehispanic centre, currently under investigation by the CIAR.

PREHISPANIC CULTURES

MUSEUM PLAN


DIRECCIÓN
FORMATIVO
SAUCES
MOJOCOYA
YURA
YAMPARA
INCA
TIWANAKU
SALA
ARMAS Y
HERRAMIENTAS

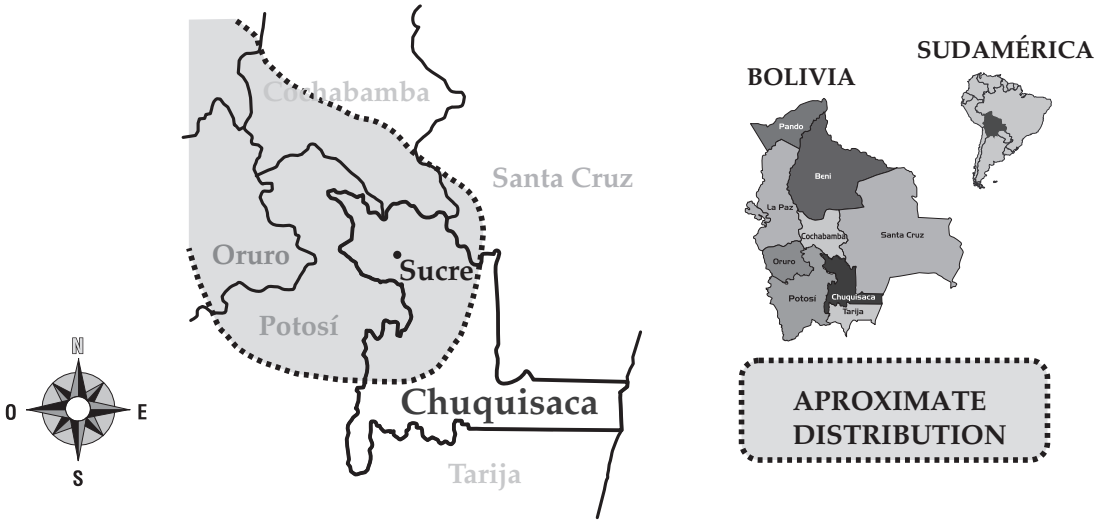
POTTERY SHAPES

	***Cántaro***	Pitcher used to transport and store food. A round body with a high neck and one or two handles.
	***Keru*** ***Challador***	Beaker used on special occasions. A tall, conical or cylindrical shape. Variant of the ***Keru.*** Drinking cup with a perforation in the base used in libations. A tall, funnel, shape.
	**Olla**	Jar used in the preparation and consumption of food. A round body without, or with a very low neck. One or two handles.

	***Pucu***	Bowl used in the preparation and consumption of food. A low and wide form.
	**Tripod Bowl**	A bowl with three legs used on ceremonial occasions. The body is low and wide.

FORMATIVE PERIOD

Chronology
Early: 1600-500 BC
Middle: 500-200 BC
Late: 200 BC-400 AD



The Formative Period covers a time span of approximately 2000 years and witnessed some major cultural transformations. Within this phase Chuquisaca saw the introduction of pottery and the establishment of its first settlements. Such communities based their existence upon agriculture, fishing, animal husbandry and pottery production, depending upon the possibilities offered by the local environment. Settlements of this period are usually found in the proximity of water; near springs, along rivers, or on hilltops close to rivers.

A good example of a site, where Formative remains are particularly abundant, is Chataquila. On the eastern face of the Chataquila mountain range a scatter of lithic artefacts was found, consisting of tools such as hand axes, hammers, grinding stones (see Weapons and Tools), as well as a range of bowls and dishes, painstakingly carved out of stone and polished. Pottery fragments from Chataquila

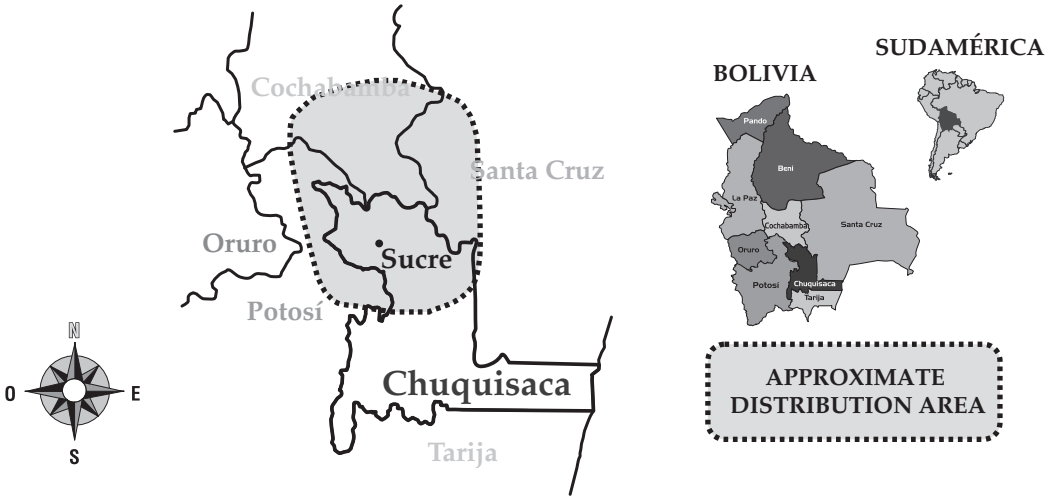
characteristic features of Formative pottery: they have thick walls, are often irregularly fired, and decorations are either incised or added in relief. Particularly striking are jars with anthropomorphic features. Frequently used shapes are the *pucu* (bowl), *cántaro* (pitcher) (see Pottery Shapes) and jars in a variety of shapes and sizes. Miniature vases were probably used as toys.

Small caves and rock shelters in the mountain slopes were used for habitation or as production centres of obsidian artefacts such as arrowheads and spear-points, which measure between 5 and 8cm long. Such weapons were probably used to hunt large animals such as deer, which no longer roam in the area today, suggesting a considerable change in flora and fauna.

It is possible that the petroglyphs (images that are carved into a rock surface) of Marca Rumi (see Rock Art) and Quila Quila date from this time, based on evidence from Tanga Tanga in the neighbouring Department of Potosi. Similar petroglyphs from the Tanga Tanga region, which had close connections with Chuquisaca at the time, were analysed and confirmed as belonging to the Formative Period.

SAUCES

Chronology
200-700 AD



The Sauces culture takes its name from the "Hacienda Sauces" in the Mizque River Valley (Cochabamba Department), where an abundance of finds led to the definition of this style. The term "culture" in this context refers to a ceramic tradition and its associated archaeological artefacts. Artefacts in Sauces style are widely distributed across the south of Cochabamba and the north of Chuquisaca and are often found side by side, and are thought to be contemporary with the remains of other cultures, such as for example Mojocoya.

The Sauces culture produced the first painted pottery in Chuquisaca. Typical designs are geometrical, consisting of for example zigzag lines and triangles, which are rendered in black and red, and outlined in white. Most Sauces pottery is polished, covered in a slip, called engobe (a mixture of water and clay which forms an outer coat when heated) and well fired. Popular shapes include the *pucu*, *cántaro* and *keru* (beaker). The *challador* is a variation of the *keru* with a pierced base, which was probably used in libations (see Pottery Shapes). Small vases in the shape of animals were also popular.

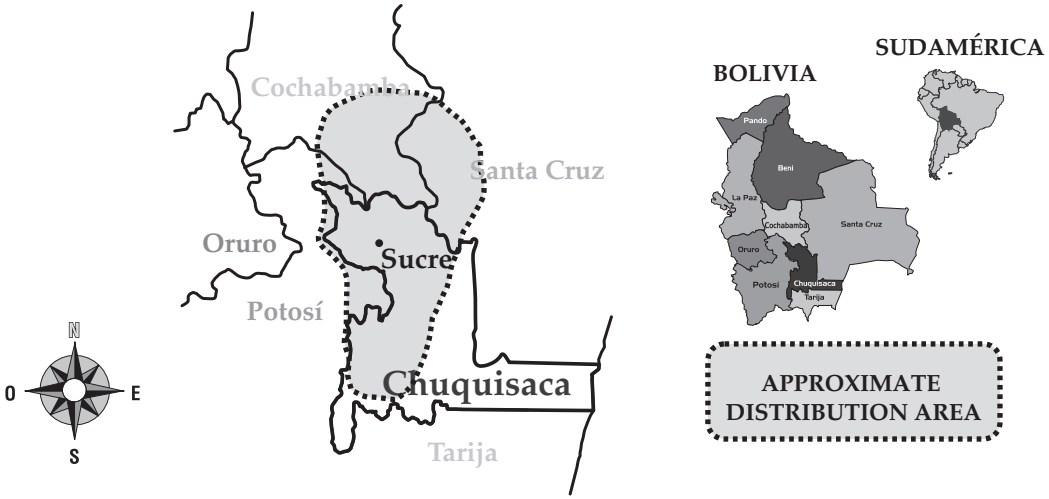
Associated with Sauces ceramics is the first evidence of metalworking in Chuquisaca. Copper ores were smelted and moulded into ornaments, such as pendants. Simultaneously bronze, a harder copper alloy, was developed to produce other types of objects such as weapons.

Lithic artefacts, including weapons, tools and other domestic objects are often highly polished and reveal a high level of craftsmanship (see Weapons and Tools).

The rock paintings of Incamachay found on the western slopes of the Chataquila mountain range, display the same motives as found on Sauces pottery (see Rock Art), and are thought to belong to this culture.

MOJOCOYA

Chronology
100-1200 AD



Mojocoya culture centres on the modern village of Mojocoya (200km northeast of Sucre), in whose surroundings an abundance of archaeological remains, such as lithics and ceramics, have been found. Mojocoya style is widely distributed over parts of Chuquisaca, as well as Cochabamba and Santa Cruz.

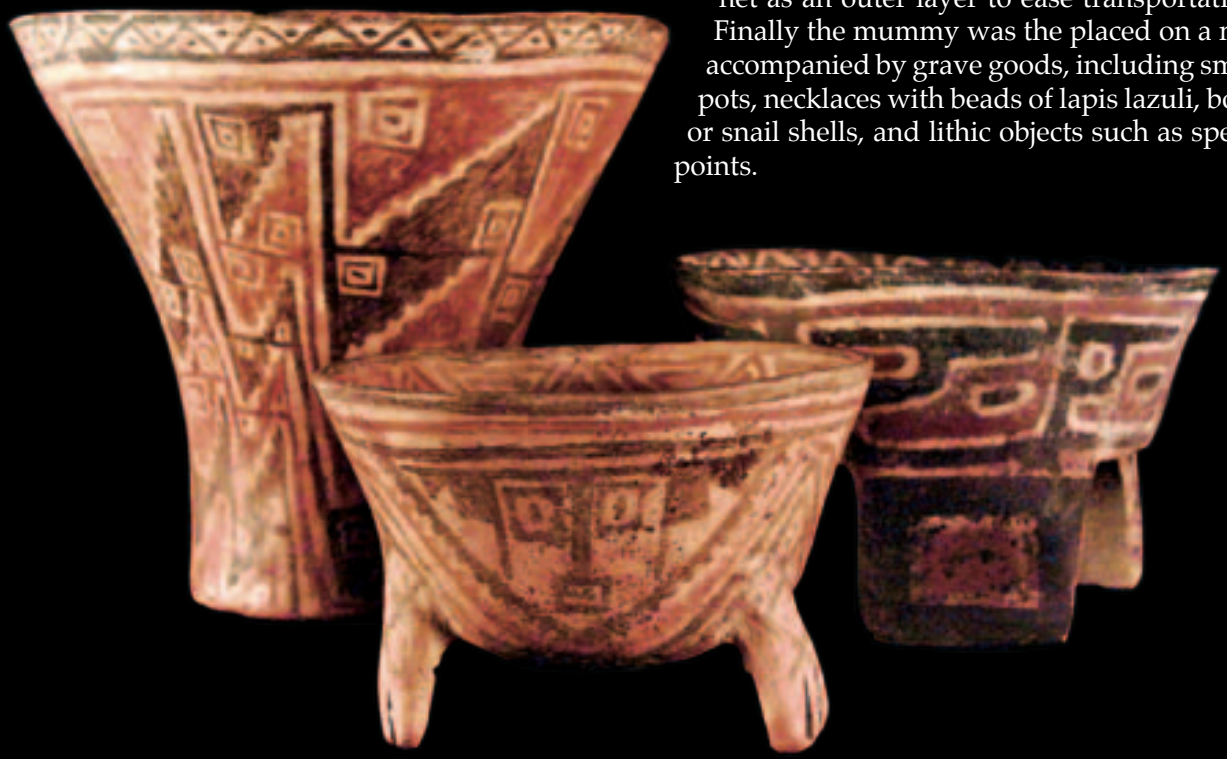
Mojocoya settlements are usually located on defended hilltops with controlled access and consist of circular, square and rectangular buildings surrounded by agricultural terraces also known as *andenes*.

Mojocoya pottery is of a high quality, hard baked and made of a fine clay paste, resulting in fragments with remarkably thin walls of 2 or 3mm. Particularly characteristic of the Mojocoya style are the tripod (three-legged) bowls, which have legs that are either straight, cylindrical or shaped as animal feet. Other typical shapes include the *keru*, *pucu*, olla (globular jar), *cántaro* and *challador*.

The geometrical decorations consist of complex patterns, in which spirals, quadrangular spirals and oblique lines, sometimes undulating or staggered, play a prominent role. On certain vases the repetition of motives in mirror image creates the appearance of a face. Internal decorations include triangles and an animal motive that is likely to represent a llama or alpaca. The colour schemes vary, but most frequently used are black, white, sepia (a dark brown-grey colour) and reddish-brown in a range of shades.

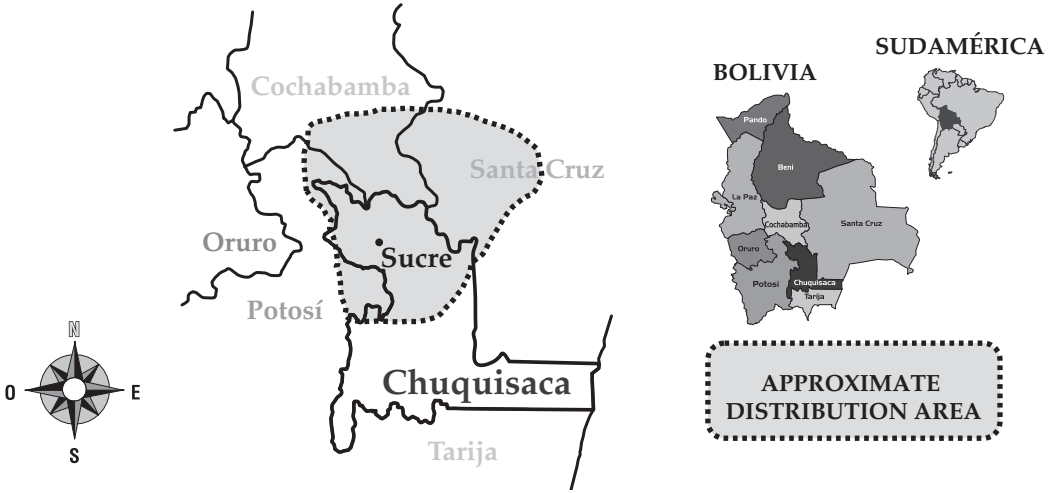
Lithic artefacts that are thought to belong to this culture include a variety of weapons and tools, such as axes and spear-points (see Weapons and Tools), and some beautifully crafted tripod bowls. Exceptional pieces are a tripod bowl with lid and a square four-legged dish.

Mojocoya culture is renowned for its textiles, which display a remarkable range of techniques and colours. Many fragments of textiles were preserved as part of mummy bundles deposited in caves and rock shelters, in which dry and cold conditions favoured a natural process of mummification. Corpses, in full dress and wearing sandals, were placed in foetal position and wrapped in hides or textiles made of wool to form conic bundles. The bundle was then covered in nets made of plant fibres with a particularly loose net as an outer layer to ease transportation. Finally the mummy was the placed on a mat accompanied by grave goods, including small pots, necklaces with beads of lapis lazuli, bone or snail shells, and lithic objects such as spear-points.



OMEREQUE POLYCHROME

Chronology
600-1200 AD



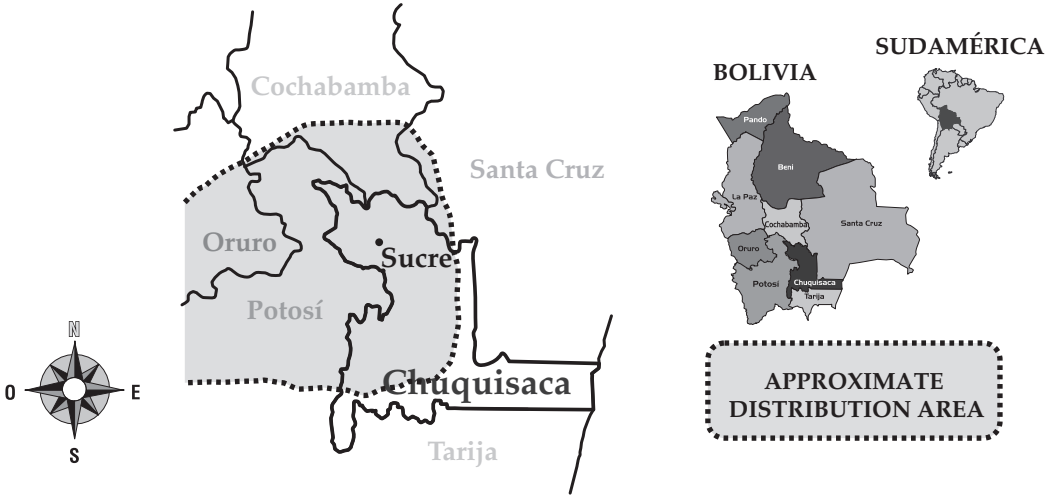
This culture derives its name from the site Omereque in Cochabamba, where it was first encountered. In the same department remains of this culture have been found in Mizque and Arani. Further afield Omereque Polychrome sites are situated in the environs of Lake Titicaca on the altiplano, as well as in the Valle Grande of the Santa Cruz Department. In Chuquisaca, Omereque Polychrome pottery is mostly found in the north of the department with particularly significant concentrations, for example, in Icla, Escana and Presto.

The most outstanding remains of this culture are undoubtedly its ceramics, which are amongst the most colourful produced in prehispanic Bolivia. A fine clay paste was used with an almost invisible temper (i.e. materials added to the clay to give it enough texture to be modelled and fired, see Pottery Production below), resulting in pottery walls that are only 2mm thick. Surfaces were polished and subsequently burnished (i.e. polished with a smooth pebble, or piece of wood or bone) to produce a shiny surface. Complex decorations were added in up to nine different colours. Frequently used

designs are geometrical, such as steps, and stylised anthropomorphic and zoomorphic motives, which are often outlined in black and white. A range of shapes was used, amongst which the most common are the *keru* and *challador*.

YURA

Chronology
300- approximately 1500 AD



The name of this culture stems from the River Yura Valley in the central part of the Potosi Department; its core distribution area. In Chuquisaca Yura material is predominantly found in the north, usually in combination with artefacts from other local cultures.

The most representative Yura pottery shapes are the bell shaped *keru,* the semi-spherical *cántaro* with handle, the olla with one or two handles and the *pucu*. Although some pots were adorned with decorations in relief, this style is known in the first place for its geometrical paintings, first in black and later in sepia or red. These were painted directly onto the clay or on a slip (see Pottery Production).

Designs used by Yura potters follow three distinct styles:

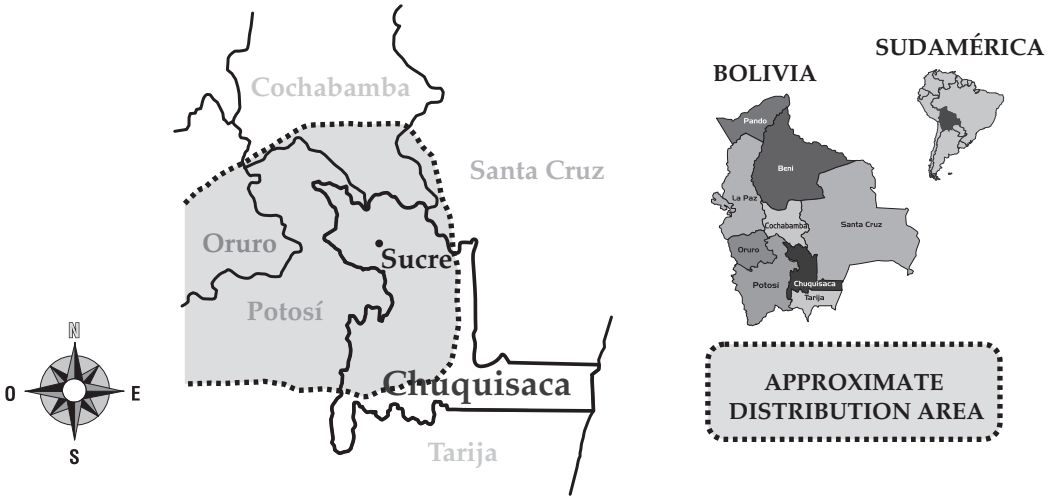
- Geometrical Yura, which was in use from the Early Intermediate Period around 550 AD until the arrival of the Incas in the Late Intermediate Period. Typical motives are stylised

'F' and 'S' shapes, which are found in repetitive patterns on the bellies of pots in vertical or horizontal position.

- Polygonal Yura, which was applied from the Early Intermediate period around 300 AD until about 900 AD in the Middle Intermediate Period. This style is characterised by triangle motives filled with internal triangles, crosses and undulating lines. These designs are sometimes used in combination with S-shaped lines at the neck or base of the vessel.
- Foliaceous Yura is a continuation from the Polygonal style, which remained current during part of the Inca period until approximately 1500 AD. Further research is needed to establish its precise duration. Apart from the geometrical motives previously used, characteristic of this style are leaf and spiral motives, divided by internal lines.

YURA–HURUQUILLA

Chronology
300- approximately 1500 AD



Recent research distinguishes between the Yura and the Yura-Huruquilla styles, as a variant of the first. The main difference lies in the firing of the pottery; whereas the first was fired with abundant oxygen producing a red-pinkish colour, the latter was heated in a reduced oxygen atmosphere, resulting in a grey colour. It is possible that this variation originated in a mistake, which was later perpetuated as a style. These ceramics are of a fine quality with thinner walls than similar vessels in the Yura style. Designs are rendered in black or red, and include zigzag lines, eye shapes and triangles filled with dots and crosses. Apart from painted decorations some vases are adorned with applied anthropomorphic features, representing faces and in one case what appears to be a female body with nipples and a navel.

An important site of the Yura-Huruquilla culture in Chuquisaca is located on the hilltop of Pukara close to the modern community of Kainakas in the mountainous region of Mama Huasy. It includes a cemetery and agricultural terraces, although to date no settlement remains have been identified.

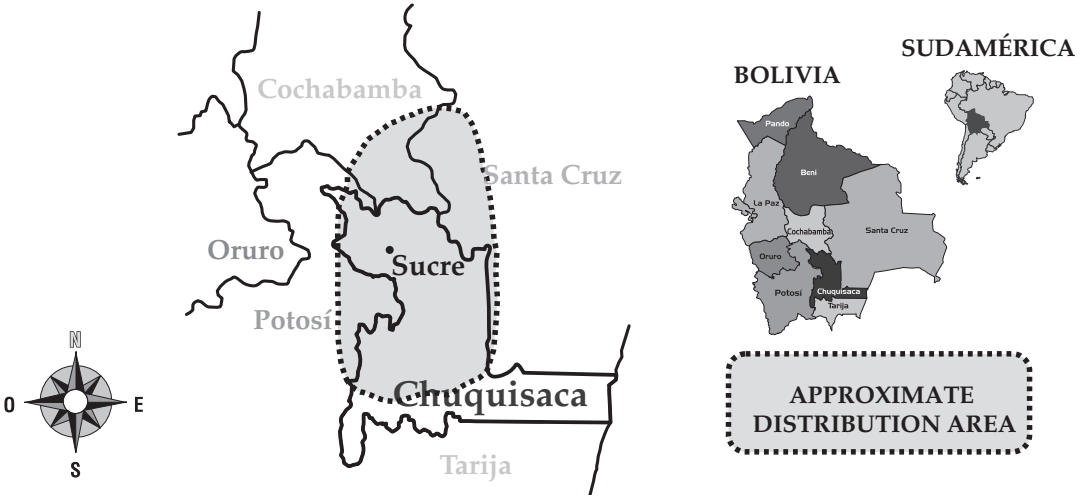
The cemetery of Pukara consists of individual graves measuring approximately 75cm long by 45cm wide and 60cm deep. The sides of the pits were reinforced with slabs of stones to form a coffin, which was covered with a large stone as a lid. A tall rock protruding from the soil either on the east or north side of the grave acted as a grave marker. Given the size of the tombs it is likely that corpses were buried in foetal position. As part of the burial rites a bell shaped *keru* and a bowl with either oblique or rounded walls were inserted in each tomb. Surrounding the main cemetery are several pit graves without stone reinforcements, which are circular, square or rhomboidal in shape.

Lithic artefacts belonging to this culture include grinding stones, pestles with handles, and a range of axes, hammers, and sling stones (see Weapons and Tools).

Rock paintings that are thought to belong to the Huruquilla Culture (see Rock Art) are those of Pumamachay and possibly Supay Huasy.

YAMPARA

Chronology
900- approximately 1500 AD



Remains of the Yampara culture are widely distributed over Chuquisaca and are encountered on many important archaeological sites, usually in combination with materials of other local cultures. Four variants of the Yampara style in Chuquisaca have been identified; the Ancient Yampara style, also known as Classical Yampara, Yampara I, Yampara II and Yampara-Presto-Puno, which first appeared in the 13th century at the same time as Yampara Lakatambo in Cochabamba.

A Yampara settlement at La Cienega, between Yamparaez and Tarabuco, includes agricultural terraces and the foundations of small rectangular and circular buildings next to larger empty circular spaces and tiled terraces that are thought to represent communal areas.

Rock shelters and caves were used for the disposal of the dead, similar to the Mojocoya practice, although underground interments were also current.

Although the pottery is relatively thick walled, often double the width of Mojocoya ceramics, it is made of a fine and homogenous paste with a temper that is hardly visible. It is well polished and

fired, resulting in a highly shiny surface. Decorations are polychrome, using black, red and ochre in different shades and white contour lines. Typical Yampara designs include geometrical shapes, such as quadrangular spirals, zigzag and stepped lines and stylised anthropomorphic and zoomorphic motives.

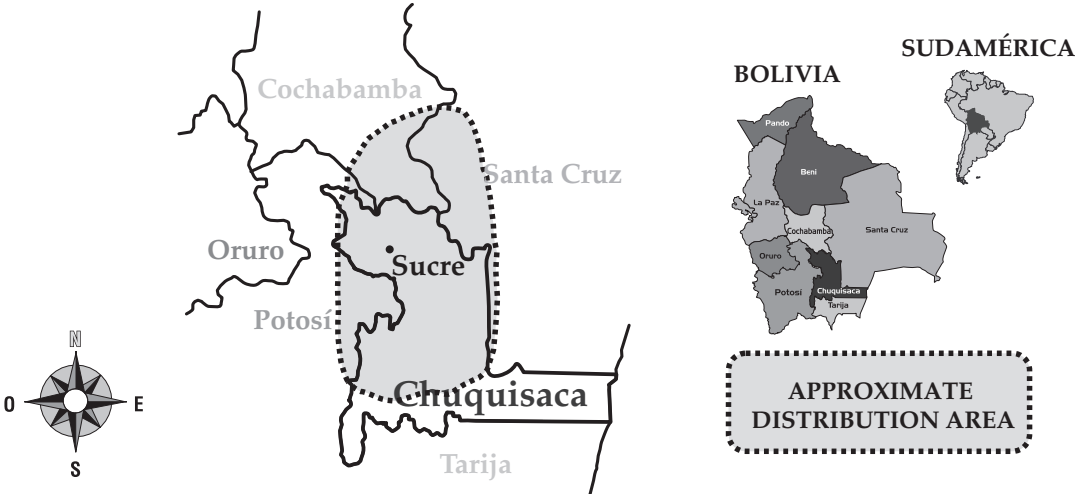
The Yampara style displays a wide range of variation over time and place, taking inspiration from many different cultures, such as Omereque Polychrome, Sauces and Mojocoya. It has been noted that anthropomorphic and zoomorphic motives on some of the earlier pieces bear a resemblance to the Omereque Polychrome style, whereas geometric decorations are reminiscent of Mojocoya. Yampara pottery shows no affiliation with that from the Tiwanaku culture, supporting the theory that Chuquisaca remained by and large out of Tiwanaku's sphere of influence. This is in contrast to the neighbouring Cochabamba, where its impact was profound, especially during the heights of its expansion between 800 and 1000 AD.

A wide range of shapes was used in Yampara pottery. The *keru*, often with pronounced feet, the *challador* and spherical jars with a wide or a narrow base, sometimes with handles, were particularly popular. The *cántaro* took on a highly anthropomorphized form with a neck, facial features and ears at the top. The *pucu* was either globular or inverse bell shaped and carried elaborate internal decorations. Low spherical vases with globular protuberances were probably imitations of metal vessels.

Lithic artefacts belonging to this culture include axes, which were worked to form grooved neck or waistlines, and domestic objects, such as large grinding stones with deep concave depressions. Spear-points associated with this culture are rare.

YAMPARA-PRESTO-PUNO

Chronology
1200- approximately 1500 AD

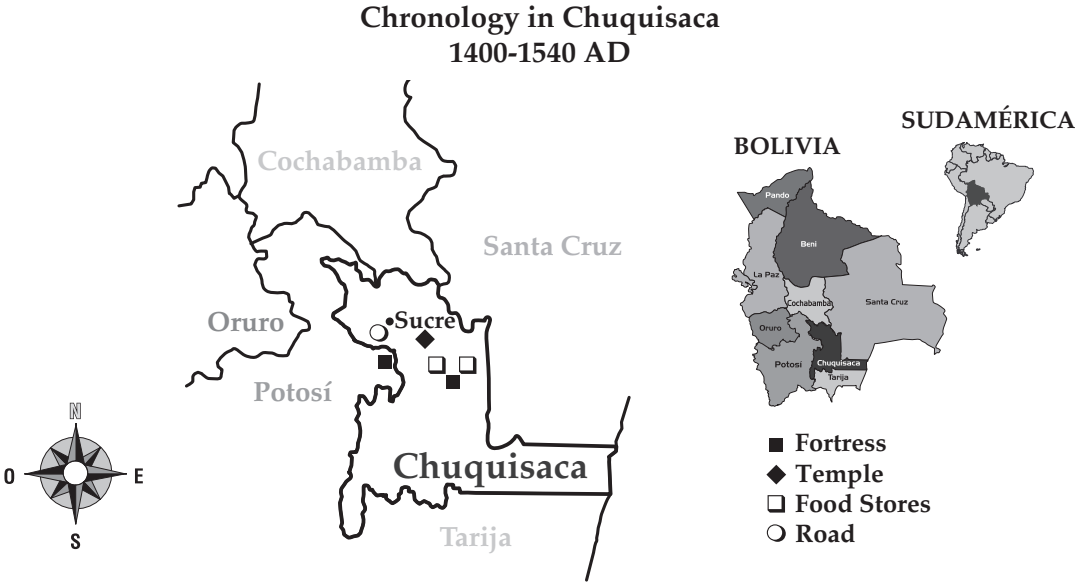


The material of the Yampara-Presto-Puno culture roughly has the same distribution area as that of Yampara with its focus in the north of the department around the villages of Presto and Puno. Because of its direct geographical relationship the Presto-Puno style is usually regarded as a late local variation on the Yampara style, although some scholars maintain that it constitutes a distinct culture in direct contact with Yampara.

The characteristics of Presto-Puno pottery are similar to those of Yampara; the paste is relatively thick, but well worked. Decorations are overall geometrical, and polychrome using white, red, brown and black. Unprecedented, however, is the use of white as a dominant colour in many designs. Some motives in white are repeated several times creating, what seems to be an intentional relief effect. Pottery shapes are similar to Yampara, although anthropomorphic shapes are less frequently used and utilitarian shapes prevail. Remarkable is the presence of many smaller vases, some of which are so tiny that they might be called miniatures.

On the summit of the hill Kuru Loma close to Presto lies an important Yampara-Presto-Puno settlement of people who most likely cultivated the plains between the villages of Presto and Tomoroco. It consists of rows of square or circular habitations alternated with empty spaces, bound in the north by a wall, which probably served defensive purposes. Pottery fragments include utilitarian, undecorated, pieces with evidence of use, such as wear and soot stains, as well as the painted fragments indicative of this group. Apart from the ceramics there are copious lithic artefacts; most of all large concave grinding stones. In the ancient village corpses were buried in the ground, whereas in the surroundings area rock shelters and caves were used for such purposes in the manner of Mojocoya.

INCA



The Inca expansion into what is today Bolivia began in the Departments of La Paz and Cochabamba around 1400 AD and continued into Chuquisaca between 1400 and 1450 AD. The occupation was short lived, however, and ended with the arrival of the Spanish in 1532 AD. In the newly conquered territories the Inca leadership entrusted regional powers to local dignitaries such as hereditary nobles, *kurakas*, and priests, whose task it was to communicate with the capital Cuzco and maintain the unity of the empire. A construction programme of roads, temples, fortresses and food stores further reinforced political and religious power. *Mitimaes* or resettlements of groups of people into alien territory, often with a very different ecosystem, were used for economic and political reasons, for example to secure labour where needed, or to destabilise particularly rebellious groups. It is thought, for example, that the people of Tarabuco originally came from the altiplano.

Inca construction work in Chuquisaca includes a road network, of which parts have been restored (e.g. at Chataquila 25 km northwest of Sucre). Chuquisaca formed part of the eastern border of the Inca

Empire and contains a belt of fortresses, which probably also served religious purposes, such as at Oroncota, Incawasi, Manchahi and Cuzcotuyo. In the provinces Inca engineers reserved high quality masonry work, Inca ground plans and architectural features, such as trapezoidal windows, niches and doorways, for high prestige buildings. The Oroncota fortress in Chuquisaca, which displays the elaborate masonry work of the Inca-Cuzco style, is a good example. It is made of cut stone blocks with sunken joints, which create a "pillow effect". The walls are two to five stones thick and contain body-size niches. Other important Inca buildings in Chuquisaca include a temple at Arabate, foundations of circular food stores or *colcas* at Paracti and Sopachuy and settlement remains at Pampas del Carmen. The settlement at Huata is thought to have been used by Incas of nobility; the Huallparrocas.

The pottery of the Incas is well polished with polychrome geometric decorations, such as rhomboids, crosses, checkerboards, circles, points and triangles. Such high quality wares often served as a reward for particularly loyal administrators and dignitaries in the provinces. Relatively few fragments of Inca ceramics are, however, found in Chuquisaca, which may reflect local taste, a lack of Inca influence, or a limited use of prestige goods in the consolidation of this part of the empire. Nevertheless in some parts of Chuquisaca a regional Inca style of ceramics is found, which incorporates Inca pottery forms, such as the distinctive aryballus jar (named after a Greek vase of a similar shape), and shallow plates with handles in the shape of a bird's head. Typical Inca designs, which were copied, include chequered and rectangular motives.

Numerous Inca instruments of war have been encountered in Chuquisaca, such as the lithic *bolas*, slings, axes and star shaped maces of bronze or stone (see Weapons and Tools). The Incas also made a range of metal tools and ornaments, of which knives, rings and pins are on display.

WEAPONS AND TOOLS

INTRODUCTION

This part of the display includes a wide range artefacts, i.e. objects that were intentionally shaped by people to perform certain tasks.The majority served as weapons and tools, whereas a few relate to other aspects of everyday life such as dress, music and ritual. Most have come from donations and acquisitions, which are poorly documented providing only a rough indication of the place where they were found. Few were retrieved in archaeological investigations, in which the context was recorded. Only under such exceptional circumstances, in which the position of an artefact in the layers of an excavation and its association with other artefacts are known, are we offered a glimpse into its history. These fragments of information are vital clues as to when and by whom the object was made, and how it was used. Once these basics are established it becomes possible to compare the object with similar materials from other sites, and to undertake a further analysis reconstructing, for example, the technological development of such artefacts or attempting to understand their social significance.

Without such contextual information it was challenging to establish a typology and chronology of the weapons and tools in this collection. As extrinsic evidence was missing the analysis was based on the intrinsic qualities of the artefact, i.e. form. Comparison with similar objects from other parts of Bolivia and the Americas at large played a vital role in this process.

A range of materials were used to make weapons and tools:

- Stone. Most of the artefacts (450) are lithics, i.e. made of stone. This remained a prime raw material for thousands of years due first of all to its availability, but also because of intrinsic qualities, such as hardness and sharpness. The fact that it does not decay also explains why it is often encountered on archaeological sites. Generally, local stones were used, which in Chuquisaca include slate, quartz and obsidian. Sometimes, however, stones were acquired from further afield, if considered particularly valuable because of particular qualities, such as appearance, or because they were easier to work.
- Ceramics. Pottery is almost as durable as stone and found in great quantities. Although this material is mainly known from pots, it was also used in the production of tools.

Examples of ceramic tools that are on display in the museum include potters' discs and weights used in weaving. There are no known examples of ceramic weapons.

- Metals. The technology for smelting and casting copper and bronze, as we have seen above, became available in Chuquisaca during the time of the Sauces culture. Copper and its alloy bronze were initially worked to produce ornaments and later weapons and tools, such as knives and axes. Gold and silver, although the first metals discovered in the Andes, were scarcely used for utilitarian objects. The application of iron was extremely rare in the Andes (see Metallurgy below).

- Vegetal materials. Parts of plants, such as wood, leaves, roots and grasses, undoubtedly played a key role in the manufacture of both weapons and tools. Sometimes they served as a primary material for example to make a solid wooden spoon. In other cases they played a secondary role supplying for example the rope to tie an axe to a shaft. Vegetal materials decay rapidly, however, and are only under exceptional circumstances found in an archaeological context. Many wooden implements in the ethnographic collection, such as a plough, bow and arrow and a pestle and mortar, are probably similar to those used in the past but rarely survive for more than a few generations.

- Animal remains. Like plants, animal remains played a major role as primary and secondary raw materials. They include bone, shell, horns and hoofs, which remain well preserved under certain conditions, but also skins, wool, hair, tendons and feathers which decompose easily. Examples of artefacts made of animal remains in the museum are bone needles, cones and shuttles used in weaving.

AXES

The first stone artefact was the hand axe, an elaboration of the stone held by early humans to increase the impact of the bare hand. The first axes consisted of a round stone worked along the top to create a sharp edge or of a large chip worked on both sides to form a flat tool. These early axes helped people to perform some of the fundamental tasks in their lives more effectively, such as chopping down plants and trees, killing animals and processing meat.

In a next step in the development of the axe a handle was attached to further increase its impact and reduce the amount of effort needed to perform daily tasks. From then on axes were shaped in such a way that they could be tied to a shaft with a string or leather strap. This could be done in a number of ways:

- By engraving a band, also called waist, around the middle or top of the stone. In some cases the groove is so wide that the main body and the top of the blade, known as the shoulder, almost seem like separate entities.
- By incising two notches, or indentations, along the sides of the axe, creating what is called a neck.
- By drilling one or two perforations into the top of the blade. One of Guaman Poma's (chronicler and descendant of Inca nobility working at the turn of the 17th century) illustrations shows that these perforations also served for hanging the blade when stored.
- By giving the blade a T-shape.
- By flattening the top end of the blade to fit into a haft.

Many axes were multi-purpose tools and used for example in battle, hunting, agriculture and building work. Others performed a specific function. For example small polished axes with a sharp edge were ideal for working metals. It is likely that large blunt axes performed a hammer function, whereas large pointed axes were made to split stones, for example, in mining activities.

When the technology became available axes were also made of metal, initially following the shape of stone models. The introduction of metal inspired the creation of new forms, such as the T-shape. Such innovations were later copied in stone and the two traditions clearly came to influence one another.

Some metal blades were adorned with animal figures, maybe representing a cat or a camelid. It is likely that such axes functioned ceremonially or as a status symbol. It is known from anthropological and archaeological studies that in many cultures axes were imbued with a significance that reached far beyond the realm of the utilitarian. Axes made important offerings to the gods and were carried by high status individuals as a symbol of their power.

SMALL LITHICS

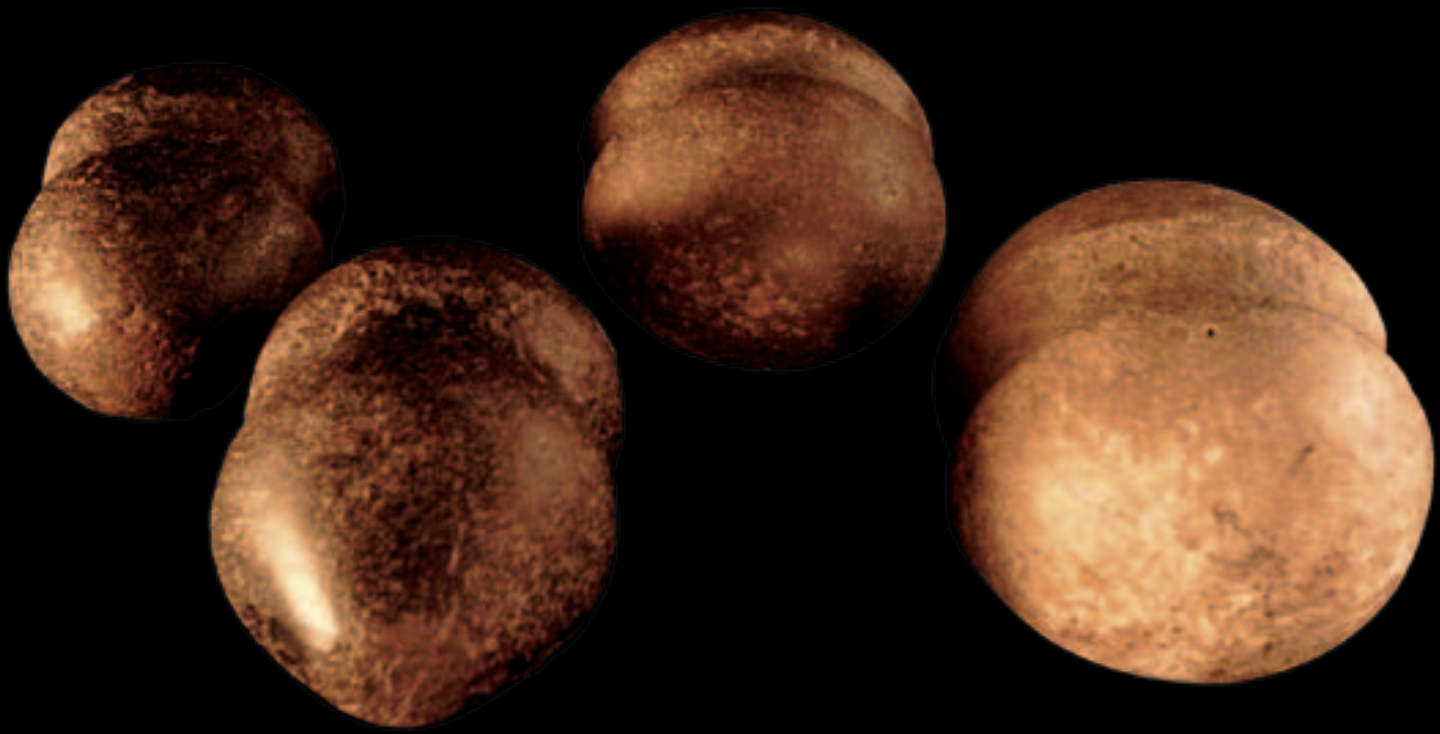
As stone technology developed a greater variety of lithic artefacts appeared, each with a distinct function. Scrapers, for example, were held in the palm of the hand with the sharp side outwards to clean objects, such as animal skins or tree branches. Borers were worked into sharp tips for making holes in skins, bone etc. Fine pointed blades were produced in a range of sizes and shapes to serve particular purposes. Tied to a short handle they acted as knives and daggers. Attached to larger poles they functioned as spear-points. Very fine sharp tips were employed as arrowheads. Such pointed tools were either leaf shaped or straight edged. In some cases the base was worked into an attachment, or tang, for slotting into a haft. These lithics were an essential part of everyday life and their shapes stayed essentially unchanged for several millennia.

MACES

The mace is a battering weapon, which was used both in the hunt and hand-to-hand combat for many thousands of years. It was the main weapon of the common soldier in the Inca army, as Spanish conquistadors relate. At the time it was also known as *rompecabeza*, or head breaker, or *porra*, which means sledgehammer or club. In its early form it consisted of a perforated natural stone on a stick made of hard wood. Later mace heads were made of worked stone or metal. The mace head was hammered on to the haft, whose sides had been flattened, and then secured with string. The haft rarely survives in the archaeological context, yet a variety of mace heads has been found:

- Disc shaped. These are flat perforated stones, which were used separately or in pairs.
- Star shaped. A star shape was made out of stone or metal. It consists of five or six points, which were either sharpened to form a very sharp tip or left blunt.
- Five points and an axe. Some metal mace heads consisted of five points and an axe shaped appendix with a straight or rounded edge.

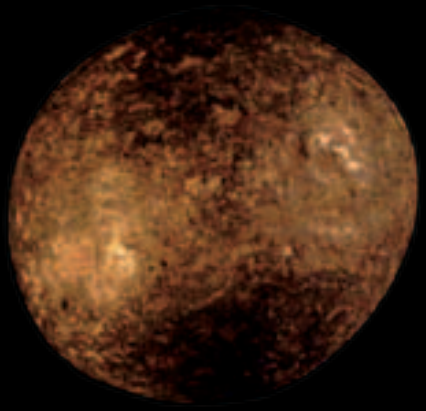
Guaman Poma de Ayala (1615)

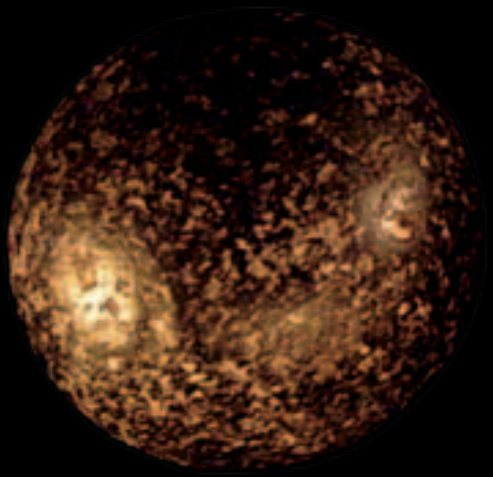


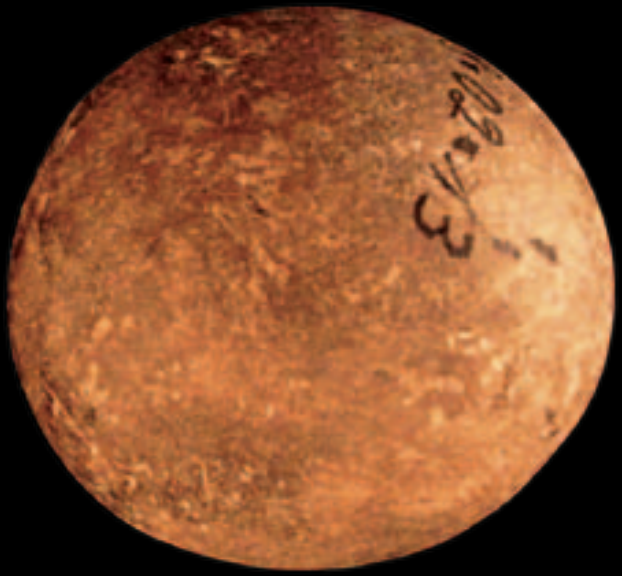
BOLAS

The bola was an important hunting weapon and an instrument of war. It consists of several stones attached to a cord. To operate the bola it was whirled around the head to gather momentum and then propelled forwards in a circular motion to entangle its target. This could be a small animal or an opponent's feet in a fight or battle. Equally it could be hand held to deal out blows. On the whole a bola consisted of two or three metal balls or stones. Bola stones were oblong, semi-spherical or spherical, and were worked into points or left blunt. To attach the stones to the string some were engraved with a central waistband. Another possibility was to insert the stones in little textile bags, which could be fastened to a cord. Although organic materials rarely survive, the museum holds the exceptional find of a complete bola consisting of a stone fitted with a leather strap and fixed to a long cord.

Guaman Poma de Ayala (1615)







SLING BULLETS

The sling was the Inca's most important long distance weapon, which was used with astonishing accuracy according to Spanish reports. It consists of a strap made of animal or plant fibres with an enlarged central area, or cradle, to support the bullet. The warrior held both ends in one hand, whirled the sling above the head and then released one end to propel the bullet forwards at high speed. In the Andes, for thousands of years, the sling remained an essential part of a man's equipment worn as a belt or hair band. It can still be seen in the countryside today where it is used by shepherds to control and protect their flock or to hunt birds and small animals.

Although few prehispanic sling straps survive, bullets are numerous. They consist of stones in their natural shape or worked into a spherical form. Metal bullets were made by throwing rocks with a high iron contents into the embers of a fire to create a regular globular shape, which represents the first attempt to melt this metal in South America.

Guaman Poma de Ayala (1615)

WRISTGUARDS

An Inca soldier's armour consisted of a wooden helmet and shield covered in hides, and a quilted cotton tunic or strips of textile wrapped tightly around the body (see Guaman Poma's illustration of an Inca warrior with sling). The only pieces of metal armour that were frequently worn were wristguards to fend off blows from enemy weapons, such as maces, axes and spear-points. An Inca soldier attacked with a mace in one hand, while defending the body with the wristguard on the other arm. It is very likely that metal wristguards were also worn for adornment and carried connotations of prestige.

The wristguards from Chuquisaca on display in the museum are made of bronze. They are conical in shape to fit tightly around the arm with rounded top and bottom edges for comfort.

KNIVES

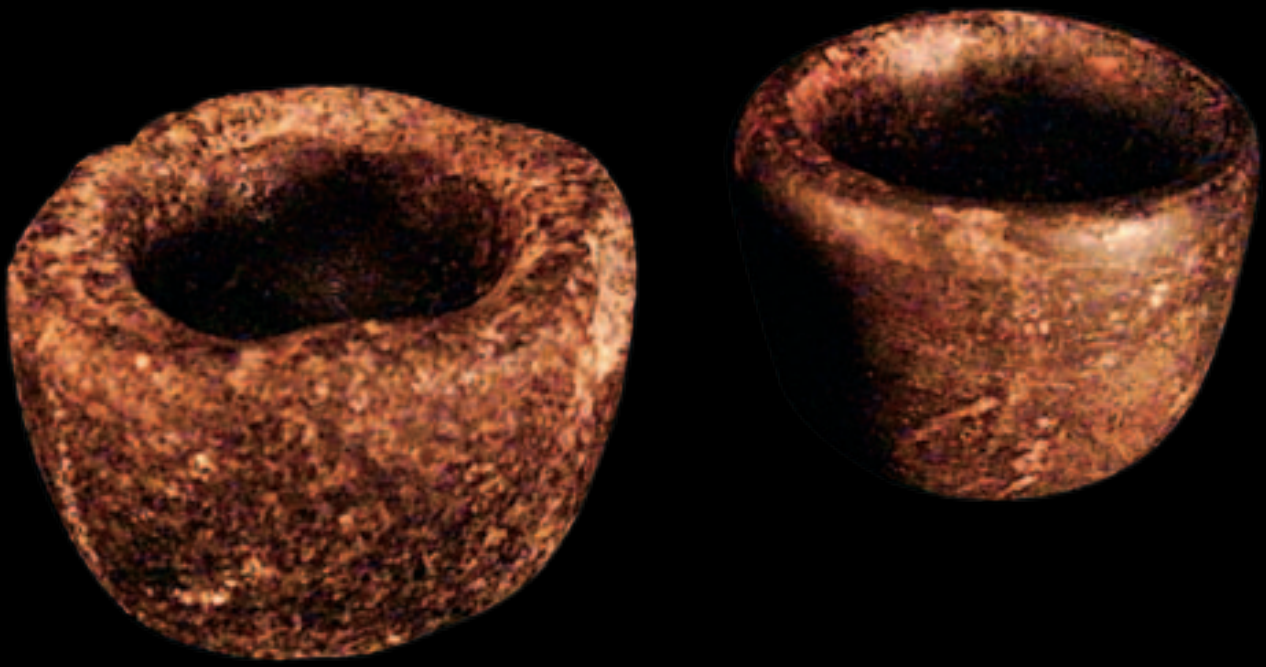
The *tumi* is a crescent shaped knife mainly known from ritual scenes of decapitation or sacrifice depicted on vases and textiles. Andean people however produced a range of knives for different purposes. In the museum are bronze knives in a variety of sizes and shapes, such as oval, rectangular and trapezoidal. Some have appendixes, or wings, that are straight or semi-circular in shape. Occasionally knives were made with blades on both ends.

Guaman Poma de Ayala (1615)

MORTARS

Mortars, or grinding stones, are abundantly found in and around settlements, where they were used, as they are today, in the preparation of food, such as grain and maize. They also had manufacturing applications, for example, to grind up metal ores, plants to dye textiles or tempers to be added to clay. Mortars are round, rectangular or square in shape and have a flat or concave grinding surface. Sometimes a handle was added for ease of use. Mortars were often not discarded until the base was completely eroded and the museum holds several examples with a large cavity.

The hand stone or pestle used with the mortar was either round or rectangular when used in a horizontal motion or cylinder shaped if used in a vertical movement. The cylinder shapes were sometimes engraved at the top to form a handle.



METALLURGY

One of the first centres for the development of metallurgy in South America was the central Andes, approximately modern Peru and Bolivia. The northern highlands of Peru and its adjacent coast, and the Bolivian altiplano contain rich resources of gold, silver, copper and tin. Gold and silver were found in the form of dust and nuggets in rivers and streams and were the first metals to be worked. Later silver, copper and tin were also mined.

Up to the colonial period the Andes retained its distinct metallurgical tradition, which was primarily based on cold hammering, the beating of metals into very thin sheets and subsequently shaping it into designs. Not only gold, a very soft metal, but also silver, copper and bronze were hammered. The latter three, however, needed occasional softening through reheating, a process called annealing. Although the technique of casting metals into moulds was developed in the first centuries AD, its use was never widespread.

The first tools used in cold hammering come from Peru and date to approximately 1800 BC. The museum hosts several similar tools from Chuquisaca, including anvils and hammering stones. Anvils were made of square or rectangular stones with four to six hollows used as hammering surfaces, or disc shaped rocks with a concave area on each side. Stone axes were also reused as anvils, of which there are a few examples in the museum.

Hammers were either conical or cylindrical in shape. The cylinder shapes were often used at both ends and occasionally engraved with a central indentation for better grip. Their tips could be pointed, straight or blunt. A wide flat tip served a dual purpose as a hammering surface.

Metal artefacts were finished with chisels and polishing stones. Chisels have sharp edges for removing small imperfections and traces of hammering. Polishing stones on the other hand are extremely smooth with rounded edges.

At various stages in the metal working process heating was necessary, for example to anneal, to purify raw materials or to separate elements of gold and silver found in river deposits. This could be done in crucibles, thick walled ceramic cups, which were placed in an open fire. In the museum are two such crucibles.

Furnaces of adobe brick were built to reach the temperatures required to smelt copper ores. As the bellow had not been invented Andean metallurgists blew into their furnaces with tubes, as used in the cooking hearths of rural communities today. Alternatively they would place a way*rachina*, or perforated clay oven, in a blustery place for the wind to stir the fires. Even higher temperatures are needed to smelt iron ores, which were rarely reached in prehispanic South America. The application of this metal was therefore rare.

Amongst prehispanic cultures the use of metals was reserved for the production of ornaments, such as earrings, necklaces and pins, until the arrival of the Incas, who started making weapons out of copper and bronze. Metal objects were imbued with social and religious significance. The Inca associated gold with the sun, whereas silver was linked to the moon. Metal plaques worn on uniforms indicated a soldier's rank, while among Inca nobility the size of a man's golden earrings conveyed his status.

POTTERY PRODUCTION

The largest section in the museum is dedicated to pottery. Pottery takes such an important place not only because of its abundance, as it was produced in great quantities over a long period of time and is almost as durable as stone. It also provides key evidence about prehispanic cultures, for which written accounts do not exist. Variations in clay, shapes, decorations and production techniques allow archaeologists to distinguish between cultural groups and establish a chronological framework for understanding the prehispanic past.

The introduction of pottery was a key step in the development of many cultures worldwide as it provided new ways of cooking and storing food, thus improving survival chances. In South America this innovation came relatively late with the first evidence of pottery production in the Central Andes dating between 2300 and 1800 BC. The earliest ceramics on the altiplano and in Chuquisaca belong to the Formative Period (1600 BC–400 AD), as we have seen above.

The first step in making a pot is to add a temper or binding agent to the clay, which by itself does not have enough structure to be modelled, dried and fired. Tempers frequently applied in Chuquisaca include crushed quartz, slate, mica, snail shell and pottery. As a general rule the bigger the vessel the larger the size of the pieces of temper inserted.

The main technique employed to shape pots was coiling, which consists of placing coils of clay on top of one another. Smaller vessels were also modelled by hand or with the help of a mould. The potters' wheel was not known in the Andean world prior to the Spanish occupation, but a manually operated turntable, or *tournette*, was available. The *tournette* turned pots during coiling, when filling depressions between coils, removing irregularities, and adding finishing touches such as trimmed edges and a smooth finish. Two variants of the *tournette* are on display in the museum. The first is a flat ceramic disc that turned on a smooth or rounded surface, such as the base of a bowl. The second consists of a disc with a central indentation, which rotated around the pivot of a second ceramic disc. Other tools used to shape and polish pots include pieces of textiles and animal skins and square, rectangular or cylindrical stones, of which there are several examples in the museum. These had either blunt or pointed tips depending on their specific function.

When the pot was semi-dry it could be decorated and finished using a variety of techniques:

- Incising. Designs, such as lines and dots, were engraved in the clay with a sharp tool.
- Excising. Decorations were incised and in the process bits of clay were removed creating a relief effect.
- Modelling. Decorations were shaped with the fingers or a tool into the surface of the pot.
- Applying. Decorations were formed separately and stuck to the pot with a thick slip.
- Painting. Designs were painted on the inside or outside of the pot in a range of colours such as black, white and red.
- A slip, or engobe, which was made of a mixture of water, fine clay and sometimes a dye, was added to the pot to give it an attractive and less permeable outer layer.
- Burnishing. The potter rubbed the surface of the pot with a smooth object, such as a pebble or a piece of wood or bone, to produce an extremely smooth, shiny, surface.

In the Andean world pots were on the whole baked in open fires, sometimes in pits or against other structures, such as walls, to increase temperatures. The potter either left the fire open to let oxygen circulate freely around the vessels (an oxidizing atmosphere), or covered the fire with broken pots, animal dung and earth thus limiting the oxygen supply (a reducing atmosphere). The first technique resulted in ceramics that are light-red or orange in colour, the latter in grey or black ceramics.

TEXTILE PRODUCTION

Textile production was one of the earliest art forms in the Andes, and today continues to be imbued with much social and ritual significance. As the weaver embarks on a new project he or she is likely to perform certain personal rituals, such as to invoke the virgin and ask for inspiration. The role of the muse is crucial as the artist works entirely from memory without drawn designs.

Guaman Poma de Ayala (1615)

Textiles were and are produced to accompany liminal events, such as birth and death, or pivotal moments in the agricultural cycle such as the flowering of new crops around carnival time. In prehispanic times hundreds of meters of cloth were woven to wrap around the dead and form mummy bundles (see Mojocoya). In the case of particularly important ancestors such wrappings were renewed regularly to retain the physical presence of the forebears, who were thought to remain active amongst the living. In the collection are several pieces of such funerary shrouds, which are particularly well preserved. Textiles also acted as a form of wealth accumulation to sell in times of hardship; a function, which it has retained to some extent up to today. The Incas raised taxes in the form of textiles, which they used to pay soldiers and servants.

Textile technology developed gradually from twisting rope, to braiding, to twining. The latter consists of tying vertical threads (the warp) to a stationary object and twisting horizontal threads (the weft) around these. While twining remained in use weaving on a loom was discovered to be faster. Looms included those with a back-strap and one side attached to a post, as can be seen in an illustration by Guaman Poma. The width of textiles produced on these looms was limited to the reach of an arm, which is approximately 35cm. The loom, which was and is most commonly used in the Central Andes, is fixed in a horizontal position parallel to the ground using four stakes. Such a frame, of which an example

is on display in the ethnographic collection, is easily moved and adjusted to create cloth in different sizes.

Strikingly the museum owns a variety of weaving tools from archaeological contexts, which are very similar to tools used today. The *wichuña* for example is a pointed tool made of llama bone or wood, which was used to lift sections of the warp to introduce and tighten the weft. Some *wichuñas* are pointed on one side and coomb shaped on the other.

The *lanzadera*, or shuttle, is employed to introduce the weft into the warp. The thread is either inserted into a small perforation or secured to an enlarged rounded top. Shuttles are rectangular or conical in shape with a sharp or blunt edge, depending on their use.

Raw materials used in Andean textile production include vegetal fibres from cotton, palm and agave plants, as well as the wool from camelids such as alpaca, llama, vicuña, and guanaco. Whereas the wool from domesticated alpacas and llamas was easily accessible that from the wild vicuña and guanaco was obtained in the hunt and more rare. As cotton was mainly grown on the coast and camelid wool only found in the Central Andes, they were traded over large distances. Wool from the Central Andes has been found on sites as far away as Ecuador and Columbia. All these materials had distinct applications and fine alpaca wool, for example, was used in the first place for clothing, whereas rougher plant fibres were used for example for making rope.

Vegetal and animal fibres were used in their original colours or dyed. Cotton occurs naturally in a range of colours from white to yellow and brown, whereas camelid wool can be any of these tints and black. Popular dyes include indigo for blue, madder roots and cochineal beetle for red and purpura mollusc for purple.

SPINDLE WHORLS

The first spinning was done by hand by rolling and twisting thread; a technique which is still used occasionally. More common however is the use of spindles, which produce fine and uniform threads more rapidly. These consist of a distaff, approximately 30 cm long and a counterweight, or spindle whorl, to provide momentum. The wool or cotton to be spun was supported on a forked stick, as can be seen in Guaman Poma's illustration. Spindle whorls were made of stone, metal, pottery or wood. They could be globular, disc or cone shaped with blunt or sharp edges and in some cases were decorated. In the collection are a few fragments of pottery reused as spindle whorls.

Guaman Poma de Ayala (1615)

MIRRORS

Mirrors were made of bronze and copper and then polished with an abrasive, such as sand, to produce a reflective surface. Some were fitted with long handles.

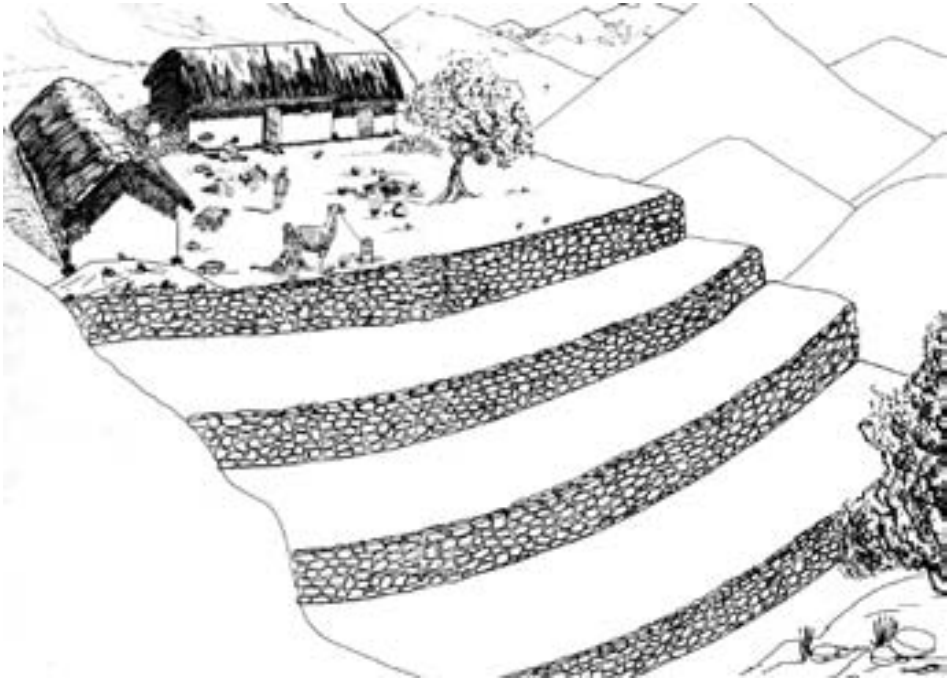
NEEDLES

The first Andean needles were cactus thorns perforated at the top for inserting a thread of animal or plant fibre, such as wool or grass. Although these remained in use up to fairly recently, metal, bone and wood needles were also introduced for the tasks of weaving, sowing and embroidery.

TUPUS

Inca clothing consisted of square pieces of woven textiles held together with pins called *tupus*. Women, for example, wore a long dress down to the ankles, tied at the waist with a colourful, patterned belt and fixed with pins at the shoulders. Over the dress was a long mantle closed at the front with a *tupu* (see Guaman Poma illustration with spindle whorls). These pins were made of gold, silver, copper or bronze. The heads were given a variety of shapes but most common are a semi-circular or circular disc, which could also be used as a knife. Other jewellery worn by Inca women includes bracelets, rings and necklaces, made of lapis lazuli, bone and snail shell beads, as on display in the museum.

AGRICULTURAL TERRACES



Farmers of many parts of the Andes camp with two main difficulties: a shortage of level land, suitable for agriculture, and a tremendous variation in rainfall. Torrential downpours during the rainy season cause erosion, whilst a lack of water during the dry season leaves the soil desiccated. To tackle these issues the prehispanic population built agricultural terraces or *andenes*. Such terraces increased the amount of agricultural land and through the use of retaining walls reduced the loss of fertile soil. Irrigation channels were added to control water supplies and bring relief to the crops during the dry periods. The growing season was thus extended, resulting in more than one harvest a season. An

additional benefit was that the terraces acted as a microclimate, which heated up during the day and retained some of its warmth during the night thus protecting the crops against frosts. The construction of such terraces required considerable organisation of manpower and reached its pinnacle under the Inca Empire. To feed its subjects and army the Incas created *andenes* on such a massive scale that it is said that the Spanish named the Andean mountain range after them.

The *andenes* were constructed by building retaining walls of stone and filling the created spaces with layers of small stones, poor sterile soil and sand where available. Finally topsoil was added consisting of fine earth enriched with animal or plant fertilizer. In the more advanced systems stone walled irrigation channels were added, which were graded to carry water over long distances.

The agricultural tools used in the past are very similar to those found in the countryside today and include:

- The *chaquitajlla*, a foot plough used to turn the topsoil, of which an example can be seen in the ethnography collection. However, this tool has now been largely replaced by the plough pulled by oxen introduced from Spain.
- The *liukana* an equivalent of the modern mattock.
- The *kupaňa* a hammer used to break up lumps of soil.

CHAQUITAJLLA LIUKANA KUPAÑA

In the Andes more than 150 different plant species exist at different altitude levels. Many of these were unknown to Europe prior to the Spanish invasion, but were to revolutionise its food economy. Famous crops from the Andean world include potato, maize, peanut, tobacco, chilli pepper, pumpkin and quiňoa to name but a few.

CULT OBJECTS AND FETISHES

Written sources on Andean religion include the accounts of Spanish chroniclers, who visited the colony of Alto Peru, roughly modern Peru and Bolivia, in the first 100 years after the conquest in 1532 AD. Amongst their descriptions of the indigenous population were several treatises on what they called the "idolatry of the Indians". More detailed information came from the so-called "visitors of idols"; a group of priests and administrators who were commissioned in the early 17th century to eradicate the practice of idolatry amongst Indians through the physical destruction of sacred relics and cult objects.

Although these accounts provide a certain amount of information on Inca religion and mythology, they present their own limitations. Firstly Spanish chroniclers were most likely to come into contact and represent the perspective of members of the Inca nobility rather than that of a broader section of the population. Secondly it has to be born in mind that these accounts were produced as part of a policy of conquest aimed at subjugating the indigenous population and eradicating some of their practices. Archaeological and ethnographic sources provide further indispensable evidence.

The Incas saw the natural world as animate with the Pachamama, or earth mother, as one of its prime forces. Prominent natural features, such as mountain abysses and caves, springs or streams of water, were considered *huacas* or sacred places. Moreover towering mountain peaks and prominent boulders were thought to be inhabited by the ancestors, who took an active part in the world of the living and acted as the protectors of the *Ayllus* (kinship based community organizations). Such places were called *pacarina*s or mythical place of origin.

Within the Inca mythological universe a range of objects also possessed a sacred character. Amongst them are the representations of mamas (mothers) who were thought to promote the fertility of plants. The Saramama, for example, is the mother of maize who looks after this crop. Her presence was expressed, for example, in a two- jointed maize cob, a doll made of maize and dressed in feminine clothes, or a stone worked in the shape of a cob. Similarly Cocamama is the mother of the coca plant and was considered to possess similar properties in relation to the production of coca. In the same way the Inca people worshipped domestic goddesses in the shape of idols, or amulets, called *conopas*, *chancos* or *huasicamayoc*, associated with the protection of the hearth and the family. These amulets took on many different appearances, such as crystals, lumps of metals, stones with particularly distinctive features, or representations of phalli. Other idols, like stones with concentric circles, were probably related to the cult of Illapa, the God of Rain and Thunder. They were used to attract the rain at times when needed; a matter of life and death to the Andean farmer.

The Archaeological Museum has two examples of the Saramama, both of which have come from the Tarabuco area. They are made of stone, one in the shape of a maize cob, the other a head with eyes and mouth in relief. The latter was still an object of worship when acquired by the museum in 1959. Its body and limbs were made of maize cobs and it was accompanied by llama fat and coca leaves. Other idols in the museum include stones that are phallic, geometrical, or zoomorphic in design, such as toads that are thought to be associated with water and rain.

MUSICAL INSTRUMENTS

Spanish chroniclers, paintings and drawings, as well as prehispanic ceramics and sculptures offer a glimpse into the world of music prior to the Spanish conquest. Wind and percussion instruments played a prime role and in the museum are some examples of instruments used: copper and bronze bells, a stone whistle and a small vertical bone flute. Particularly interesting are two panpipes carved out of stone. One was found in a burial in Potosi Department and is thought to belong to the Yura Culture, dating to the 15th century AD. It consists of four tubes, two of which are open on both sides, whilst two have one end closed. A recent study by physicist Arnaud Gerard shows that in terms of construction, tuning and timbre this panpipe bears a great resemblance to those made in northern Potosi today, pointing at strong continuity in musical traditions.

It is possible that other objects in the collection, which have so far not been associated with music, were shaped in such a way as to generate particular sounds. A jar from the Formative Period, which is now called the "acoustic jar", for example was discovered to produce a range of tones depending upon the levels of liquid in the jar.

New perspectives on Andean music have recently come from ethnomusicology, emphasising the role of music in the transmission of culture, including for example gender roles and concepts of time. Music, it is found, strengthens communities as it promotes social cohesion and provides a sense of identity. Moreover, as part of a much wider spectrum of sounds, it enables communication not only between people but also with other realms such as that of the ancestors and the forces ruling the natural world. Music is thought for example to play an active role in inducing rain and promoting the growth of plants. The instruments in the collection, therefore, were very likely part of a much larger world of sound, much of which remains to be explored.

CURRENT RESEARCH

INTRODUCTION

Many objects in the collection, as noted above, came to the museum without any information about their provenance and as a result very little known about the cultures that produced them. The CIAR (see "A brief history of archaeological research in Chuquisaca" above) was founded to address this imbalance and generate systematic archaeological projects in Chuquisaca and its zones of cultural interaction. Investigations were initiated in Maragua in 1999 and in Pucarillo in 2001. These explorations often turned out to be physically challenging. The ascent to the Pucarillo platform, for example, is steep and hazardous. The proximity of the Rio Grande makes it virtually impossible to work for more than a couple of hours a day, as spells of intense sunshine alternate with cold fog blown up from the river basin. The results are, however, groundbreaking. For the first time an insight is offered into two prehispanic cultures, which developed outside the sphere of influence of both Tiwanaku and the Incas. In the Maragua crater are at least two prehispanic settlements, protected by a system of defensive walls. Masonry work is of a high quality and early indications are that Maragua had its own pottery and lithic production centres. The settlement of Pucarillo displays similar characteristics. It has fortifications, buildings in different shapes

and sizes, as well as communal areas. There is some evidence that pottery might have been produced on site.

MARAGUA

Maragua is situated in the crater of a former volcano with an 8km diameter floor. Its walls consist of steep mountain ridges in scale like formations. Along these ridges fertile soil accumulated, making not only the crater bowl but also the walls highly suitable for agriculture. It is very likely that the entire crater, basin and slopes, was used for agriculture during the prehispanic period as an even spread of archaeological artefacts suggests. From early on retaining walls and terraces were constructed along the crater walls, some of which are still in use today.

In the north-eastern part of the crater, between the modern villages of Maragua and Irupampa, is an ancient settlement occupying an area of approximately 250 by 500m. It is situated in an easily defendable position along the crater edge with steep drops of approximately 400m to the northeast. On the southwest edge are several sets of defensive walls, gradually added as the site expanded. Living quarters are rectangular in shape with walls made of carved square stones and mortar consisting of mud mixed with flakes of stone. Door openings are visible and some walls incorporate square niches with a lintel made of one solid block. In between the houses are streets and open spaces, which were probably used as working and meeting places. Drainage channels are visible in several parts of the site.

The archaeological materials recorded on the site are of a domestic nature and include large quantities of pottery, lithic tools and fragments of mortars and pestles. Amongst the ceramics are fragments of Mojocoya, Yura-Huruquilla and Yampara identified on the basis of their decorations. These types of pottery were produced over a long period of time from 100 to 1532 AD and probably reached the Maragua crater through trade. Other pots, however, do not seem to correspond to any previously known categories, suggesting that Maragua developed its own pottery production. These pots are coated in white, orange and reddish engobe and/or decorated with large red and black stripes. Some fragments of large pots have incised decorations.

Recently farmers, working in the area surrounding the modern cemetery in the centre of the crater, have come across badly weathered human remains. These bones were accompanied by fragments of Mojocoya, Omereque Polychrome and Yampara pottery, suggesting that the current cemetery was also an ancient burial site.

In the area called Kocha Pampa in the southern part of the crater large quantities of obsidian were

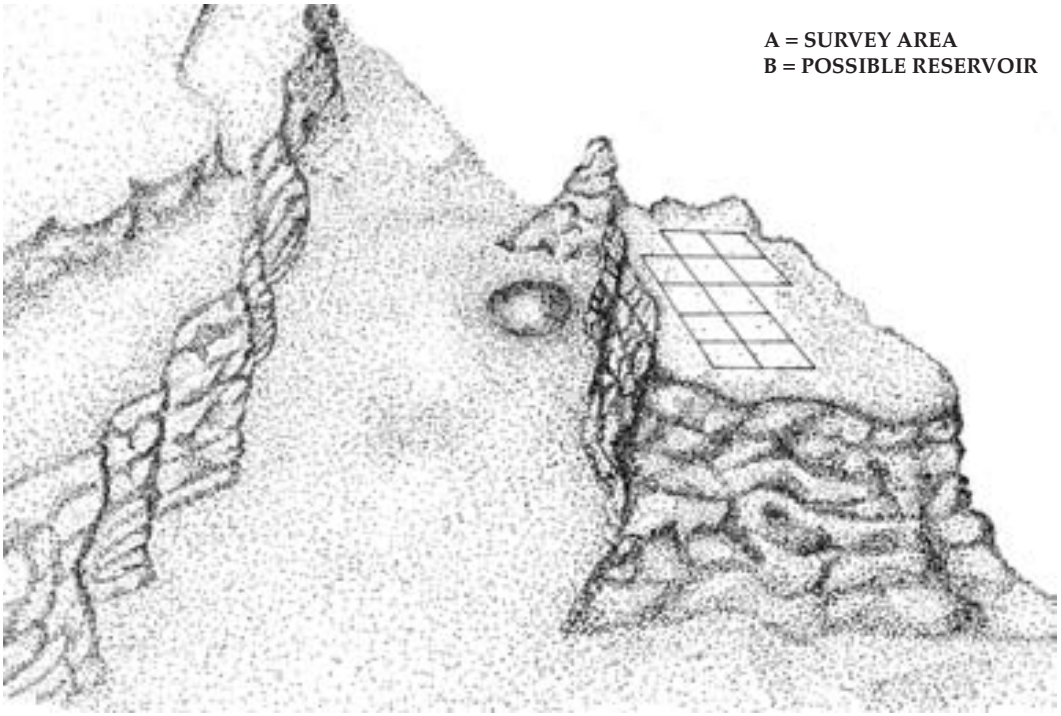
found in a range of sizes from tiny fragments to large slabs. It is possible that this site was used for manufacturing lithic tools but, as it is largely destroyed by agriculture, it has not been possible to confirm this hypothesis.

A small satellite settlement has been identified on the north-western crater edge in a location called Thuntorkha. Its dwellings are built in the same way as those in Maragua; they are rectangular in shape and are made of stone and mortar walls with rectangular niches. The site was badly looted and only a few artefacts were recovered. These include obsidian tools and ceramics, including fragments of Mojocoya and Yampara, as well as pottery decorated with black and red stripes, which is presumed to be local.

PUCARILLO

The site of Pucarillo is situated in a region that contains a number of large mountain plateaus. South of Pucarillo is the plateau of Yacamba and Redención Pampa at an altitude of 2500m, on which the archaeologically important Mojocoya region is situated. Pucarillo itself is part of the higher Naunaca plateau at 2800m. These plateaus are made of sandstone with a wavy surface through which little streams run during the rainy season. They are eminently suitable for agriculture and are at present intensely cultivated, as they probably were in the past. An even distribution of archaeological materials certainly points to prehispanic activity throughout the area.

PUCARILLO SITE LOCATION



The Pucarillo plateau forms the northern tip of the Naunaca platform, from which it is separated by a schism of about 200m deep (see drawing of site location). It has steep sides, which measure about 100m in the south up to 200m high in the north. The plateau of Pucarillo measures about 160m east-west and 70m north-south with a total surface of 11.000 square meters. At the top are the foundations of dwellings and in some places remnants of walls, which stand up to 0.8m tall. These were made of local stones in their natural shapes and mortar, made of mud and small pebbles, which survives in the lower parts of the walls.

Pucarillo dwellings are either round, square or rectangular in ground plan (see reconstruction of settlement). Circular structures are found in isolation or in small groups forming a string of four. Their entrances are protected from wind and rain as their walls curve around in a spiral shape, doubling up and forming a shelter in front of the door. Square houses are found in the centre of the site in two clusters of three. Both circular and square buildings in the centre face inwards, opening onto a central space, which very likely held a social function. Rectangular dwellings are found individually in different parts of the site. They vary largely in size and are both the smallest and the biggest buildings. From two test pits dug in different parts of the site it is clear that a large part of the settlement still lies buried underneath layers of humus and vegetation. The test pits also reveal several occupation layers, which indicate prolonged use of the settlement.

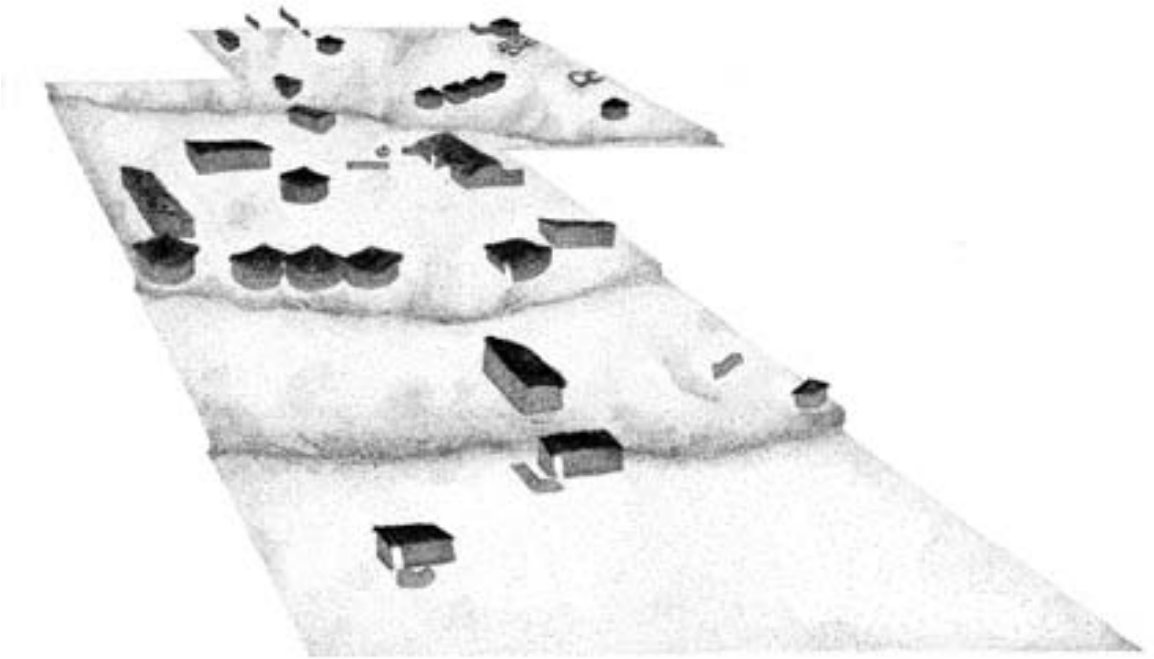
Around the dwellings are numerous fragments of mortars and pestles, which were probably used in the preparation of food, e.g. grinding maize. Cooked bones indicate that meat was also part of the diet. Evidence of other activities performed on site includes spindle whorls and polishing stones for pottery production. In one place was a sling stone, which may have been used for hunting or in defending the site.

Pottery fragments are on the whole made of a red paste with temper that includes sand, ground up quartz, slate and ceramics. Pots are usually polished, in some cases with the help of a spatula leaving marks on the surface. The larger thick walled pots are not decorated and were probably intended for cooking and storing food, and fetching water. The majority of decorated pottery fragments are Mojocoya, while smaller amounts of Yampara and Yampara-Presto-Puno have been found. The paste used to produce decorated pottery is generally fine resulting in pottery walls 2mm wide. The firing of these pots is regular, surfaces are polished and many are coated in engobe. Shapes used include the *puku*, *keru* and tripod bowls.

Access to water must have been a major concern for the inhabitants of Pucarillo, as there is no sign

of a spring on the platform. At the foot of the plateau, on the southwest side, however, a circular area of distinct vegetation showed up. Further investigation revealed a depression with a diameter of about 30m and 4m deep, which might have acted as a water reservoir. Its contents would have been sufficient to supply a site the size of Pucarillo. Access to this potential reservoir is available on the nearby west face of the rock, which is the easiest place to climb the rock.

RECONSTRUCCION OF THE PUCARILLO SETTLEMENT



Close to the reservoir are the remains of a wall, which might have served as a retaining wall for the earth removed from the reservoir, or as part of a defensive system. Remains of walls running towards the Rio Grande suggest that this might have been part of extensive fortifications. The area surrounding the plateau overall needs further investigation, as there are signs of habitation both to the east and the west, and of burials in rock shelters to the northeast.

ROCK ART

INTRODUCTION

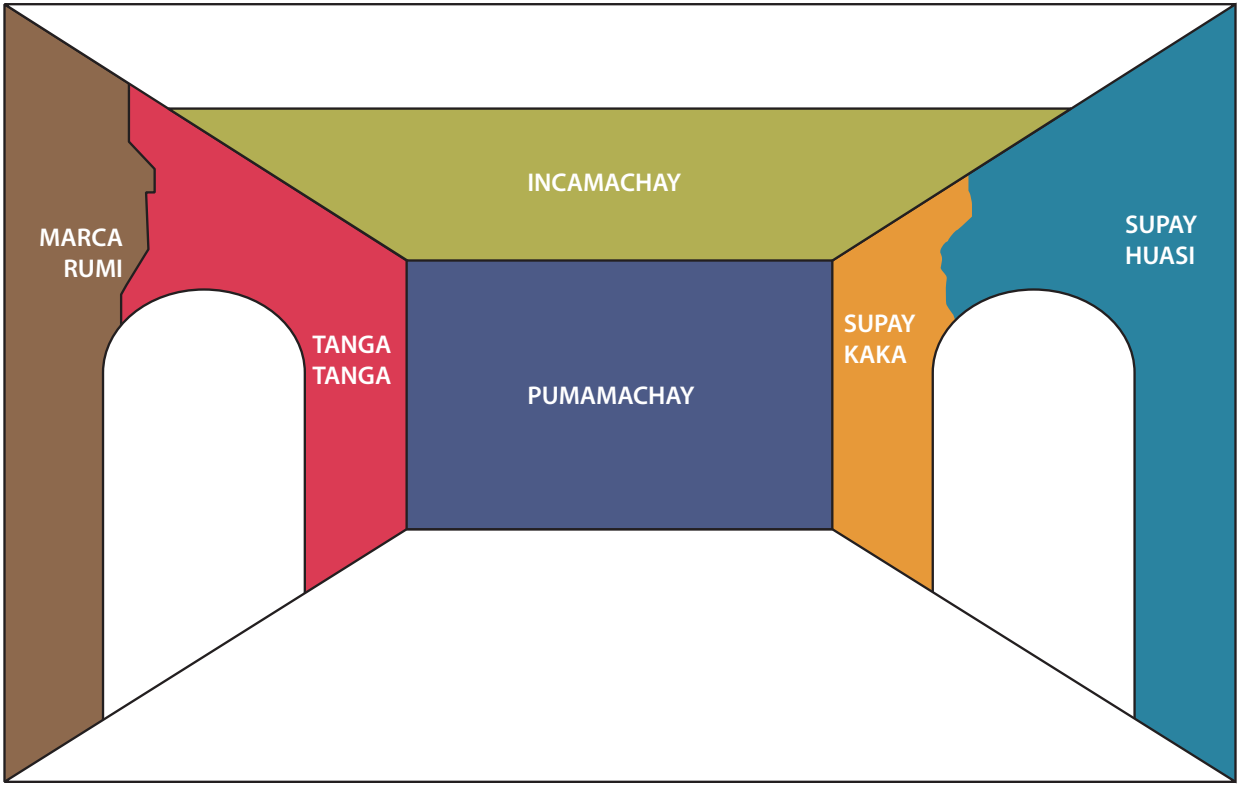
Bolivia offers a wealth of rock art, dispersed all over the country from the Andean mountain ranges to the Amazonian lowlands. In 1987 the Bolivian Rock Art Society (SIARB) was founded to record and protect this resource and has so far registered over a 1000 sites. The term rock art covers both paintings, called pictographs, as well as engravings, which are also known as petroglyphs. Rock art is usually found in isolated locations in caves, rock shelters, or on vertical cliffs and large boulders. The history of rock art is extensive. Although the most famous rock paintings date from prehispanic times, the practice persisted into the colonial and republican periods. Amongst the prehispanic rock paintings of Incamachay, for example, are figures in oil paint that were added in colonial times. Although the precise date of their creation remains unknown, it is clear that they were painted before 1940, as a photograph of this year demonstrates.

The meaning of many images depicted remains a matter of debate. Faces crowned by several spikes however closely resemble those on textiles and most probably represent Supay. This Andean spirit of fecundity, who can bring both good and bad fortune, needs to be handled with extreme care. This dangerous side led the Spanish to equate this spirit with the Christian devil. Supay is thought to dwell in caves, which is reflected in some place names. Supay Huasy for example means “house of Supay”, and Supay K’aka stands for “rock of Supay” in Quechua. There is contemporary evidence, for example from the north of Potosi, that several rock art sites depicting Supay continue to act as cult centres.

The Rock Art gallery includes life size reproductions of paintings and petroglyphs from Chuquisaca and the neighbouring Potosi Department. These were recorded and reproduced by the CIAR, using the original materials and techniques where possible. Paints were applied with a brush consisting of a stick topped with textile, the branch of a plant, such as hyssop, or using fingers. Pigments used include chalk or kaolin (a soft clay) for white, soot for black and iron oxide for red-brown. The tables below present an overview of the approximate age, subject matter and location of the original paintings. The dates provided are based on stylistic comparison with other art forms, such as pottery decorations. Although it is possible to date works of art like these directly by analysing a sample of paint, this process is costly and was not available to the current project.

Examples of original rock art can be seen in the vicinity of Sucre. The sites of Incamachay and Pumamachay, for example, are situated approximately 38 km northwest of Sucre. Their importance was recognised in 1958, when they were declared a National Monument. Thanks to the efforts of SIARB in conjunction with local rural communities they have been part of a guarded park since 2005.

PLAN OF THE ROCK ART GALLERY



MARCA RUMI

TYPE OF ROCK ART	PETROGLYPHS
LOCATION	DEPARTAMENT: CHUQUISACA PROVINCE: OROPEZA CANTON: QUILA QUILA
TYPE OF ROCK	RED SANDSTONE
SETTING	ROCK SHELTER AND BOULDERS (APPROXIMATELY 30)
MOTIVES	• ANTHROPOMORPHIC • ZOOMORPHIC • GEOMETRIC
CHRONOLOGY and CULTURE	UP TO 2500 YEARS OLD, POSSIBLY FORMATIVE PERIOD

TANGA TANGA

TYPE OF ROCK ART	PETROGLYPHS
LOCATION	DEPARTAMENT: POTOSI PROVINCE: CHAYANTA CANTON: MORO MORO
TYPE OF ROCK	GREY SANDSTONE
SETTING	CAVE
MOTIVES	ANTHROPOMORPHIC ZOOMORPHIC GEOMETRIC
CHRONOLOGY and CULTURE	UP TO 2500 YEARS OLD, FORMATIVE PERIOD

INCAMACHAY

TYPE OF ROCK ART	PICTOGRAPHS
LOCATION	DEPARTAMENT: CHUQUISACA PROVINCE: OROPEZA CANTON: CHAUNACA
TYPE OF ROCK	PINK SANDSTONE
SETTING	ROCK SHELTER
MOTIVES	• ANTHROPOMORPHIC • ZOOMORPHIC • GEOMETRIC
CHRONOLOGY and CULTURE	UP TO 2000 YEARS OLD, POSSIBLY SAUCES

PUMAMACHAY

TYPE OF ROCK ART	PICTOGRAPHS
LOCATION	DEPARTAMENT: CHUQUISACA PROVINCE: OROPEZA CANTON: CHAUNACA
TYPE OF ROCK	GREY-PINK SANDSTONE
SETTING	CAVE
MOTIVES	• ANTHROPOMORPHIC • ZOOMORPHIC • GEOMETRIC
CHRONOLOGY and CULTURE	UP TO 1500 YEARS OLD, YURA-HURUQUILLA

SUPAY K'AKA

TYPE OF ROCK ART	PICTOGRAPHS
LOCATION	DEPARTAMENT: CHUQUISACA PROVINCE: TOMINA CANTON: EL VILLAR
TYPE OF ROCK	RED SANDSTONE
SETTING	ROCK SHELTER
MOTIVES	ANTHROPOMORPHIC ZOOMORPHIC GEOMETRIC
CHRONOLOGY and CULTURE	UNDER INVESTIGATION, UNKNOWN

SUPAY HUASY

TYPE OF ROCK ART	PICTOGRAPHS
LOCATION	DEPARTAMENT: CHUQUISACA PROVINCE: OROPEZA CANTON: MAMA HUASY
TYPE OF ROCK	PINK SANDSTONE
SETTING	ROCK SHELTER AND SLOPES
MOTIVES	• ANTHROPOMORPHIC • ZOOMORPHIC • GEOMETRIC
CHRONOLOGY and CULTURE	UP TO 1500 YEARS OLD, POSSIBLY YURA-HURUQUILLA

PHYSICAL ANTHROPOLOGY

SKULLS

The collection contains 53 prehispanic skulls acquired at different points in the history of the museum. The majority have come from Zudañez Province and in particular from the Mojocoya area. Some were donated or bought, whilst the bulk originates from investigations undertaken by museum staff. It is likely that Dick Edgar Ibarra Grasso, former museum director, collected the skulls from Mojocoya, Chullpa Huayco and Puno Pukara as part of his fieldwork in the 1950's. Investigators of the German Mission, directed by Dr Hans-Dietrich Disselhoff, probably discovered the skulls from Chullpa Mocko in 1958. The remainder were bought or donated individually.

Based on the scant records of find location and object description dating from the time of their acquisition the process of cataloguing the skulls began in the 1980's. Fascinating new insights emerged from a physical anthropology investigation launched in 2000. This analysis was undertaken as a collaborative project between the CIAR, The Anthropology Department of the University of Cochabamba and the Department of Anthropology of Binghampton University (USA). A total of 49 skulls were examined, whilst four could not be included because they were either too damaged or belonged to some very young individuals. As a result facts, such as sex and age when death occurred, were established and interesting details about these people's medical histories emerged. It was found that amongst the 49 skulls investigated the majority, 35, belonged to women and 14 to men. The most common age at the time of death for women was found to lie between 20 and 30, whereas for men it was between 30 and 40 years old. Six individuals lived to the ripe old age of 50 years or older, of which 83% were females. In early 2008 the museum completed the facial reconstructions of four of the skulls in the collection, providing a good impression of what the early inhabitants of Chuquisaca might have looked like.

PROVENANCE	NUMBERS
MOJOCOYA	15
CHULLPA HUAYCO	14
PUNO PUKARA	5
CHULLPA MOCKO	4
ESCANA	1
ICLA	1
WITHOUT PROVENANCE	9
TOTAL	**49**

CRANIAL DEFORMATION

No less than 27 out of 49 skulls in the collection exhibit cranial deformations. Cranial deformation, i.e. altering the shape of a skull by applying pressure, was practiced in many parts of the world, including the Americas, Europe and Asia over many thousands of years. Motivations appear to have involved aesthetics, religion or the display of social status. To obtain these deformations the heads of very young children were bound while they were still flexible. Three different types of cranial deformation are found in Chuquisaca:

- **Annular**: the skull was bound with textiles or leather straps to obtain a rounded elongated shape.
- **Tabular**: the skull was constrained between two planks to produce an elongated oblique or tall head shape.
- **Bilobular**: pressure was applied to the front and the back to widen the top (parietal) part of the skull.

AGE ACCORDING TO SEX AND FIND PLACE

AGE M / F	CHULLPA HUAYCO	CHULLPA MOCKO	MOJOCOYA	PUNO PUKARA	ESCANA	ICLA	WIITHOUT PROVENANCE	TOTAL M / F
20 – 30	0 / 1	0 / 3	1 / 5	0 / 2	0 / 1	0 / 0	1 / 1	2 / 13
25 – 35	1 / 1	0 / 0	0 / 0	0 / 1	0 / 0	0 / 0	0 / 0	1 / 2
30 – 40	2 / 2	0 / 0	0 / 2	0 / 0	0 / 0	1 / 0	3 / 2	6 / 6
35 – 45	0 / 0	1 / 0	0 / 2	0 / 0	0 / 0	0 / 0	0 / 0	1 / 2
40 – 50	2 / 3	0 / 0	1 / 3	0 / 1	0 / 0	0 / 0	0 / 0	3 / 7
50 +	1 / 1	0 / 0	0 / 1	0 / 1	0 / 0	0 / 0	0 / 2	1 / 5

* M / F = MALE / FEMALE

TYPE OF DEFORMATION ACCORDING TO SEX AND FIND PLACE

DEFORMATION M / F	CHULLPA HUAYCO	CHULLPA MOCKO	MOJOCOYA	PUNO PUKARA	ESCANA	ICLA	WITHOUT PROVENANCE	TOTAL M / F	TOTAL
ANNULAR	1 / 0	0 / 0	0 / 2	0 / 0	0 / 0	0 / 1	2 / 1	3 / 4	7
TABULAR	4/ 3	1 / 1	2 / 1	0 / 1	1 / 0	0 / 0	1 / 1	9 / 7	16
BILOBULAR	0/ 1	0 / 0	0 / 1	0 / 0	0 / 0	0 / 0	0 / 2	0 / 4	4

* M / F = MALE / FEMALE

TREPANATION

Several skulls were found to contain trepanations, holes bored in the skull of a living subject. This form of surgery was practiced in many parts of the world for curing illnesses, particularly those related to

the brain, as well as for ritual or experimental purposes. It was common amongst the prehispanic people of South America, including the Incas. On display in the museum are a number of the tools used in such operations, as well as the skulls of some patients.

PATHOLOGY

Through pathology, the study of decease through its marks left on the body, other aspects of the lives of the prehispanic population have come to light. There are several cases of severe injuries mostly to the front of the skull, which were most likely inflicted in battles and fights. Diseases detected include osteoarthritis and infections, such as of the sinuses.

PEOPLE'S PROFILES

Bringing together the information obtained through the physical anthropology research, here are the profiles of some of the individuals whose skulls are now in the museum:

A young woman from Escana was operated upon several times. Her skull contains two trepanations on the right and one on the left. The trepanation on the left was never finished, however, suggesting that the patient died during the operation. She was between 20 and 30 years old when she died. As a child her skull had been bound to produce an annular shape. During the excavation of her body the skull was slightly damaged, leaving a small hole on the front.

A trepanation was performed on a young female from an unknown place. She survived the operation and the bone tissue partly grew back. At some stage in her life she suffered from an infection in the temporal mandibular bone, the joint that connects the lower jawbone to the skull. She died at a ripe old age of 50 years or over.

A possible trepanation is found in the skull of a male aged between 30 and 40 years. If the hole was the result of an operation the patient did not survive, as the tissue did not grow back. The same man has a possible fracture on the front of the skull.

[See facial reconstruction] As a child both tabular and bilobular pressure was applied to the skull of this female. She suffered a severe blow to the front of the head; a wound which healed. She probably died of old age at 50 years or more.

[See facial reconstruction] The head of a male from Icla was shaped into a tabular form. He suffered a severe injury around the left eye to the bone called the zygomatic, but recovered. He died aged between 30 and 40 years old.

PREHISPANIC MUMMIES

The museum owns several mummies discovered in the caves and rock shelters of Mojocoya. They were preserved through the natural conditions in these caves, which provide a dry environment with minimal variation in temperature and a scarce flow of oxygen. The bodies had not been subject to any treatment, such as the removal of internal organs, to mummify the body.

Mummy 01 was subject to an in depth investigation using non-destructive techniques from modern pathology, such as the CAT scan (see photos on display), complemented by sampling small amounts of mummified tissue. This research revealed a great deal about the medical history of this particular individual and the preservation of the group of mummies at large. Such examinations are costly, however, and it was not possible to subject the other mummies to the same process. As a result far less is known about them.

Mummy 01

Provenance: Naunaca, Mojocoya, Zudañez Province.
Position: foetal.
Sex: female.
Age at the time of death: 50-55 years old.
Cause of death: old age.
Bones: well developed due to good nutrition. This woman gave birth several times, as marks on the pelvis suggest. No signs of osteoporosis.
Teeth: lost several teeth during her life.
Estimated height: 142 cm (Testut-Latarget method)
Current weight 3,710 kg.
Comments: life expectancy in prehispanic times was less than 50 years and this person therefore reached an advanced age.

Microbiology

In the pelvic zone a fungus called *cladosporium spp* was encountered.
In the thorax (the cavity between neck and abdomen) the bacteria *micrococcus* and *bacillus subtilis* were found.

Pathology

The investigation revealed healthy skin tissue with signs of fibrosis (skin repair) and collagens (skin flexibility).
Through a hole in the abdomen fatty tissues were observed. They are well preserved with normal cell tissue walls.
Blood vessels contained red and white blood cells.
A sample of bone tissue from the skull did not provide cellular information.

Mummy 02

Provenance: Naunaca, Mojocoya, Zudaňez Province.
Position: lying on back, head resting on the right arm, legs slightly pulled in.
Sex: female.
Age at the time of death: approximately 25 years old.
Cause of death: Accidental? The position of this person suggests that she was resting at the time when death occurred, maybe she was overcome by hypothermia.
Bones: well developed due to good nutrition.
Estimated height: 146 cm.
Comments: it is very unlikely that mummy 02 is the mother of mummy 03, as a marked difference in nutrition suggests. Whereas mummy 02 is well built with traces of fatty tissues and folds in the abdomen and legs, the bones of mummy 03 are brittle as a result of malnutrition. It is more likely that the two were placed together by museum personnel arranging the exhibit for dramatic effect.

Mummy 03.

Provenance: Naunaca, Mojocoya, Zudaňez Province.
Position: foetal.
Sex: female.
Age at the time of death: 3-5 years.
Cause of death: malnutrition.
Bones: poorly developed with a low level of calcification. The skull is brittle with open sutures.
Teeth: stained and scratched.
Estimated height: 90 cm.
Comments: it is very unlikely that 02 and 03 are related.

Mummy 04

Provenance: unknown.
Position: foetal.
Sex: male.
Age at the time of death: 8-10 years old.
Cause of death: probably an accident as the right side of his chest was left severely damaged through impact. It is possible that he died as a heavy object fell on him.
Estimated height: 112 cm.

Mummies 05 and 06

Provenance: Naunaca, Mojocoya, Zudañez Province.
Position: foetal.
Sex: unknown.
Age at the time of death: 7 and 10 months old.
Cause of death: unknown.
Estimated height: unknown.
Comments: the preservation of these mummies is extremely poor and it was not possible to establish the sex, height and cause of death of these babies. They were not twins as the age difference indicates. A former museum worker tried to repair their fragile bodies by stitching parts together with a needle and thread, and fitting skull fragments together with glued paper. These interventions have done more damage than good. The glue and thread have now been removed where possible and the mummies have been placed in a horizontal rather than vertical position to prevent further damage.

CONSERVATION

One of the biggest threats facing mummies once removed from their original surroundings is biological deterioration from fungi and insects. During the investigations on mummy 01 the fungus *cladosporium spp* was detected. To treat this fungus it was decided to avoid the use of chemicals as these might react with and modify the original mummy tissue, thereby hindering future molecular research. Instead ultraviolet light waves of less than 300 nm were used to sterilise the surfaces, leaving them free of bacteria and viruses. Ultraviolet light modifies the cell structure of such bacteria preventing them from reproducing. Three UV lamps were installed in the room housing the Physical Anthropology exhibit so that the entire space would be treated. Further testing showed that the treatment had been successful and that room and the mummy display cases are now free of *cladosporium spp*. To prevent further contamination mummies were placed in hermetically sealed display cases. In the thorax of mummy 01 the bacteria *micrococcus* and *bacillus subtilis* were also found. These are however a harmless part of all surfaces, and did not need further treatment.

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