

**PATTERNS IN SEAL ICONOGRAPHY;
A FREQUENCY MODEL**

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by

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ABSTRACT

PATTERNS IN SEAL ICONOGRAPHY; A FREQUENCY MODEL

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In this thesis I explore iconography displayed on flat and roller seals manufactured during the Preclassic era in five Maya regions in Mexico, Guatemala, Belize, El Salvador and Honduras as well as two collections of seals of the same age from Ecuador and Peru. I gathered a corpus of images and established 21 categories of basic motifs. As background to the analysis of seal iconography, I discuss the history of the Preclassic period in terms of large scale political organization and seals as tools in social interaction and ritual. Next, I describe sites and seal assemblages included in this study. Analysis includes examining the frequencies of basic motifs, iconographic interpretations and similarities between sites and regions. Structural analysis shows iconography was chosen from a range of ancient motifs, executed with wide variation, with particular similarities that suggest directly shared practices. The frequency model put forth in this thesis reflects how seals were utilized in early symbolic communication and to display cultural identities.

CHAPTER 1

INTRODUCTION

Ceramic cylindrical and flat seals were a unique part of material culture through which ancient peoples communicated their ideology and social and political boundaries. They have been uncovered in several early civilizations, most famously in the ancient burials of Uruk, Mesopotamia. The exact origin of seals is hard to determine, engendering debates of technological/style diffusion and travel in prehistoric times. Their malleability, low cost and portability make them excellent candidates for long distance communication and early writing, and the iconography on roller and flat seals offers an interesting window into the symbol systems of Preclassic Latin America. The two distinct forms of seals, flat and cylindrical are classified together because of their shared apparent function to imprint an image. Structural analysis shows iconography was chosen from a range of ancient motifs, executed with wide variation, with particular similarities that suggest directly shared practices. I believe that seals, also called stamps or sellos, integrate into worship as prayer requests on paper and body decoration. Iconographic evidence supports the hypothesis that seals may be understood as the first printable type, but more than an efficient reproduction, seals added meaning and symmetry, and were treasured objects that functioned to solidify status. As background

to the analysis, I discuss the history of the Preclassic period in terms of large scale political organization and seals as tools in social interaction and ritual. Next, I describe sites and seal assemblages included in this analysis. Analysis includes examining the frequencies of basic motifs, iconographic interpretations and similarities between sites and regions. I believe the frequency model put forth in this thesis reflects how seals were utilized in early symbolic communication and to display cultural identities.

CHAPTER 2

BACKGROUND

The Preclassic Period

Social and historical contexts are important in understanding the role of seals when they were first developed. Frederick Field (1967:6) believed that seals originated in the Valley of Mexico, in cylindrical form, before 1300 BC. He believed they spread to Tlatilco by 1200 BC, and by 1000 BC seals had spread all through the Valley of Mexico and Puebla and later to the Gulf coast, Michoacán, Jalisco, Colima, Guerrero, and southern Mesoamerica. He argued that seals predated the Olmec culture, who then took the tradition as their own and added their own symbols (Field 1967:32). In 1932 Maurice Ries published a distribution map of seals that included all of Mexico, the Caribbean, Central America, Columbia, northern Ecuador, the American southwest, Florida, Louisiana, Illinois, and up the entire east coast to the area around present day Philadelphia. Mesoamerican seals are most common during the period of ceramic experimentation and social transition of the Preclassic 1500BC- AD 200 (Coe 1961:105; Hammond 1991; Lee 1969:74; Thompson 1941:45). Willey and Phillips (1958:144) defined the Preclassic (also known as the Formative) stage by the presence of maize or manioc agriculture and by successful socioeconomic integration into well-established

sedentary village life that ends with the essential elements for achieving civilization. The Preclassic is marked by a great acceleration in cultural achievements and shifting geographical spheres of influence. Preclassic artwork shows shared cultural values across distances, with perhaps some pan-New World elements.

The Early Preclassic period (1500 BC- 1000 BC) is characterized as being egalitarian, agricultural based societies, focusing on corn, and living in hamlets and villages near rivers (Coe 2002:45; Hammond 1991:5). Ceramic technology was developed, and people used pots in mostly a utilitarian fashion (Hammond 1991:219). In fact, Terry Powis (2002:226) states that the inventory of ceramics at Laminai, Belize shows that all members of society had access to fine quality pottery as well as a range of utility ware during the Preclassic. However, signs of complexity, differential wealth, and cult worship were flowering in various regions. For example, Olmec architecture and artwork show an early tribe of Mixe-Zoque speakers who developed complex systems of ruler-worship based on a shamanistic cosmology. The Olmec heartland is considered the Gulf Lowlands in the Mexican state of Veracruz, but the Mixe-Zoque people also occupied the area of the Isthmus of Tehuantepec, stretching down to the Mexican border in Chiapas. F. Kent Reilly (1995) defines Olmec as an archaeological culture geographically centered in Mexico's Gulf Coast and a widely dispersed art style. Preclassic sites in both central Mexico and Guatemala have documented material and symbolic connections with Olmec ideology. Reilly argues for the existence of a Pan Mesoamerican belief system underlying a Middle Formative Ceremonial Complex with cultural or symbolic contributions from a wide area. In addition, Schele (1995) argues that there was a mythical center from which people selectively borrowed and reworked.

Although few stamps have been recovered from the Olmec heartland itself, culturally connected sites such as Chalcatzingo, Tlatilco, and Las Bocas, all had abundant seals (Drucker 1959; Field 1964; Porter 1953:142-143).

During the initial Preclassic and into the Middle Preclassic, the Isthmus is characterized by closely-knit communities with shared motifs and economic interaction (Evans 2008:172). Robert Zeitlin's (1994) analysis showed that the north and south Isthmus shared stylistic attributes that "co-occurred in conventionalized patterns and must have been through contact." The map in Figure 1 shows the area covered in this analysis.



Figure 1. Map of southern Mesoamerica.

In the Middle Preclassic period (1000 BC to 300 BC) we see the rise of an urban aristocracy as populations increased and regional centers grew with raised platforms and pyramids. The Olmec powerhouses of San Lorenzo, and later La Venta, reached down the Pacific coast to El Salvador for trade items. Competing cities developed large schemes for connecting elites across distances and shared motifs spread over a large area. Feasting and display became more common. The most dramatic change in ceramic assemblages after 600 BC at Cuello, Belize is the emphasis to plates and platters in place of bowls. Kosakowsky (1991:175) notes that evidence of serving food on groups occurs in most lowland Maya sites in the Middle Preclassic. In addition to changes in the character of pot sherds and vessels, other non-vessel ceramics like figurines, ocarinas, and ear spoons increased in number and variety (Lee 1965:193). Demand for exotic resources such as jade and obsidian connected distant sites along particular trade routes. Michael Love (2005) says that La Blanca's rise as a regional center is visible in the material culture, as elites began acquiring more iconography to show their identity with the other elites.

By the Late Preclassic political ties were restructured. The Gulf lowland stopped being a major center by 600/500 BC and influence from the Maya Peten pushed north to Chiapas (Evans 2008:201). In the Maya lowlands, the Chicanel phase ceramics (300 BC-AD 300) were almost homogenous, showing new forms of art and architecture and a special feasting ware (Evans 2008:228). Zeitlin's (1994:220) analysis also notices a break in ceramic designs along the Isthmus as the southern and eastern areas become more aligned with Maya Mammon phase ceramics. By 200 BC, sites in the southern Isthmus and the Pacific coastal site of Soconusco were using a new gray ware ceramic

manufactured in the Zapotec capital in Oaxaca (Zeitlin 1994:224). Settlements in Soconusco and Guatemalan highlands showed local development as well as ties to both the Mixe-Zoque and their Mayan neighbors (Evans 2008:223). As politics and influences shifted direction from one area to another, hierarchical cities developed, trade and warfare dominated activities, iconography heralded rulers as divinity, and ancient beliefs were politicized.

The Pacific coastal areas of South America experienced similar social transitions, from kin based agricultural settlements to regional ceremonial centers with sacred spaces and elite residences (Damp et al. 1990; Damp and Vargas 1995, Stothert 2003; Willey 1961). Several seals have been uncovered in Ecuador's Machalilla and Chorrera cultures and a few from Peru's Chavin culture (1500 BC), but Ecuador and Costa Rica experienced their greatest manifestation of seals in the Late Preclassic and Classic. (Lathrap et al. 1980). Although Cummings (1996) believes that Preclassic Ecuadorian artwork is a local development with ties to Peru, the coeval manufacture of both forms of seals in Mexico and Ecuador has often been used as evidence of early sea trade (Coe 1960; Porter 1953). Contact between the two is quite possible, since a well-developed form of Mesoamerican maize was harvested in South America by 1500 BC (Willey 1961). Muriel Porter's list of common attributes between South America and Mesoamerica also includes rocker stamping, well-polished, hand mold figurines, negative painting, zoned decoration, stirrup-spout vessels, annular base, jaguar/feline motifs and the concept of dualism (Porter 1953:15-16). Willey (1961) believed that the similarities between Mesoamerica and regions of Peru and Ecuador suggested a process of regional interchange, symbiosis and hybridization or fusion of cultures. Debate continues as to

the nature and timeline of contact between Mesoamerica and South America, but the idea of sea travel is given credence by Valdivian archaeological artifacts found on the island of La Plata, about 30 miles from the coast of Ecuador. Furthermore, a 1525 Spanish account by Rodrigo de Alboroz described meeting a Mateno (Ecuadorian) on the open seas. This early sailor is still celebrated in the small towns in the coastal state of Manabi, Ecuador with an annual festival and a replica of the balsa raft illustrated by Rodrigo de Alboroz.

Visual Communication in the Preclassic Period

Willey (1961) believed the Chavin of South America and Olmec of Mexico had a pervasive iconography, which he labeled as “great styles.” He noted thematically conservative stylistic canons with sacred centers, monumental architecture and high artistry. Willey (1961:283) says that at their finest, the artwork produced in these two cultural centers was “truly powerful and awe-inspiring.” Reproduced in a variety of media and context, the iconography shows a cosmological view of a multi-layered, ritualized landscape and shamanism. While Willey wondered if the two cultural centers had influenced each other, he also wondered how these art styles influenced the creation of civilizations.

In Mesoamerica, we see ancient cosmology expressed through detailed motifs, site planning, astronomy and funerary mounds. Early Mesoamerica developed a complex, divinatory calendar that involved sacred days, months and years. Rice (2007) believes that the calendar developed from seasonal rounds of food procurement during the Archaic period. She believes the Popul Vuh, the K’iche’ Maya epic of creation, is

describing not the creation of man, but the creation of time and argues that deep-seated rituals, celebrating temporal cycles, regulated every aspect of the Mesoamerican life. Freidel (1995) also believes that the Middle Formative Ceremonial Complex developed from a farmer's cult in the Archaic where people exchanged blood for water and crop fertility. In Mesoamerica, characters and events of the Popul Vuh story are commonly depicted on stone, ceramic, and bark paper. Freidel and Schele believe that the story of the Popul Vuh "creates an ideological affirmation of brotherhood across segments of society" (Freidel and Schele 1988:549). In other words, the Popul Vuh creation myth frames a hierarchical relationship where elites are the ancestors and the commoners are the worshippers. The symbols associated with story can be interpreted as expressing an archaic shamanism as well as elite or chiefly ideals. Seal iconography highlight regional stylistic and symbolic representation of this widespread, Archaic belief system.

Most models discussing the phenomenal rise of Mayan society recognize the important and dynamic function of art in developing and maintaining hierarchies (Earl 1977; Willey 1961). Art has the ability to combine abstract ideas into a tangible medium, sending long distance messages that express stratification and rulership. In *Anthropology of Art*, Robert Layton (1991) proposes that great civilizations are created in part by art styles that support a hierarchical belief system. Wobst's (1971) Information Exchange theory argues that decoration is used symbolically in direct correlation with social boundaries. The more contact groups have between social boundaries, the more the symbols are announced. As Timothy Earle (1977:144) explains, ideology as a source of power rests on it being exercised and visually manifested. Related to this is that once an object functions in the realm of symbolic communication, it becomes a billboard, and

groups learn to read symbols in particular places for particular meanings. The risk of being misunderstood would control the symbolic communication. Given this framework, the earliest seals would speak at the most basic level, and represent the most clearly understood signs across a very wide area.

My corpus of seals stretches over language and literate boundaries. The Isthmus Script or epi-Olmec, believed to be in the voice of Mixe-Zoque, Maya, from southeastern Mexico and Guatemala, and the Zapotec script, from the Oaxaca Valley, all relied on a type of rebus, or puzzle writing in the beginning. Several scholars have suggested that the three writing systems perhaps originated from a shared ancestral text (Justeson 1986; Rice 2007). Brian Stross (1982) believes that Maya hieroglyphic writing got its basic symbols from Mixe language and that the language of Maya does not match the sound of the logograms. Early seal iconography may be logograms (representing the entire word as well as pronunciation) or ideograms, which indicate meaning without indicating an associated sound. In his analysis of seals from Kaminaljuyu, Godoy Ericastilla (1992) concluded that use and knowledge of seals was not exclusive to one culture and therefore can be included as a model of incipient writing, which evolved into ideographic forms until reaching a phonetic sound.

The early texts show possibly a mix of logograms and phonograms, with the homophonic principal used in naming. In the structure of Mayan written language we see main signs, compound signs, suffixes, and infixes. The central or main elements are independent and can visually correspond to their meaning, as a pictographic logogram. Such logograms stand for whole words and sometimes can carry a phonetic value. The

acrophonic principal is when a word gets its syllable sound from the first sound of the object, which can be built together in kind of writing.

The number of logograms in Maya writing fluctuated through time as some logograms fell from use and political changes caused new logograms to be incorporated into the corpus. The number of logograms increased along with developing monuments and concerns for accession (Grube 2003). However, the number of logograms in the corpus of hieroglyphic writing never exceeded 400 (Grube 2003:2). Some logograms had limited distributions and shorter periods of use. Nikolai Grube believes that scribes invented logograms more easily than syllabic signs, since syllabic signs are more permanent in the corpus. However, 85% of signs in the earliest text are in later codices, which Grube (2003:3) believes shows that a certain amount of ancient signs make up a core group within the corpus of hieroglyphs.

By the Late Preclassic, glyphic motifs and sequential arrangements appear on monumental architecture and murals, and scribes began to create a purposeful syllabary (Rice 2007). The principal subject matter on public buildings, tombs, and stelae seems to be historical and sociopolitical “propaganda” regarding ruling histories, dates, names, conquests and sacrifices. For example, a Late Preclassic slab monument from the state of Oaxaca has calendar glyphs carved into the legs of a slain captive, probably a ruler from another town named for his day of birth. Early stone carvings from Izapa, Chiapa de Corzo and Veracruz also show a mix of cosmological and rulership symbols. On the murals of San Bartolo, Petén, dating to 300 BC (Saturno et al. 2006), in wall-size, polychrome color we see the Popul Vuh creation story with recognizable figures and events. The similarities in iconography and textual content between the murals and the

Popul Vuh (recorded in the early 17th century) verify the continuity and geographic spread of beliefs and images.

In Classic Maya, the script was very developed and logograms could have polyvalence, which means an element is a logogram in one instance (a visual representation of a whole word) and phonetic in another (See Figure 4 for examples of logograms in Mesoamerican texts). After AD 650, Maya scribes began writing more logograms with syllabic signs and using more phonetic qualifiers.

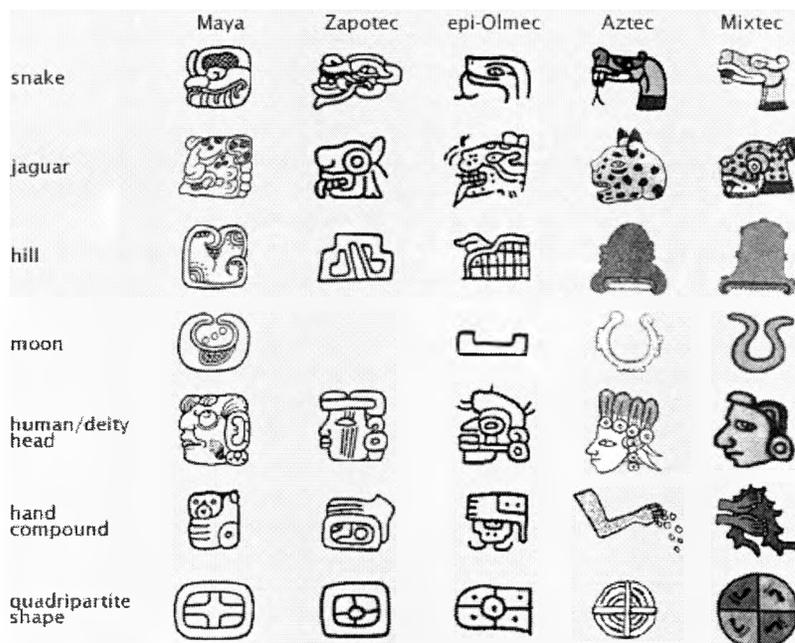


Figure 2. Several logograms in ancient Mesoamerican texts.

Fahsen and Grube think early logograms first appeared on portable objects (Rice 2007:169). Schele (1995) also believed that primary means of ideological transfer was through portable objects, perhaps along trade routes. While it is tempting to look for the beginnings of writing and find seals, does an analysis of seals lead one to find actual script? Pohl et al. (2002) posit a Middle Preclassic roller seal from San Andres, Tabasco

(Seal 188) as evidence of initial stages of logographic writing in the Gulf Lowlands. The stamp has an excised design with a bird emitting curved speech scrolls. The design incorporates U shaped elements, scroll and bracket motifs, and double merlon placed in a cartouche, forming an *ajaw* in Isthmian Script. The authors believe the bird is a representation of an Olmec ruler, named 3 *Ajaw*. Thus connecting speech scrolls, calendrics, and rulership, the San Andres seal has all the markings of early script. However, Stephen Houston (2004) believes that the San Andres seal shows iconic elements, but not continuous text. Kettunen and Helmke (2008:23) echo the fact that “true writing is graphical representation of spoken language in linear sequence.” They suggest that as a roller seal it is impossible to know where the text begins and therefore cannot be writing. However, John Justeson (1986:440) suggests that the first step of writing is the ability to represent multiple ideas, stacked into concise symbols. Some seals combine distinct iconography that can reinforce ideas or carry separate designs, which I believe indicate at least the foundations of early writing systems.

Community Service and Tangible Functions

Stamps have the unique ability to transfer symbolic power and at the same time bring to life sacred symbols. In the parables of the Maya Popul Vuh, objects and people are activated and pots and pans come to life by painting and decorating them (Schele 1995:113). Seals continued to be important objects in Mesoamerica beyond the Preclassic. In fact, Moctezuma sent a ceramic seal that he wore on his wrist to verify his command to arrest a high ranking subject (Heimpel 1994:2). The seal is not depicted but described as a symbol for *Huitzilopochtli*, the patron saint of the Aztec city. This account shows that the object of a seal signified meaning to the Aztec. Furthermore, a

Teotihuacan figurine shows a headdress with what seems to me to be groups of roller seals (Kubler 1967, Figure 34) (Figure 3). The iconography on these stamps includes the side step motif, diamonds, and E-comb in multiple registers, a characteristic attribute of roller seals. This Classic and Post Classic evidence shows that seals or stamps had a “stand alone” importance, but many scholars believe they also had tangible functions.

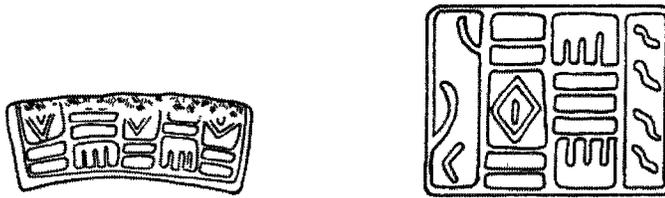


Figure 3. Designs stamped on headdresses of Period IV Teotihuacan figurines.

The standard theories for use include tattooing on skin or hide (Vaillant 1931:296; Enciso 1947; Westheim 1950:130), and printing on paper and fabric (Hammond 2006, Coe 1965:54). However, there are no remnants of stamped images since, unfortunately, these types of materials would perish with time. Ries (1932:416) believes seals were used to decorate utilitarian pottery and compares them with a form of typesetter. However, the few examples of imprinted ceramic vessels do not account for the amount and the variety of seals. I discount fabric stamping because of the amazing tradition of loom weaving and embroidering that continues to this day. Moreover, in South America, where textiles have preserved, although some are painted, there is no evidence of stamp designs on cloth (Pohl et al. 2002:1984).

Colonial documents can be a source of insight into what rituals may have been important in earlier times. The great Spanish chronicler of Aztec customs, Bernardino de Sahagun, recorded noble women making themselves up, saying, “they stamp with clay

stamps patterns on them in dark red” (Heimpel 1994:2). Landa and Oviedo also described scenes of people painting their arms and back (Cummings 1996:60). In fact, the report from the Banco Central de Costa Rica relates seals to a type of woman’s cult based on the idea that seals were used as a tool for applying decoration on women. The Banco Central (2003:3) suggests that paints or inks were made from Guaitil for black, Annatto for red and blood mixed with charcoal to paint their bodies. Field (1967:20) says of his collection that many seals have concave surfaces as if to better fit around an arm. Although the *Codice Chalcihuitzin Vasquez* shows painted stamps on forearms of a woman (Ohi 2000:188), in most Classic Maya codices only captives have branding on their limbs. Unless used as a template, seal tattooing is temporary and different from the phenomenon of permanent tattoos common in cultures as markers of rites of passage. Holly Bachand (2003) believes seals are part of personal adornment and relate to social identity and personal dress. Wobst (1977) explains that dress and adornment is one of the most outwardly visual methods of distinguishing oneself and sending messages. Love (2005:10) says that the figurines from La Blanca show a wide variation in appearance and reflect “a type of communication manifested by variable style in accordance with social context.” As the figures demonstrate variable dress that can be interpreted in as social markers, stamped tattoo designs may relate to ethnic or group affiliations. In addition as tattoos, seal iconography may relate to specific ceremonies that were shared across sites. I cannot help but think of the ceremonies of Xipe Toltec where symbols could be stamped on the victim, like Milagros on a cross, before being flayed.

For support of the connection between seals and tattooing, we look to the abundant Preclassic figurines found all over Latin America for clues about dress and

body decoration. Some figurines have designs that resemble stamps with repeated triangles, lines and zigzags, and footprints. However, there are no exact matches of stamps with designs on figurines. Perhaps Frederick Field (1967:11-12) is correct in saying that figurines show free-hand body painting and do not support the argument of body stamping. Schele (1995:113) also believes that most information on body painting indicates that finger painting is the most common form. However, the Huastec female figurine that Field presents (1967:14, Fig 3) has a tattoo on her cheek that strongly correlates with a seal pattern that I would categorize as circumference triangle lines (Figure 4). Since this design corroborates accounts of personal adornment on women, it would be interesting if we could relate the presence of circumference triangle line seals with the presence of an elite female at the site.



Figure 4. Huastec figurine with stamp design on cheek (Field 1967:14, Fig.3). It matches seals with circumference triangle lines from the Maya lowlands and Chiapa de Corzo.

Alternatively, seals could be closely associated with the advent of bark paper.

The Maya used bark paper to make books, which they plastered with stucco and painted.

Paper clothing was also worn and could have been decorated with seal imprints.

Following the work of Marshall Saville, Paul Tolstoy (1991) traces the importation of bark beaters used to make paper to the Pacific coast of Central America beginning around 500 BC from the Torjada group in Sulawesi, Asia. Tolstoy examines the issues between independent invention and diffusion in their paper making techniques. He recognizes that recurrent technical constraints and desires would lead to similar yet independent inventions. He identifies 300 variable features in the steps that go into producing bark paper. The process involves stripping the inner bark or blast of a fig tree, which is then soaked and beaten with a large grooved stone called a bark beater. Tolstoy believes all variations in the steps have functional alternatives, and few are determined absolutely by the mere goal of making paper. He concludes that Mesoamerican paper technology evolved from a prototype shared with Sulawesi bark cloth.

Although there may be a connection between people and technologies in these two areas, bark beaters have been found in Mesoamerica much earlier than he supposes. Willey (1965:469-522, 1978:79-80) connected bark beaters from Barton Ramie, Altar de Sacrificios, Seibal and other Maya lowland sites with a typology of forms including oval, circular, club handed and rectangular. He said all forms were found in refuse deposits dating from the Early Preclassic to Classic and increased in frequency through time. Hammond (2006) also securely dated a bark beater from Cuello to the Early Preclassic, at 900 BC. In 1991, Hammond reported on 10 bark beaters found at Cuello, all of local limestone. He could date one from the Early Classic, two from the late Preclassic and two from the early Middle Preclassic (1991:189). This scattering in dates shows the early and continued importance of paper making in Mesoamerica.

In the Classic and Postclassic, bark paper was used to make books or codices, treasured by ancient people and modern anthropologists alike. Stucco has been found on a flat seal from Kaminaljuyu and on one from the Alta Verapaz collection, which may relate seals to an early form of painted bark paper. Examining the few surviving codices, I see a few direct similarities. Common at Las Bocas and Tlatilco and appearing only once in this dataset, a flat stamp of a foot is the most obvious similarity between codices and seal iconography. The artwork in codices resembles several of the basic units on seals, like speech scrolls and volutes, but they seem more hand painted than stamped and seals are larger than motifs in the codices. Besides codices, we know paper had major significance in Late Preclassic and Classic rituals. Bloodletting and rulership ceremonies included the knotting and burning of paper (Reilly 2006). In addition, Sahagun describes an ancient Aztec paper burning ceremony where symbols were put on paper, a liquid rubber was dripped and pressed into forms and then the paper was burned (Field 1974:xxiii). Sahagun says that if the papers burned well, as opposed to smoldering in the fire, then it was a good omen. If seals were used in such a divinatory ritual, then the priests who impressed the sacred images could control their distribution. They also functioned for participants of the ceremony, taking concrete images of their desires into heaven as smoke, like a pipe ceremony, likely with blood to open the portal. A multitude of simple requests could be expressed using ancient symbols that would speak directly to the gods.

Seals were manufactured individually in Mesoamerica, without molds. The seals seem “normal” for the clays in the area, or within the range of variability of local ceramics (Bachand 2002:537). The seals that I have examined from Cahal Pech seem to

have a varied paste composition. The lightning seal from Structure B4 at Cahal Pech (Seal 159) was fired a neutral buff color with sand temper (Personal Notes 2008). The seals from Blackman Eddy included shell temper, which is also normal for their pottery. Such sturdy ceramic pieces probably had little chance of breaking during manufacture, allowing for a wide range of clay sources and methods of pit firing. Widespread paste compositional analysis would help identify the place of seals within the systems of ceramic production and offer clues as to how seals spread geographically from their area of origin.

Some seals exhibit high artistry and some are more crudely crafted. Most seals are slipped and deeply excised, although six in this study are completely undecorated. Artisans carved most pieces with a cameo technique where the background is carved out so that the design stands in high relief. A few are carved with intaglio, which is the opposite of cameo- the design is cut into unfired clay and the background remains. Seals are uniquely noted for their mirror reflection when printed and intaglio versus cameo relates to the amount of dark space in the final print. Porter (1953:41) says this is really the idea of negative painting, the opposite mental image of molds since stamps leave the positive relief. Ignacio Bernal (1969) commented that Olmec are more sculpturally oriented while Maya are more paint-oriented, although this is not a strong distinction and Maya stone work usually leaves the designs in cameo.

The shapes and constructional forms of roller and flat seals have small, regional variations but mostly conform to general characteristics. Roller seals range widely in lengths from 2 cm to over 10 cm. Field (1967:6) noted that the rolled out image of seals could measure anywhere from 5 cm to 36 cm. Central diameter varies from solid, small,

proportionate to exaggeratedly large. In other words, the central diameter is not controlled by any standard axle size. Eighteen are solid: eleven from Chiapa de Corzo, one from Kaminaljuyu, and six from La Blanca. Although 35 seals are missing this piece of data, 80% of roller seals are hollow. Roller seals were carved in either a horizontal or a vertical orientation. Basic units carved vertically allowed distinct images to be represented around the seal, but also made the representations more squat. Perhaps for this aesthetic reason, horizontal orientation is more common. In several instances spatial segregation of elements is achieved with different registers, often clearly marked with lines. Multiple registers are a characteristic attribute and found with different motifs, in various sites throughout time. The flat stamps generally have a handle on the back (89%), some have holes in the handle (as if to be worn) and one was a whistle. The shape of the outline of flat stamps in Preclassic Mesoamerica is generally cut out around the designs. The Ecuadorian assemblage has more rectangular-shaped seals and squared seals become more common in later periods in Mesoamerica.

We cannot assume that the seals were used in only one context, nor can we assume that this function is exclusive to ceramic seals. Carla Sinpoli (1991) suggests for ceramic analysts to think of non-ceramic counterparts like bone, stone, wood, and metal that may have been similarly employed. The overwhelming majority of Mesoamerican seals are made of ceramic; only one roller seal from Peru is stone. Out of the 2,000 seals examined by Field, six were made of stone (Field 1967:5). Moreover, hollow, excised roller seals are stylistically similar to “bone tubes” found common in the New World from South America to Texas. Bone tubes, plain and decorated were made from sections of deer long bones and bird bones, carved with sacred symbols and were often included

in burials (Willey 1978:169, Hammond 1001:183). They may have been functionally associated in the minds of the Maya as the same tool in a different medium. I suggest more research into this connection to see if they compare stylistically to ceramic seals. Furthermore, although none has been found archaeologically, wooden seals have been attested to in ethnography. In the tropical forest of South America, similar roller stamps made of carved balsa wood are used exclusively for the purpose of laying painted designs on the face and body (Lathrap et al.1980:51). There is also a twentieth century ethnographic account of a man on the Ecuadorian coast who coated his canoe in bees wax, impressed a repeated design into the wax with a wooden seal, and then painted inside the lines, thus assuring symmetry of the design around the boat (Cummings 1996:58). In describing Tlatilco stamps Porter (1953:41) commented that seal motifs are “massive, slow in feeling and might have originally been in stone or wood.” Ceramic seals could be an imitation or a socio-tech exaggeration of something made in wood or bone and used readily by more people.

Ericastilla Godoy (1992) and Cummings (1996:63) believe that the seals they examined are not worn at edges and exhibit no use wear. Borhegyi and Kidder, however, believe that edges of roller seals are broken from use with an axle. The zigzag or lightning seal I examined from Cahal Pech (Seal 159) was slightly fragmented on one end, but did not appear to have any residue (Personal Notes 2008). The lack of apparent ink on seals led Field (1967:47) to originally suggest that seals were used to roll images on sand, like a mandala. However, in his later work (1967) he states that seals relate to paper ceremonies. The plant tannin found on the stamp at Cuello indicates that seals were used with ink. More chemical analyses is necessary before we can have a broader

understanding of the systemic context of seals. On a side note, chemical analysis may also indicate color of ink, an important consideration to the Maya.

Field (1967:6) and Hammond (1991:179) agree that the seals are probably not marking specific ownership, nor did they mark a particular product as we see inscribed on other Classic period portable objects. Within networks of trade, stamps could be a form of tribute, tokens of friendship, symbols of alliance, or a bought blessing – like buying an absolution in Martin Luther’s day, purchasable and dispersed religious power. Seals reflect multi-layered interaction, following trade routes along with commodities. Yet, seals may be the epitome of what we know was happening in Preclassic Mesoamerica- that people were sharing intangible resources (iconography) as well as goods. In *Anthropology of Art*, Robert Layton (1991) switches the viewpoint and instead of asking why something was made, he asks what is the consequence of making the artifact and what is the nature of the values the artifact expresses. His questions are more important to the study of seals since they are not hard to make or replicate. Their use and frequency depend on their social role within the community and the community’s role within a much larger network.

CHAPTER 3

METHODS

I researched various resources to compile a corpus of images of seals, comparing photos, modern imprints, and some personal analysis. Frederick Field's work published in 1967 by Dumbarton Oaks offered the first catalogue of seals within a theoretical framework. He analyzed thousands of seals, comparing mostly unprovenienced pieces from Las Bocas and Tlatilco, against a wider scope of later period seals from Mexico's West Coast and Central Highland area. He and Jorge Enciso worked to produce the beginnings of a seal catalogue and established an accessible collection. Although Field believed the Maya area was vacant of seals, several site reports have been helpful in documenting seals in the southern areas of Mesoamerica including Kidder's volume on Kaminaljuyu, Thomas Lee's report from Chiapa de Corzo and Gordon Willey's excavation reports from Seibal, Barton Ramie and Altar de Sacrificios.

The final dataset includes a corpus of 237 seals (111 roller and 126 flat stamps), from 19 sites, grouped into six regions including the Maya lowlands, the Isthmus of Tehuantepec, Soconusco, the Southern Guatemalan Highlands, the Gulf lowlands, and South America's Pacific coast. The Isthmus of Tehuantepec has only one representative site, Chiapa de Corzo; all other regions have at least two sites contributing to the analysis. In order to have relative-sized groups, I have included 10 sites in the Maya Lowland

group, encompassing a larger area than the other regions. Unfortunately, many recorded seals are from vague proveniences. They have been lost, stolen and gifted since they were first made, and continue to move and change hands to this day. I have incorporated three seals into the Maya Lowland group that Stephen Borghegyi (1951) believes provenience to Alta Verapaz, Guatemala.

Entangled in the mystique of seals is the idea that seals provide evidence for contact between the Pacific coast of Mesoamerica and South America (Coe 1961; Meggers 1964; Porter 1953). Thomas Bitting Foster Cummings (1996) has published a nice catalogue of seals from Ecuador's Jama-

Coaque culture from the Regional Development phase of 200 BC- AD 700 when seals flourished in the area. The image in Figure 5 is the cover of Cumming's book showing the fine execution of some of the 1200 seals recorded. The catalogue shows wide stylistic variations, some are wispy and others more structured. Similarly, the Banco Central de Costa Rica (2004) has published a bilingual, high glossy book of seals produced after

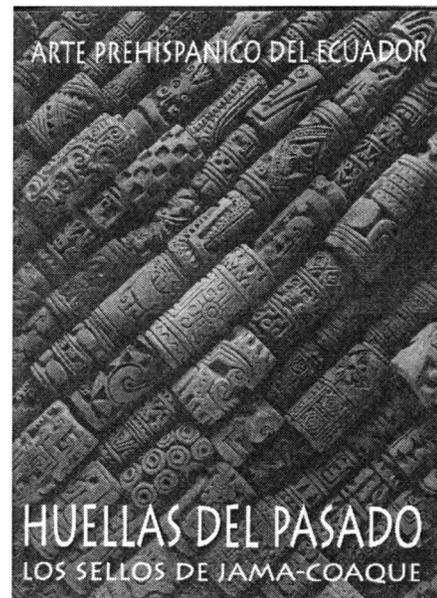


Figure 5. Cover of catalog of Ecuadorian seals.

300 BC. Although the scholarship into the seal phenomenon is insightful, the lack of provenience data in these two catalogues precluded using any of those seals in this study. My main source for the South American seals are from an exhibit organized by the Field Museum of Natural History and the Museo del Banco del Pacifico Guayaquil edited by Donald Lathrap, Donald Collier and Helen Chandra (1980). Twenty-four seals are

included from Early and Middle Preclassic Pacific Ecuador and Peru. I analyzed the South American seals with same list of attributes.

Site and regional assemblages exhibit a range of archaeological contexts including burial, elite rituals centered on architecture, and household deposits. This archaeological typology of context is utilized to compare their use, value, and disposal. The dataset is a reflective sample of the corpus and does not mean to represent all seals made or uncovered. In fact, Holly Blachand (2002:535) wrote that although not all Middle and Late Preclassic sites have seals, their distribution is “extensive and it could be that the majority of the sites had them.” In other words, I have analyzed a representative sample. My methodology aims at understanding how designs compare within site assemblages and within the corpus of seal images. Organized by sites, seals are numbered and referred to throughout the paper. Refer to Appendix A for full descriptions of motifs and references and Appendix B for images.

Prudence Rice (1987:249) parses the discussion of style into six categories of analysis: elements, motifs, configurations, basic units, layout, and structure. She describes elements as the smallest constellation of stylistic consistencies that can be isolated. A motif is the fixed combination of elements and can be large and complex, and the arrangement of motifs is the configuration. She defines the conceptual category, most immediately recognized, borrowed and imitated as a basic unit. Gordon Willey, Field, and Thomas Lee grouped seals according to basic unit categories such as anthromorphs (or personages), zoomorphs, birds, serpents, and geometrics. Lee’s grouping also groupings based on stylistic creation such as curvilinear reticular, continuous lines, and free forms. Almost all of Field’s groupings would qualify as representations of the

natural environment, both flora and fauna. Field interpreted much of the seal iconography as demonstrating everyday life, and his collection of seals has images of hunting, atlats and fishnets. He also saw religious and shamanistic or animistic symbols on seals such as the world directions, moon, sun, rain, earth, water, clouds, and smoke (Field 1967:7). In South America, Cummings (1996:68-69) believes that seal iconography and motif arrangements have compositional order. He found a repetitive quality to seal iconography that allowed him to recognize abstract designs by relating them to a more fully depicted proto-type. Although the chronology of Jama-Coaque seals needs further research, he says that there may be a temporal trend toward more abstraction. His categories include geometrics, flowers, humans and fauna.

My analysis follows previous typologies, while adding several elements and a finer resolution of geometric designs. I developed 23 categories I felt salient to both forms of seals (Table 1), but by no means is this an exhaustive list of motifs or designs on seals. Because basic units (the mental concepts of the subject matter) are the easiest to copy or imitate, Rice (1987) argues that the underlining design structure of style may be a truer point for iconographic comparison since it connects to deeper cultural understandings and actual manufacture. In addition to basic units, I recorded the orientation, framing, and the form of designs and analyzed their overlapping relationships.

Table 1. Basic Unit Categories.

Undecorated	Cross	Crescent	Star
U-shape	Step fret	Woven	Anthromorph
Spiral	Numeration	Diamond	Circumference lines
Concentric Circle	Concentric Square	Calendar	Zigzag
Plant	Reptile	Bird	Stacked-parallel
Side step	Monkey	Circumference triangle lines	Undetermined

Much of my work involved normalizing the data by listing basic units separately to understand the components of iconography and the structure of stylistic patterns between assemblages. Although I grouped where I could, I also allowed each category to display wide stylistic variations once the basic unit was recognized. Stamps can have more than one element recorded, and I eliminated seals if too fragmented to record the iconography. Thirty-two seals had iconography that I could not recognize or describe in any efficient way, and is a rich resource to be mined by epigraphers. They include unconnected lines or images with only vague resemblance to actual things (Figure 6). Although Field (1967:7) believes all seal iconography derived from some real or symbolic meaning, the unclassifiable and abstract iconography may also hold clues to distinguishing seals that carried meanings and those that were more decorative.

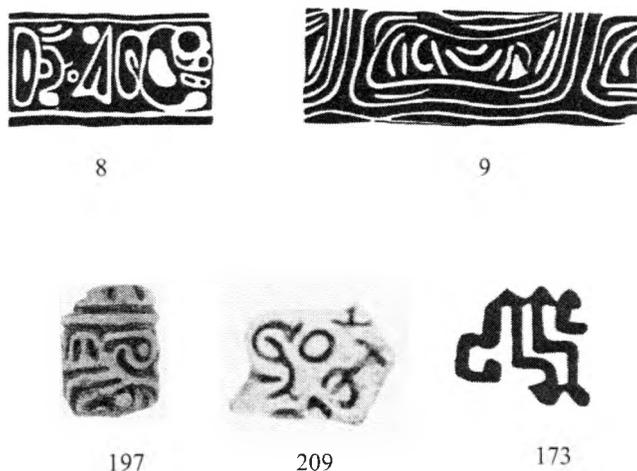


Figure 6. Some of the diversity of abstract and unknown seal iconography. Seals 8-9 are from Chiapa de Corzo, 197 and 209 are from Tres Zapotes, and Seal 173 is from Mirador

Statistical analysis, such as factor analysis, is a common statistical method to explore patterns in data and to test archaeological inferences. For example, size-class distinctions within pottery forms have been detected with rim diameter studies (Henrickson and McDonald 1983). Unfortunately, metric data such as height, length, diameter, depth of excising, etc. are not always recorded alongside seal images. The lack of consistent measurements makes quantitative statistical analysis impossible at this point. However, several attributes of execution can be estimated and iconography is generally well recorded.

Statistical analysis is further limited because of nominal data and because it is artwork that is being compared, sometimes hard to describe, much less quantify. Distinguishing the basic units is undoubtedly the most difficult area of my research and the one most affected by cultural and linguistic lens. Within cultures, constructed patterns of lines and geometry become recognizable configurations, or configurations are

simplified into geometry in a process of *pars pro todo*. Furthermore, the mind sees points of continuity between patterns that are hard to properly weigh in statistical analysis. However, I believe patterns and behavioral information can be inferred from the relative frequency, distribution and interpretations of the basic units.

Diffusion and invention are dynamic and complex processes not wholly understood and manipulated by an array of human and cultural facts beyond historical contact. Although not always the case, invention, like evolution, is believed to be a gradual process with evidence of failures, and a central or origin point exhibiting the most diversity. The comparative method of anthropology is limited because similar traits in unrelated cultures may arise for different reasons and traits may have surface similarity but may mean different things. If there is affiliation between peoples, technology is often shared and adopted if it is beneficial and there is access to raw materials and training or skills (Zeitlin 1994). If people share an identity, they copy designs and the level of shared motifs can reflect social integration and changing contacts through time (Longacre 1968, Proskouriakoff 1950). As part of this thesis, I examine the coefficients of similarity between regions. I followed the methods of Robert Zeitlin (1994) who analyzed iconography and design attributes on pottery from the Isthmus of Tehuantepec, grouping ceramics from the southern Isthmus, northern Isthmus, Soconusco and the Chiapa Depression to measure interaction between the areas. His procedure for finding the coefficient of similarity between assemblages entailed gathering a corpus of stylistic attributes, and counting matches in ceramic forms and iconography between pairs of assemblages, and then dividing by the total number of attributes in the corpus. Zeitlin combined his analysis with information on known obsidian sources and trade. His results

show how cultural alignments shifted from the Early Preclassic to the Terminal Preclassic period (Zeitlin 1994). My analysis is similar to Zeitlin's in that I also rely on presence/absence data to understand overall commonality of attributes and geographic connections. However, the variation within each of the conceptual categories, or basic units, in my analysis and the larger geographic area of study adds a more interesting comparison and reflects more complicated social processes and structures.

Erwin Panofsky (1939) purposes three levels of interpretation or decipherment involved in understanding visual images. The initial and almost unconscious step for the observer is to identify objects and their relationships. Colors, lines and shapes come together into factual subject matter based on the observer's personal experience and recognition. In my analysis, a directed, heuristic approach has helped find similarities in the various assemblages by recognizing the primary subject matter or basic unit (Kintigh and Ammerman 1982). Panofsky's secondary or conventional layer of interpretation is the iconographical description and classification. This more "intelligible" reading of artwork relies on a general knowledge of the customs and norms peculiar to the civilization from whence it was produced. To understand iconography one must connect the representational elements or motifs with concepts to bring alive the stories and allegories in the images. The advances in epigraphy and scholarship in pre-Columbian iconography has made it possible to attempt a widespread iconographic analysis. Panofsky's third dimension of interpretation understands the intrinsic meaning or content. He explains that the artist's personality, conditioned by upbringing, society, nation, religion, past experiences and present surroundings, is inseparable from the final product. The artist's indelible hand can shed light onto those very societal influences. The

synthesis of these three layers of understanding offers a more complete method of interpretation he calls iconology. I believe that seal iconography is a great body of work to highlight this third level of interpretation because of their geographic distribution and the variations in the basic units.

CHAPTER 4

SITES AND SEAL ASSEMBLAGES

Seals may be connected geographically to the western edge of Maya regions. The assemblages from Chiapa de Corzo, La Blanca and Kaminaljuyu are much larger than from other sites. Combined with the seals from west Mexico and South America, it may indicate the use of seals, if not the actual seals, spread from the Pacific coast. In the following paragraphs, I have described the six regions, their historical connections, the contexts of seals and the basic units in each assemblage. I have listed them by size of assemblage according to region because it affects overall impact on iconographic analysis. Table 2 lists the sites and number of seals in each region. Table 3 is a chronology of Preclassic ceramic phases discussed in this chapter.

Table 2. Number of Seals (Roller and Flat) in each Site Assemblage.

Assemblages	Roller	Flat	Total
Tehuantepec			73
Chiapa de Corzo	26	47	
SE Guatemalan Highlands			40
Kaminaljuyu	5	29	
Chalchuapa	1	5	
Soconusco			37
La Blanca	29	6	
La Victoria	1	1	
Maya lowlands			36
Altar de Sacrificios	2	0	
Alta Verapaz	2	1	
Barton Ramie	1	0	
Blackman Eddy	2	0	
Cahal Pech	1	0	
Cuello	8	2	
Seibal	1	0	
Mirador	9	1	
Uaxactun	3	0	
Ulua Valley	1	2	
Gulf Lowlands			27
San Lorenzo	1	1	
San Andres	1	0	
Tres Zapotes	7	16	
La Venta	2	0	
Pacific South America			24
Chavin	2	2	
Ecuador	6	14	
Total	111	126	237

Table 3. Preclassic Ceramic Chronologies.

	Belize River Valley Cuello (Hammond 1991:4)	La Victoria (Coe 1961)	Chiapa de Corzo (Coe 1961, Lee 1969)	South America (Cummings 1996)	Uaxactun (Coe 1961)	KJ (Coe 1961)	Olmec area (Coe 1961)	Altar de Sacrificios (Willey 1978:4)	Seibal (Willey 1978:4)
terminal Pre-classic	Nuevo Tzakol (AD 200-600)		Horcones (100 BC- AD 0) Istmo AD 0- AD250	Manteno	Matzane I (AD 200-AD 300)			late facet Plancha (AD 0 - 150 AD)	
late Pre-classic	Cocos Chicanel (400 BC-200 AD)	Crucero (500 BC-0 AD)	Guanacaste (300 BC - 100 BC)	Guanagala	Chicanel (200 BC- AD 100)	Miraflores (100 BC-100 AD)	Early Tres Zapotes (300 BC- AD 200)	Plancha early facet (200 BC - 0 AD)	Cantutse early facet (200 BC- 0 AD)
middle Pre-classic	Lopez Mamon (700 - 400 BC)		Francesa (450 BC-300 BC)						
	Bladen (900-700 BC)	Conchos II 750 bc- 500 BC)	Escalera (600 BC- 450 BC)		Mamon (800 BC - 200 BC)	Las Charcas (750 BC- 300 BC)		San Felix (800 BC- 200 BC)	Escoba (800 BC- 200 BC)
Early Pre-classic	Swasey	Conchos I (1000 bc- 750 BC)	Dili (900 BC- 600 BC)	Chorrera (1200 BC- 750 BC)	Mamon (1000 BC-700 BC)		La Venta (900 BC-300 BC)	Xe (1000- 800 BC)	Real (1000 BC-800 BC)
		Ocos (1500 BC- 1000 BC)	Cotorra (1500 BC-900 BC)	Machalilla (1500- 1200 BC)			San Lorenzo		

Isthmus of Tehuantepec; Seals 1-73

The largest assemblage in my data set originates from excavations at Chiapa de Corzo published by Thomas A. Lee in 1969. Chiapa de Corzo is located in the Chiapas Depression on a high, inland ridge connected to Mirador by a passable river. The ceremonial center was built by 700 BC in a similar lay out as La Venta. The town was culturally connected to the Gulf lowlands through the Isthmus of Tehuantepec and was

the most important chiefdom in Chiapas (Evans 2008:179). Although by the end of the Middle Preclassic, Chiapa de Corzo was trading with Maya lowland sites, a stela with a date of 36 BC in Mixe-Zoque script shows continued ties with Mixe-Zoque elite. The Early Preclassic period at Chiapa de Corzo is called Cotorra phase that lasted from about 1400 BC to 850 BC (Lee 1969:192). Lee discovered in his excavations that at the end of Early Preclassic (Cotorra) phase there was break in occupation of Mound 1 and the site was either abandoned and reoccupied or the people were forcefully displaced. After this disjuncture, more new types of artifacts appear and population increases, especially during the late Preclassic (Lee 1969:192).

In general, it seems like a well-manufactured assemblage of seals and has several unique designs. All are polished; few are well burnished. This single excavation at Chiapa de Corzo contributes 73 seals (26 roller and 47 flat seals). Only two have a red slip. The ceramic fabric varies; eight are without temper, while others have hornblende and quartz sand temper, and mica and sand (Lee 1969:73-87). Out of the 73 stamps from Chiapa de Corzo, step fret is present in 18 instances, about 25% of its seals. Other basic design units include: U shape, spiral, concentric circle, circumference triangle line, cross, concentric squares, calendar, zigzag, numeration, anthropomorph, monkey, crescent, bird, diamond, star, woven, undecorated, and plant. In fact, the only basic units missing are stacked, parallel circumference lines, and reptiles. In one of the many ways seals trigger the imagination, I cannot help but mention a unique seal from Chiapa de Corzo that seems to give homage to the archaeologist who wrote the book *The Maya*. In horizontal orientation, the roller seal has three distinct motifs, a U, then an O, then an E-comb. Read vertically, the stamp reads COE (Seal 6).

Southern Guatemala Highlands; Seals 74-113

Kaminaljuyu is in the Southern Guatemalan Highlands, south of the Isthmus of Tehantepec, strategically located near the coast and chocolate, obsidian and jade producing regions. In the Middle and Late Preclassic Kaminaljuyu's population grew and residents built irrigation canals to drain the marshy areas. In the Verbena phase (400-300 BC) Kaminaljuyu's interaction was directed toward the Pacific coast and Motagua Valley, extending toward Caribbean Sea. By the beginning of the first century AD, Kaminaljuyu had become a great center and early monuments show rulership and bloodletting (Evans 2008:201-227). Kaminaljuyu declined in AD100-200 until connection with Teotihuacano supported its resurgence as powerful center.

In 1946, Kidder et al. found three stamps from "general digging" in Structure B-4 fill that dated to the Middle to Late Preclassic transition, about 500 BC-200 BC. Although one was too fragmented to decipher, the other two are almost matching roller seals of brown, unslipped pottery (Kidder et al. 1946:215, Fig 127). They also found one flat stamp fragment with a partial claw visible in Structure B5 fill presumably of the Classic era Esperanza phase (Kidder et al. 1946:214).

One of the most remarkable associations of seals with burials is from Ericastilla Godoy's 1992 salvage archaeology excavations in mounds outside Guatemala City. Archaeologists uncovered 33 seals surrounding two stacked burials. The top burial is a flexed adult male dating to Late Classic mixed with ceramics from the Terminal Preclassic. The direct, primary burial is oriented north-south, with the male looking north. He is accompanied with a poor set of goods: rough pot sherds, obsidian bifaces, and other lithics. This top burial is part of the Arenal phase, which is to say the Terminal

Preclassic (0-AD 250). Below that was a second burial, also a primary burial in flexed position. Named El Señor de los Sellos, he was found sitting in a bowl, and probably had been bundled. There were three seals around his waist as if they had been in a pouch, or on a belt. Other seals were all around and above him. To his right was a turtle carapace and to his left was a lower human jawbone. This shows the local custom of having an adult human mandible laid to one side, a characteristic of Chacras culture during the Middle Preclassic or early Late Preclassic. The burial included nine complete ceramic vessels that also date to the Early/Middle Preclassic.

Designs on stamps from this burial collection include two very odd-looking zoomorphs (one looks like an elephant), calendar signs (one with stucco), U shaped symbols, spirals, one undecorated, two with circumference triangle lines, two with numeration, one chevron, and six with unknown geometry or volutes.

Chalchuapa is 93 miles southeast of Kaminaljuyu in the Ahuachapan region of El Salvador, which was the boundary on the Pacific coast plain of Mesoamerica's southern limit. Chalchuapa traded obsidian and Olmec iconography was strong in the area from 1200-400 BC (Evans 2008:174). In Late and Terminal Preclassic, Chalchuapa was a cultural capital and they looked to Kaminaljuyu as the urbanized community in southeast highlands. Chalchuapa reached ten precincts at its peak between 400 BC-AD 500 with separate elite residences and funerary mounds and acted as a gateway on the trade route between eastern Maya in Honduras, and the northern Mixe-zoque.

Chalchuapa became a focal point for trade in Usulután ware, which Evans (2008:174) describes as a political feasting ware, widely dispersed yet not integrated into any one political system. The seals in this assemblage all date to the Late Preclassic and include

one roller and five flat stamps excavated from Mound 27 by Ohi (2007). Basic units include bird and concentric circles.

Soconusco; Seals 114-150

The third largest assemblage is from the Soconusco region, from the sites of La Blanca and La Victoria. La Blanca is 10 km from the Pacific coast in the heartland of the Soconusco chocolate producing region. La Blanca boomed in Middle Preclassic (Conchas phase) with small villages all along earthen mounds but no formal plaza groups. Love (2005:6) recorded a large amount of prestige goods, pyramids, and a defined hierarchy by 900 BC. According to Michael Love (2005:5), residents of La Blanca had specialized craft production and centrally controlled obsidian. He believes that material culture from this site shows that elites aligned themselves with Olmec ideology. For example, Monument 3 at La Blanca is a quatrefoil-shaped reflecting pool located near an elite residence that acted as a ritual portal to the underworld. The nearby site of Tak'alik Ab'aj has a colossal head, which are also found at San Lorenzo and La Venta and are believed to represent Olmec rulers (Love 2005). As a chiefly center, La Blanca survived the decline of the of Gulf Lowland site of La Venta (Evans 2008:179). Michael Love has graciously offered his assemblage of unpublished seals from recent excavations at La Blanca. The seal assemblage comes from field excavations (2007 and 2008, Operations 28 and 33) excavated into Mound 1, the largest mound at the site. All seals were in construction fill from domestic contexts, several from the same level. This site has more roller than flat seals, which rather breaks the mold for Pacific coastal sites. Seals are generally slipped and of orange and brown clay; eleven have red residue. This analysis focuses on 29 roller seals and six flat seals, eliminating 12 seals because of

fragmentation. Basic units include reptile, concentric circle, and spiral. The most abundant basic unit in this assemblage is thick lines that probably wrapped all the way around the roller seals. La Blanca has the only roller seal with the ends decorated, which would make it functionally both a flat and roller seal (Seal 115). Another unique variation in form is the double seal that has two roller seals combined end to end (Seal 125).

The second site from Soconusco is La Victoria, on the Pacific coast near the site of Ocos. Although three roller seals were reported, two were very fragmented and eroded. I have included one hollow roller seal with an outside diameter of 5.8 cm, 1.1 cm thick walls, and an interior diameter of 3.3 centimeters diameter (Coe 1961, Fig 59m). Michael Coe says that the seal may have been more than 17 centimeters in length when complete. The clay is buff gray and deeply carved. The roller surface was burnished after carving, with red pigment rubbed into carved areas and inside the cylinder. Coe believes this roller seal dates to the Conchas phase (1500 BC- 500 BC). The solitary flat stamp reported by Coe is a 3.5 cm circular stamp with concentric circles. It is unslipped and unburnished and probably dates to the Crucero phase (500 BC-AD 0) (Coe 1961:105).

Maya Lowland; Seals 151-186

Although recent discoveries are recording more seals, fewer seals have been uncovered in the eastern Maya area sites than the west. To have a relative amount of seals for comparison, this regional category includes ten sites; four sites from the Petén region of Guatemala, four sites from Belize, a collection of stamps from the state of Alta Verapaz (located between the Petén and the Pacific coast), and three seals from the Ulua

Valley. In the jungle lowlands of Petén, archaeological evidence shows an early occupation sequence that grows strong in the Late Preclassic. From the site of Altar de Sacrificios, Guatemala, Willey (1972) illustrated a complete roller seal with a stylized turtle from the Late Preclassic and one roller seal fragment showing sharp claws from the Early to Middle Preclassic San Felix phase (800 BC-200 BC), from deep in Structure B-II. At Seibal, Guatemala, Willey (1978) excavated one roller seal and one flat seal. The roller seal has an external diameter of 4.7 cm and internal diameter of about 2.3 cm. The ceramic piece is reddish brown with a dark brown exterior surface, smoothed but not polished or slipped. This roller seal is from clearly defined Escoba phase refuse (Middle Preclassic). The flat stamp is 8 x 9.5 cm and 2 cm thick. The back or outside is roughly smoothed with no handle, and was found in mixed deposits (1000 BC to AD 900) in the central plaza group. Willey argues that some of the elements on this flat seal are reminiscent of the complex designs seen on the Fine Orange type Pabellon Modeled-carved pottery. The ceramic piece is very large with no handle and a confusing array of motifs (including a partial side profile of a human) and embellishments. I doubt that it is a flat seal and I have not included it in my analysis. At Mirador in Chiapas, Mexico, Agrinier (2000) excavated four Middle Preclassic roller seals from Mound 27 Chiapa H-Quequepac phase (two were complete enough for analysis) and one flat seal in the same context. Earlier excavations (Agrinier 1984) in Mound 20 produced 19 seals, of which seven were complete enough for iconographic analysis. Excavated at Uaxactun in E Group Mamon refuse, Kidder (1947:69) describes a roller seal as crudely molded, gray, and roughly carved and suggests it could be a bead. It is a unique seal, carved in intaglio,

with possible quincunx sign or kin and a star/diamond/cross in a maze of curvy lines.

Other Uaxactun seal iconography includes woven pattern and concentric circles.

Ten seals included in analysis are from the site of Cuello. Cuello is in the Orange Walk District, Belize located on high ground between the Rio Hondo and New River. Perhaps occupied as early as 2500 BC, Cuello grew in size during the Middle to Late Preclassic, but was a minor center in Classic time. According to Hammond (1991:69), Cuello was a dispersed village community with an egalitarian social organization that exhibited gradual development of central sacred place with community level rituals in public buildings and some social ranking shown in differential house construction and labor control. The later Swasey phase starting at 900 BC marked the beginning of known affiliations with several other sites in northern Belize, with northeast Petén and Passion regions to the southwest (Hammond 1991:69). Ceramics at Cuello are continuous, mostly indigenous developments from unknown origins with typological and modal links from Bladen phase ceramics (Hammond 1991:69). The amount of ceramics and clays indicate local production at Cuello, but no workshop areas were recovered (Kosakowsky 1991:172). Norman Hammond's 1991 report of excavations uncovered several seals, three from burial contexts. Later excavations of an Early to Middle Preclassic domestic structure found an adult male (Burial 171) in his early twenties suffering from a treponemal disease such as syphilis or yaws, with a calibrated date of 840-510 BC (Hammond 2006:25). Three roller seals were found near his waist in a cluster as though they had been in bag or container. Chemical analysis of stains on one of the roller seals indicates a dark plant pigment with tannin pyrogallol (Hammond 2006:27). The Cuello

assemblage includes eight roller seals and two flat seals with numeration, anthropomorph, concentric circle, plant and calendar.

In Maya's eastern extension beyond the Petén, several sites in the fertile Belize River Valley contribute seals to this analysis. Preclassic seals were recovered in the depths of construction fill in pyramids at Barton Ramie, Blackman Eddy, and Cahal Pech. At Barton Ramie, one roller stamp, almost complete, was found in Structure-149 refuse in mixed deposits of Jenny Creek to virtually all later occupations (Willey 1965:410). The roller seal is 2 x 1.9 x .8 cm of brown-black pottery, apparently unslipped. One side of the surface is deeply carved with repetitive crescent design while the other side is badly eroded but carried no decoration. Elsewhere along the Belize River, James Garber has uncovered seals in Preclassic architecture at Blackman Eddy and Cahal Pech. Garber believes that Blackman Eddy experienced a violent destruction after warfare, with evidence of burning, smashing, and desecrating. In ritual deposits, possibly termination rituals, at Structure B1-5th a roller seal was uncovered in association with a stirrup spout vessel. Associated deposits with the seal Radiocarbon dated to 650 BC (Garber et al. 1999:22). The seal has an anthropomorph with an ovoid mouth and stylized arms descending from the upper torso, carved with a continuous line reminiscent of the Nazca lines in Peru. Garber relates its motif to Valdivian (Ecuadorian) stone figurines of the Palmar Incised type (Garber et al. 1999:25, Fig 2.3). Another roller seal was uncovered from Blackman Eddy with deeply incised circumference triangles.

Cahal Pech is located in the District of Cayo, along what to this day is the main road from the Atlantic coast to Guatemala. Four seals have been uncovered in Preclassic context, but only one is complete enough for iconographic analysis. Fourteen meters

deep in Structure B-4, a roller seal with a zigzag pattern was found in a 15 cm thick artifactual-fill layer about 30 cm above a burnt floor (Personal Notes 2008). Ceramic analysis indicates that this layer dates to about 400 BC or the Late Middle Preclassic. Since the layer included prestige items such as a celt, drilled disk, pendant, jade, obsidian and a host of ceramic pottery fragments and figurines above a burned floor, Garber believes they are also part of termination rituals. Another roller seal was found during the 2008 excavation, very fragmented and burned. Earlier investigations into Structure B-4 by Jaime Awe (1992) also produced a fragmented and burned roller seal. In addition, a small, burnt fragment was excavated in a Terminus Group structure at the end of the southern causeway. The seal fragment was found in a 60-80 cm thick level with the largest portion of the ceramic sample; including transitional types such as Sierra Red and Polvera Black (300 BC-100 BC) (Powis 1995:86). Only the roller seal with the lightening –zigzag pattern was complete enough for iconographic analysis.

South of Belize, the fertile Ulua Valley in Honduras was one of the best chocolate producing regions and Joyce and Henderson (2003, 2001:20) have found evidence of settlement as early as 1600 BC. Trade, especially in obsidian, connected the Ulua Valley to distant regional centers and Early Preclassic pottery samples relate to Soconusco (Joyce and Henderson 2001:15). Doris Stone (1941) illustrated two flat and one roller seal found in burials near the port site of Travesia. One seal has two men in loincloths facing each other, carved in a blocky style where angles, such as elbows are more squared (more characteristic of seals from Costa Rica). The second stamp recorded by Stone has three triangles with lines on a rectangular shaped flat stamp with triangle notched border, and was also a whistle. These seals are well executed and may date to

after the Preclassic. Another roller seal with a full figure monkey is included from the Ulua Valley (Bachand 2003).

Borhegyi analyzed twenty-five stamps from the Dieseldorff collection, which he believed were from the Alta Verapaz area of Guatemala (1951). I have chosen only those three stamps that Borhegyi interpreted from style and paste analysis to be from the Preclassic. Basic units include a super-stylized anthropomorph, a composite monkey and anthropomorph, and circumference triangle lines with a central diamond motif.

Gulf Lowland; Seals 184-213

The site of Tres Zapotes is located west of the Tuxtla Mountains in the Olmec heartland, north of San Lorenzo and La Venta and near the site of La Mojarra. Tres Zapotes had two Olmec colossal heads dated to Early and Middle formative and sculpture dating to Late/terminal Preclassic (Evans 2008:222). Tres Zapotes rose after the decline of San Lorenzo and La Venta, but continued cultural connections with the Olmec and with Pacific Chiapas and Guatemala. I included 21 seals (seven roller and 16 flat) illustrated by Weiant (1943, Plates 62-63). Most of the flat seals are orange colored clay, while all but two of the roller seals are coarse red clay. A few of each seal forms were cream-colored and dark gray clay. A few flat and roller seals had traces of white slip. A single flat stamp from San Lorenzo and two roller seals from La Venta are also included in this study. The San Andres seal (Pohl 2002) is also included. David Grove (1987) has published seals from Chalcatzingo, but were excluded from analysis because of fragmentation.

South America; Seals 214-237

This analysis also includes 24 stamps from South America's Pacific coast. Twenty stamps are from coastal Ecuador photographed by Lanthrap et al. (1980:106); four from Machalilla phase (1500 BC) and sixteen from Chorrera phase (900 BC-300 BC), all from refuse deposits. No seals were uncovered from the older Valdivia context, even though it is the style that matches the incised seal from Blackman Eddy and Ocos ceramics from La Victoria (Coe 1960). Four stamps in the dataset are from Chavin contexts in Peru and include two flat and two roller seals found in a house in the El Mirador section of Pacopampa. One of the roller seals is made of stone and stands 4.7cm high. The flat stamp with the form of a bird is 3.2 cm high (Burger 1995:108). The basic units in this group include anthropomorph, zigzag, and unique variations of the spiral motif.

Summary of Contexts

Such portable objects as seals could have traveled in their lifetimes and changed hands before their final disposal. The archaeological contexts of seals differ across the regions. For example, they were part of termination rituals and associated with ancestral veneration in the Belize River Valley and in burials at Cuello, Kaminaljuyu and Chiapa de Corzo. Six roller seals were found in two separate burials at Cuello, while the burials of Chiapa de Corzo and Kaminaljuyu had predominately flat seals. Interred in these three burials were adult males, each with a collection of seals near their waist as if they had been worn on a belt or in a pouch, possibly indicating their occupation. These individuals might have been functionaries of the elite or priestly scribes responsible for imprinting sacred symbols on paper or skin. The mythological epic Popul Vuh details the

beginnings of scribes. In the story, the hero twins have two jealous brothers (named One Monkey and One Artisan) who were banished to the trees as monkeys after betraying the heroes. They became the patrons of scribes, art, and music. In Classic Maya society, scribes controlled access to esoteric knowledge, lived as part of royal house, and had high religious status. The presence of seals in burials may indicate an early form of scribes.

However, not all seals are from burial contexts. Sejourne says seals are not part of burial offerings at Teotihuacán ; except for three found in burials in Zacuala Palace all were found in refuse heaps. (Field 1967:46; Sejourne 1966). Susan Toby Evans (2008:152, 5.23) believes all levels of society owned the seals uncovered from Tlatilco. Field (1967:22) commented that Tlatilco seals were found outside formal burials in dump heaps, occasionally in large urns, which he interpreted as the ruins of seal-maker's workshop. Love believes that La Blanca seals were found in domestic contexts. If seals and their distribution were not centrally controlled and represented only a rapid method of reproduction, it raises the question of efficiency in ritual. Ritual itself is characterized by added steps that heighten importance. However, do people use short cuts (like a stamping tool) when they are doing their own worship or household worship? I do not have an answer to that question and suggest further research in this area of human behavior. I expect that such objects would show a personalization of the motifs and messages if used more privately or independently.

CHAPTER 5

ANALYSIS

Next, I will review the pattern of iconographic and stylistic choices exhibited in each of the 19 sites as they are reflected in my established basic unit categories. Rice (1987:245) explains that style encompasses components selected from a narrow range of technical skills, themes and aesthetic preferences combined within cultural rules. I believe that certain rules of seal iconography are suggested by a distribution model of basic unit types created by the overall structure of frequencies.

Table 4 specifies the number of basic units found at each site. In Table 4, we see that only concentric circles and zigzags are found in all six regions. The U shape and cross are in all Mesoamerican assemblages, but not in South America. Chiapa de Corzo has most of the basic units recorded and probably is the most expressive of the seal collections, although sample size also contributes its dominance. The Maya Lowland has the next most recorded basic units, although is without spirals, birds, or straight circumference lines. The seals in Soconusco (La Blanca and La Victoria) have unique experiments in variations of iconography and form. The Guatemalan highland site of Kaminaljuyu has specific and heavily ritualized icons like numeration and calendar, perhaps due to their burial context. As we shall see, Chalchuapa has concentric circles

that tie it to other sites along the West Coast. Neither the Soconusco sites nor the Guatemalan Highland sites have anthropomorphs, monkeys, plants, stars, weaving or diamonds on their seals.

Table 4. Distribution of Basic Units at Sites. Shaded areas mark regions where basic units are absent.

	U	spiral	stacked parallel	Step fret	Zigzag	Circumference lines	concentric circles	circumference triangles	anthropomorph	calendar	numeration	undecorated	bird	cross	reptile	monkey	Plant	diamond	crescent	star	woven	Concentric squares	sidestep
Chiapa de Corzo	14	15		17	2		4	4	3	3	1	3	3	1		4	2			1	1	1	
Kaminaljuyu	12	5			1		1	3		4	2	1		1									
Chalchuapa	1	1	3			1							1										1
La Blanca			17		4	15	6	1				1		1	1				2				1
La Victoria			1			1	1																
Altar de Sacrificios								1							2								
Alta Verapaz								1	2							1		1					
Barton Ramie												1							1				
Cuello	4		2		1		1		1	1	4			1			1			1			
Seibal															1								
Mirador					1			2				2		1	1				1		1		1
Uaxactun							1											1				1	
Ulua Valley									1							1							
Tres Zapotes	3	4		1	1		1		1	1	1	1	2	2			3	2		1	1		2
San Lorenzo																							1
La Venta																							
San Andres	1									1	1		1										
Peru		1					1	1					1										
Ecuador		7			6		1		2	1			1		1			1		1			
Total	35	33	23	18	17	17	16	14	12	10	9	9	9	7	6	6	6	5	4	4	4	4	3

Table 5 shows the spread of the basic units represented by the number of different sites that employed each basic unit. In this table, we see a slight re-arrangement, where anthropomorph, as one of the most widespread, moves up in rank and step fret and stacked parallel lines diminish. My analysis that follows consists of grouping and comparing these basic units across sites, referencing provenience data, glyphic writing and iconographic interpretations to understand the roles of seals and stylistic choices.

Table 5. The Number of Sites (out of 19) in which Each Element Appears. Anthropomorphs, although stylistically varied appears in eight of the 19 assemblages, while the step fret is only found in the Chiapa de Corzo and Tres Zapotes site assemblages.

	anthropomorph	zigzag	circumference triangle	concentric circles	spiral	Cross	bird	U	undecorated	Reptile	calendar	numeration	stacked parallel	Star	woven	concentric square	Crescent	monkey	diamond	plant	circumference lines	side step	step fret
No. of sites	8	8	8	8	6	6	6	6	6	5	5	5	4	4	4	4	3	3	3	3	3	2	2

My analysis shows five frequency tiers of basic unit types that I believe are telling of the cultural practices and affiliations that influenced the iconography chosen for seals. Two hundred seventy-one basic units were recorded in this corpus of seals. From the bar graph in Figure 7, we see that geometric shapes are present in all the ranges and often dominate assemblages. Overall, the most common motif is the U shape, with spirals as a close second. Step fret and stacked parallel lines also have high frequencies and are heavily represented in the large assemblages. However, these two basic units are limited in their distribution, proveniencing predominately with one site each. After the most

common motifs, there is a gradual decrease in frequencies of geometric and iconic elements. The next most common group of seals (Tier 2) includes zigzags, concentric circles and circumference triangle lines. The third tier of basic unit types includes calendar glyphs, numeration, bird motifs and blank space. The fourth tier includes representations of the natural environment, such as reptiles, monkeys, and plants. The fifth and lowest tier of frequencies includes a diversity of basic unit types such as diamonds, crescents, stars, woven patterns, concentric squares and the side-step motif.

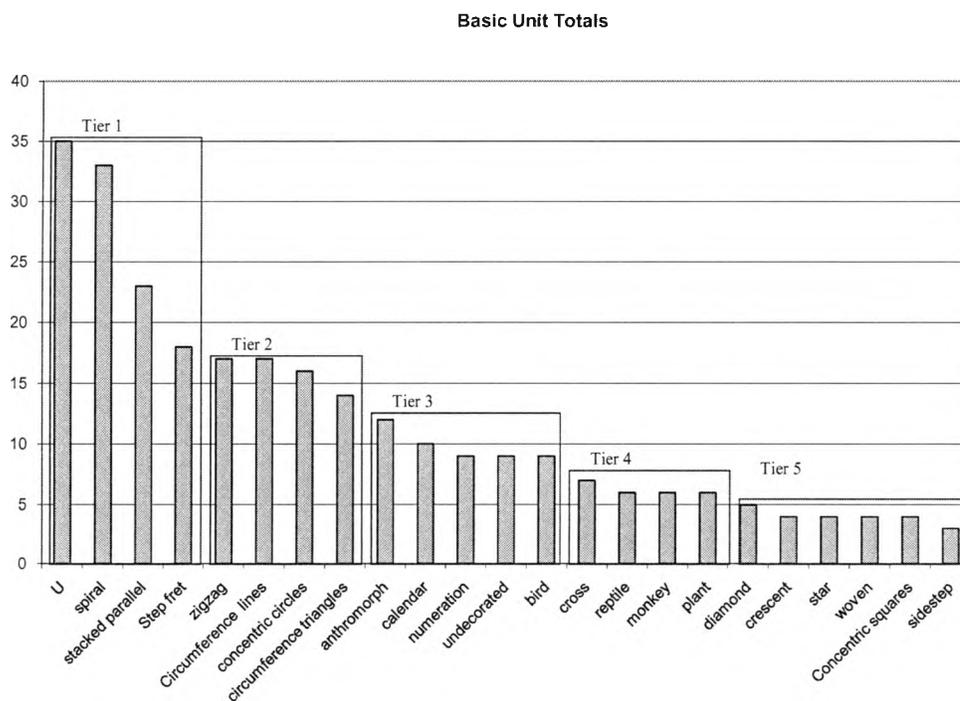


Figure 7. Bar graph of basic unit frequencies.

Most Common Basic Units

U shapes. Crossing language barriers and present in all Mesoamerican regions in the highest frequency is the U shape icon, noted on 35 seals (Figure 8). The U shape is found in nine instances on roller seals and in 26 instances on flat seals, most densely at Chiapa de Corzo and Kaminaljuyu. It exhibits a wide variation in execution both across different sites and within assemblages. This is an ancient symbol found all over Mesoamerica and can mean the moon (T683c in Thompson's glyphic catalog), a ceramic pot associated with human sacrifice, or the upper jaw of a jaguar; it can have a phonetic sound and grammatical meaning (Thompson 1962). Translated as Ch'e'n, cave or well, or as ch'e'nal, cave or tomb, the U shape is generally believed to be the cave mouth, or a sacred womb and the portal to the underworld. One of the earliest examples of use of this design is the rock art at Chalcatzingo where a ruler sits inside the U shaped mouth, worshipping the ancestors and receiving their blessings. There is also a shell pendant of this motif from Cahal Pech Cunil Phase 1100-900 BC.

From the Kaminaljuyu burial, four flat stamps are almost identical, with curvy Mixtec-like U shapes (refer Figure 2). Tres Zapotes has a roller seal with a similar U-shape design with a center dot. Within the same burial context at Kaminaljuyu, the U shape takes on a completely different form, with stacked, squared U shapes, repeated along a horizontal plane. Another form of the U shape at Kaminaljuyu associates with the handpaw motif (Seals 82-85). In the Terminal Preclassic burial that Hammond excavated at Cuello, three seals have a U-shape symbol framed by stacked parallel lines. A flat stamp from Cuello has stacked U shapes alongside dots that might be numbers.

The Chiapa de Corzo assemblage has four small flat stamps with U designs. Although each one has slightly distinct embellishments, they are thin-lined with out-flaring ends. They repeat the mirror image structure found at Kaminaljuyu, with the U symbols opposing each other. Maya believed that burials were like caves and portals to the underworld. Since 34% (n=13) of the 38 burial seals have a U symbol, it is probable that the iconography on seals was tailored to the intended use of the stamp.

Although I believe most basic units represent ideograms or early logograms, recognizable qualifiers, suffixes or adjectives appear rarely in seal iconography. The few that I have noticed include the U shape. A rare example of a jaguar (similar to glyph T753) from Chiapa de Corzo shows an open, cave-like mouth with U symbols to the side that could be a phonetic complement (Seal 35). A seal from Tres Zapotes, also part of the Isthmus Script area, shows an anthromorph, in the Danzero style, that also has the U brackets along the side of the icon (Seal 196). U symbols also associate with the bird on the San Andres seal (Seal 188) and align the top of the Maya lord seal from Chiapa de Corzo (Seal 24).

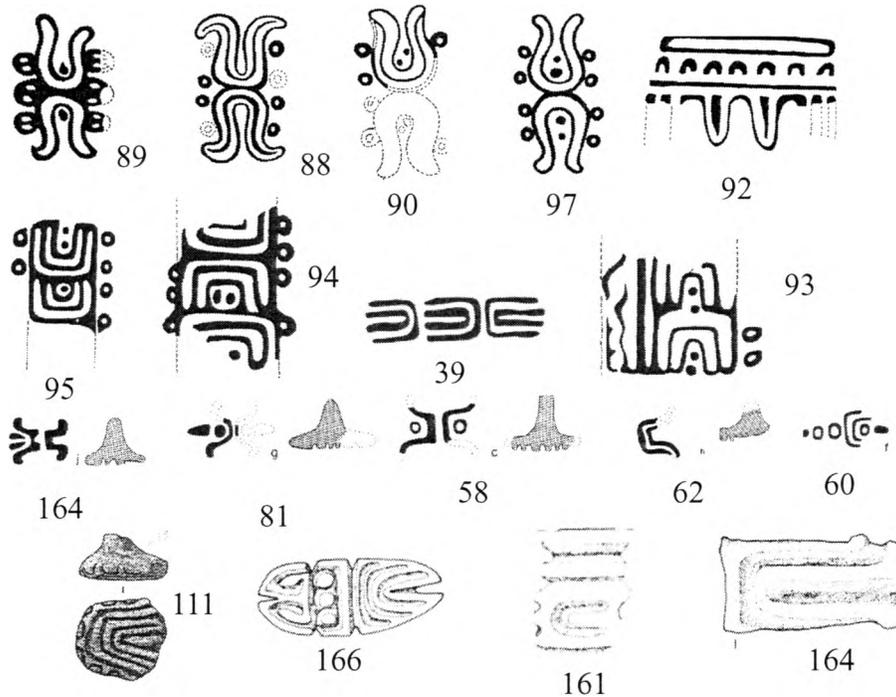


Figure 8. U shapes. Some of the U shapes decorating seals: Kaminaljuyu (Seals 87-90, 92-93), Chiapa de Corzo (Seals 39, 58, 62, 64, 81, 94-94), Chalchuapa (Seal 111), and Cuello (Seals 161, 164, 166)

Spirals. I recorded spirals and related forms 33 times on the 237 seals. An ancient symbol that commonly appears on stamps is the pictographic convention for a cloud or rain. Two spiral ends connected with a bifold rotation, the 'Lazy-S' spiral is a pre-Olmec, ancient design, found readily from South America to the Pueblo Indians in the American Southwest. The element is present as a solitary and compound motif on both flat and roller stamps. The Lazy S symbol translates as *muyal* and is a logograph for cloud. F. Kent Reilly (1993:413) commented that this association is one of the longest persisting clusters of symbolic communication in the history of Mesoamerica. Andrea Stone has found that the Lazy-S symbol associates with the Paddler Gods (of which one is a monkey) and tied to bloodletting and period ending celebrations by rulers.

Examining the issue further, Andrea Stone (1993:408) determined that the *muyal* on the

Cleveland Plaque is a toponym for the celestial realm of the ancestors in heaven. At Chiapa de Corzo spirals accompany full figure monkeys that seem to emphasize their prehensile tails. They *muyal* designs from South America are remarkably consistent with the Mayan motif. Other areas outside the dataset with *muyals* include Costa Rica, Rio Ceiba Cave area of Belize, and Tlatilco. Figure 9 shows some of the variations in representation of this symbol. Cummings (1969:69) also notes the overwhelming presence of the undulating line or “S” shape. Although he notes that they are part of design elements in the Chorrera culture, he believes that this motif originally came from Mexico and he interprets them as snakes or as the Plumed Serpent.

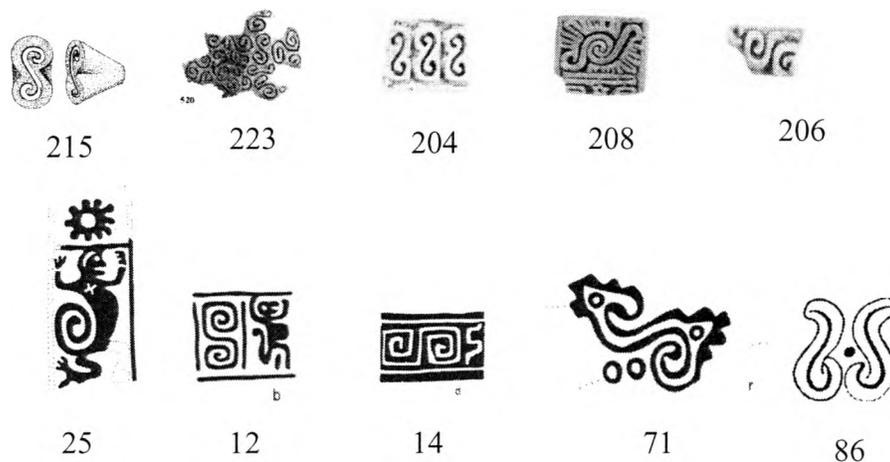


Figure 9. Muyal spirals. Seal 215 is from Peru, 223 is from Ecuador, 204, 208, 206 are from Tres Zapotes, 25, 12, 14, 71 are from Chiapa de Corzo, and 86 is from Kaminaljuyu

In various forms and places spiral ends (or one half of a *muyal*) have been interpreted as the galaxy (Hunbatz Men 1989), rubber balls, simple volutes, and speech scrolls. Spiral images are heavy at Chiapa de Corzo (15/73), but also common in South America, appearing on 40% of the assemblage. An early logograph that may have grown

into a syllabic sign is the squared counterpart of the spiral design. Chiapa de Corzo, Tres Zapotes, and Copan have almost matching fragmented flat seals (Figure 10). All three stamps are fractured in half, so we can only speculate the complete seal image. Lee believes the design was probably symmetrical with two connected squared spirals in a mirror-reflection design layout. The seals are slightly different from a particular earth glyph found on base panels of epi-Olmec and south Guatemalan sculptures and in the position of earth in a sign grouping, known as the “sun at horizon” on the La Mojarra stela. The earth motif is two squared spirals joined with merlon and the seals lack the connecting merlon. This symbol is the Zoquean word *nas* (Kaufman et al. 2001:27). Thompson notes that this sign is the source for the most common sign for the syllable (*na*) and is the same pronounced word in Maya (Thompson 1961). While representing the element of earth, the seals may relate to early phonetic spellings.

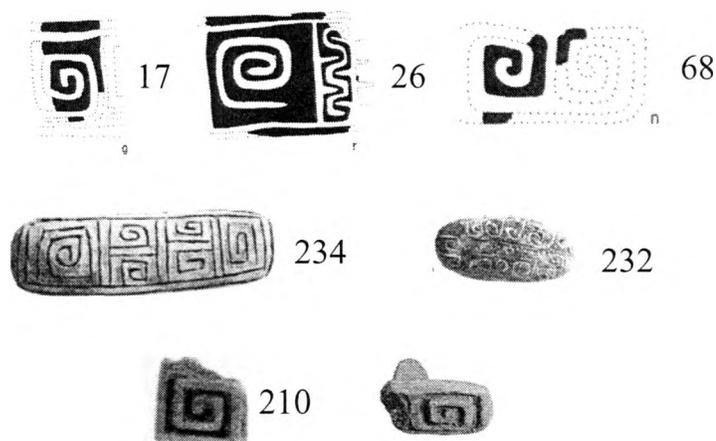


Figure 10. Squared spirals on flat stamps. Chiapa de Corzo (Seals 17, 26, 68), Ecuador (Seal 232, 234), Tres Zapotes (Seal 210) and one from Copan (Longyear 1952)

Concentric Circles. Sonia Lombardo identifies concentric circles as jewelry that by association identify with the qualitative function as something precious or valuable (Jacobs 2001:14). She argues that when they are green they are like jade or serpentine, and relate to cloud spirals as drops of rain and fertility. In a land of limited resources, it is possible that seals had the power to mark something as precious or valuable, transforming that object into something transcendental. Concentric circles are recorded at Kaminaljuyu (n=1), La Blanca (n=6), Uaxactun (n=1), Chiapa de Corzo (n=4) and La Victoria (n=1) Ecuador (n=1) and Tres Zapotes (n=1) on both flat and roller seal forms, and combine with possible numeration at Cuello (Seal 169). Figure 11 shows many of the seals with the concentric circle motif. The motif is a solitary element eight times; five times, it combines with another element. The most consistent looking stamp are the flat seals with excised concentric circles and a conical handle on the back. La Blanca, La Victoria, and Tres Zapotes have these almost identical concentric circle flat stamps. These stamps are also similar to a flat stamp from Ticoman in the Mexican Valley that has concentric circles inside a star shaped stamp (Valliant 1931). The form of these seals resembles the flat stamps with tightly wound spirals from Kaminaljuyu and Tres Zapotes. The overall appearance is so similar that it is possible that this is a specific substitution between spirals and concentric circles. Cummings (1996:61) believes that the flat spiral stamps relate to imprinting spirals in the palm of one's hand and that the size of the spiral stamps he found in the Jama-Coaque culture would fit an adult's hand. Cummings (1996:70) believes this stamp evidences direct contact between North and South America. The one image of a hand from this dataset was found at Chiapa de Corzo and it shows concentric circles in the palm.

Although this specific flat stamp may show regional clustering and/or long distance contact, variations of the concentric circle basic unit show that this design was malleable and employed in various configurations. For example, a roller seal from Uaxactun has concentric circles inside squares repeated in three separate vertical registers (Seal 182). Related designs include concentric squares on a flat stamp from Chalchuapa (Seal 109) and on a roller seal from San Lorenzo (Seal 187). The concentric circle inside a square configuration (Seal 34) seems only one step away from the concentric circle framed inside squared notch lines at Chiapa de Corzo and may be a local representation of the same configuration.

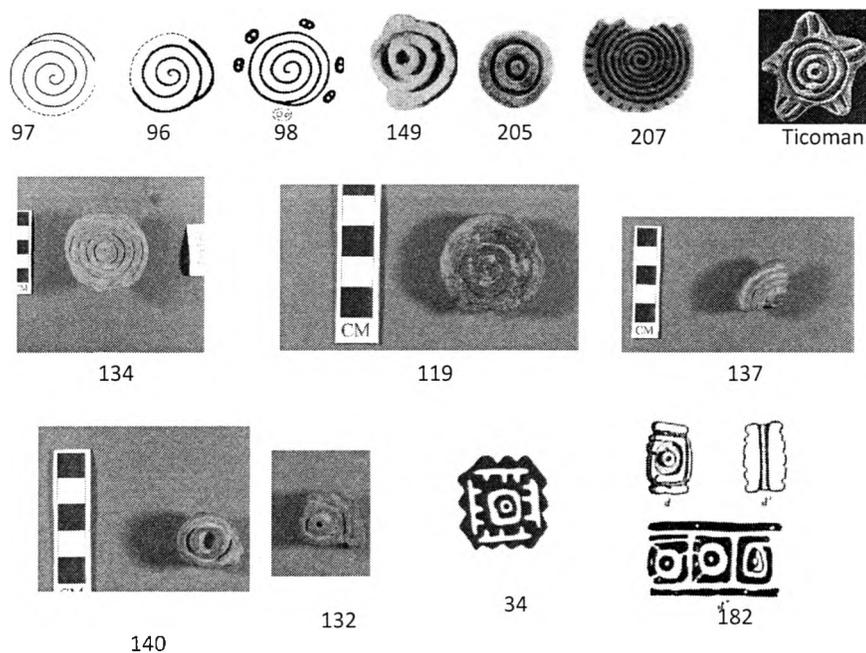


Figure 11. Representations of concentric circle and spiral flat stamps. Kaminaljuyu (Seals 96-98), La Victoria (Seal 149), Tres Zapotes (205, 207), Ticoman, La Blanca (119, 132, 134, 137, 140), Chiapa de Corzo (Seal 34), Uaxactun (182)

Structural analysis of Mesoamerican iconography relies on understanding substitutions to find meanings in symbols. A pair of Preclassic roller seals excavated by

Kidder in 1946 also demonstrates the connection between spirals and concentric circles. The seals are almost identical, perhaps made by the same artisan (Figure 12). The top register of both seals shows a row of triangles while the bottom register of one has concentric circles and the other seal has single spirals. The association between these three elements, the concentric circles, spirals and a row of triangles is expressed simply on the seals without embellishments. A similar configuration was also carved into two Classic roller seals found at Copan (Longyear 1952).

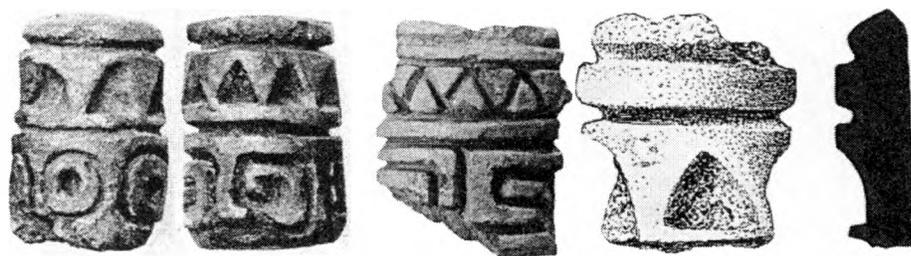


Figure 12. Multiple register seals with a top row of triangles. The two seal on the left are from Kaminaljuyu and the two on the right are seals from Copan

Circumference Triangle Lines. Perhaps interpretation of the row of triangles shown in the above figure is related to the excised circumference triangle lines mentioned in previous chapter about tattooing. Although not an exact match, Figure 13 shows the striking similarity between the roller seals from Chiapa, Kaminaljuyu, La Blanca, Alta Verapaz, Blackman Eddy, and Mirador. No two are alike, and the variation between them may be culturally significant. It is possible that circumference triangle lines was a preferential basic unit of design for roller seals, almost like a mental template of the object that traveled across Mesoamerica and changed slightly according to the manufacturer's recreation. In addition, the possibility that this seal design correlates with the presence of an elite female at the site deserves further research.

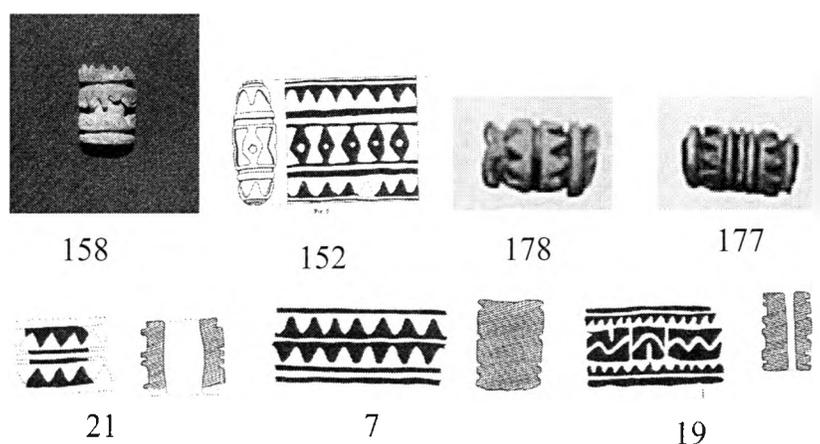


Figure 13. Circumference triangle lines. Blackman Eddy (Seal 158), Alta Verapaz (152), Mirador (177-178), Chiapa de Corzo (7, 19, 21)

Stacked Parallel Lines. Stacked, parallel lines, mostly fragmented circumference lines seals, are present 23 times in the seals I examined, found at Chalchuapa, Cuello, La Victoria and La Blanca (Figure 14). Although this design is present in four sites, it is most prevalent at La Blanca. In fact, 49% of the seals from Love's excavations included this basic unit. The lines are stacked or parallel, straight, wavy to zigzag, and diagonal. The configurations use blank space and alternating line thickness to vary the designs. This variation within a standard element may show the development of a local variety (either to the site, or to the family or production unit represented in this mound assemblage). At this point, we do not know if variation in this basic unit exhibits a freedom in choice and execution or separate meanings.

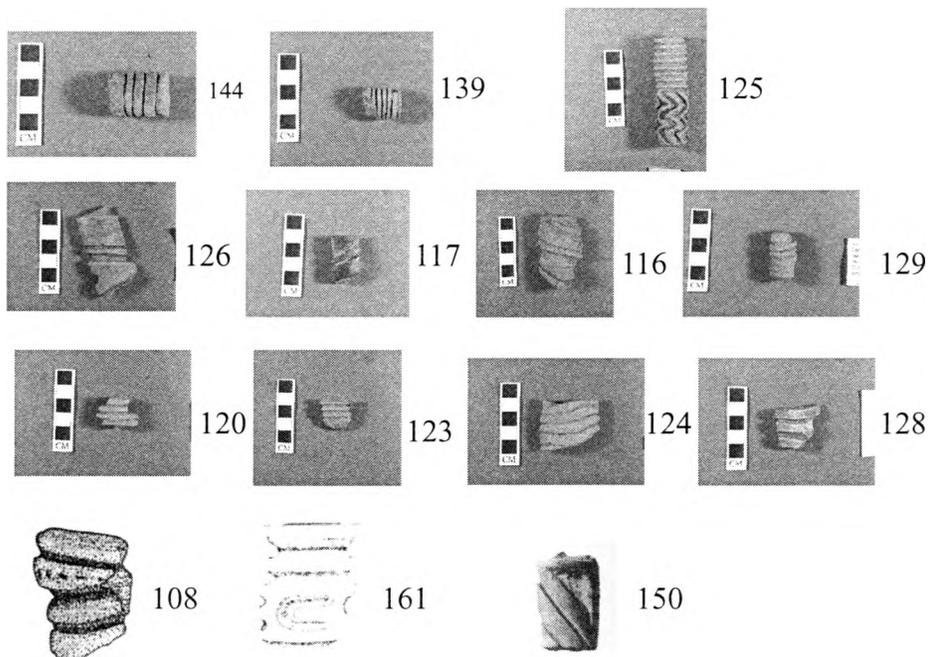


Figure 14. Circumference and stacked lines. Top three rows are from La Blanca. Fourth row: Chalchuapa (Seal 108), Cuello (Seal 161), and La Victoria (Seal 150)

Zigzags. Although this basic unit is marked in eight sites and in all regions, in this analysis it is a more generic category. Field would interpret most zigzags as serpents and argues that they are very common in the seals he has analyzed. Six stamps in Ecuador have zigzags and several of those have eyes and may be serpents. However, the majority of stamps I recorded as zigzags in this data set do not have such a direct association with snakes. I recorded designs as zigzags 16 times, more often on roller than flat seals. The zigzag seal from Cahal Pech has wavy, vertical lines repeated around the seal. At La Blanca ($n=4$) zigzags were made with thick lines and at times are more like chevrons. Zigzags also combine into other designs on flat and roller seals. This category includes widely different images with unknown interpretations.

Mid-range and Lower Frequency Basic Units

Anthropomorphs. Anthropomorphs are found in eight sites and only missing from Soconusco and Southern Guatemalan Highlands regions. It is one of the most widespread basic units and the least consistent (Figure 15). It is interesting that in South America the anthropomorph seal has five stick figures holding hands (Seal 233). I can speculate that it reflects more of a kin-based society or a group of united tribes. Compare this to the Chiapa de Corzo Maya lord, which is the most overt display of elites found on seals (Figure 15, Seal 25). The Chiapa de Corzo roller seal shows a full figure horizontally carved with his face in profile. His body is an *ollin* symbol that connects with the Mexican highlands and found readily in Field's collections. Only one foot and one hand are in the corpus of images, both from Chiapa de Corzo. A roller seal from Blackman Eddy has two distinct vertical motifs: one side has an unknown geometric pattern and the other side is an anthropomorph with a square body with arms hanging at his side. One of the anthropomorphs from Borhegyi's collection is very stylized, with volutes for arms and head, while the other anthropomorph seal from his collection combines with a naturalistic-looking monkey. Carved horizontally on a roller seal, Tres Zapotes has an anthropomorph in Danzero style. Although the Danzeros found at Monte Alban represent captives, the seal figure wears a loincloth and has U brackets; a similar interpretation (captive slave) is not conclusive. Each of anthropomorphs is widely distinct. In native languages, often the word for human is the same as for themselves. For example, in Quechua, the language of the Inca, *runi* is the word for "people" and the word for themselves. It is possible that the diversity in representing anthropomorphs

demonstrates that each site had their own way of representing the idea of “human,” perhaps specifically referring to themselves.

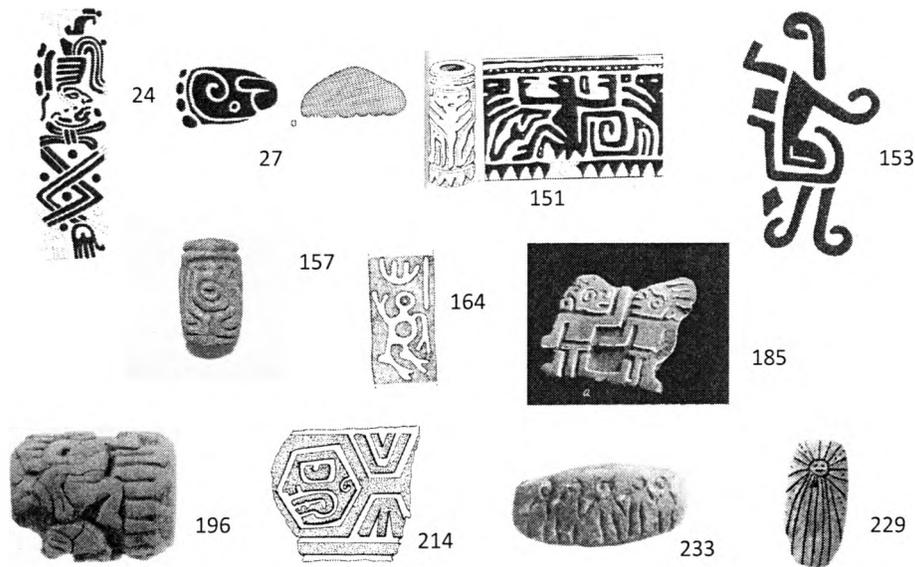


Figure 15. Anthropomorphs. Seals 24 and 27 are from Chiapa de Corzo, 151 and 153 are from Alta Verapaz, 157 is from Blackman Eddy, 164 is from Cuello, 196 is from Tres Zapotes, 214 is from Peru, 233 and 229 is from Ecuador, 185 is from the Ulua Valley

Rulership and Calendar. Several glyphs carved into seals are uncontroversial day or month names. One well-known example comes from Tlatilco where a roller seal exhibits a kin sign and a lord in separate registers (Kelly 1966). I recorded nine instances of calendrical motifs, mainly from Chiapa de Corzo and Kaminaljuyu (Figure 16). Three Isthmian-script *ajaw* glyphs (T299) are present in the dataset: one on the San Andres seal and two on roller seals at Chiapa de Corzo. These almost face-like glyphs have embedded iconography such as double merlons, spirals and a quatrefoil, cave mouth. Less direct is the connection between the Maya glyph for earth and a flat stamp from Chiapa de Corzo that has circles resembling the ‘bunched grapes’ motif. Three Lamat

signs were noted from the burial at Kaminaljuyu. In addition to a day glyph, the Lamat is a representation of the planet Venus and is the patron of the month of Yax (Montgomery 2002:82, Thompson 1960:19). Venus in Mesoamerican mythology is like a hero twin, rising to the heavens after conquering the underworld, and relates to death and rebirth. Although Godoy Ericastilla (1992) notes that most seals appear un-used, one of the Lamat signs had white stucco residue. The Ajaw and Lamat seals show little variation in representation although each has its own embellishments. From the same Kaminaljuyu sample, we find a flat stamp with four X shapes with two bars on top. The X shapes may be a variation of the calendar glyph *Zip* or *Wo* (T552 or T619) that associates with frogs and rain. I included a flat stamp from Ecuador that resembles a sun face with rays in this category; as an anthropomorphized sun it expresses the essence of a calendar. However, it is doubtful that South America developed such an elaborate calendar as the Mayan and I do not know if this symbol represents a specific day.

Cross signs are present seven times in six sites. Mixed with other elements, they resemble day signs and relate to the world tree and pillars of the cosmos. One is found in Chiapa de Corzo, Kaminaljuyu, La Blanca, Mirador, Cuello, and two in the Tres Zapotes assemblages.

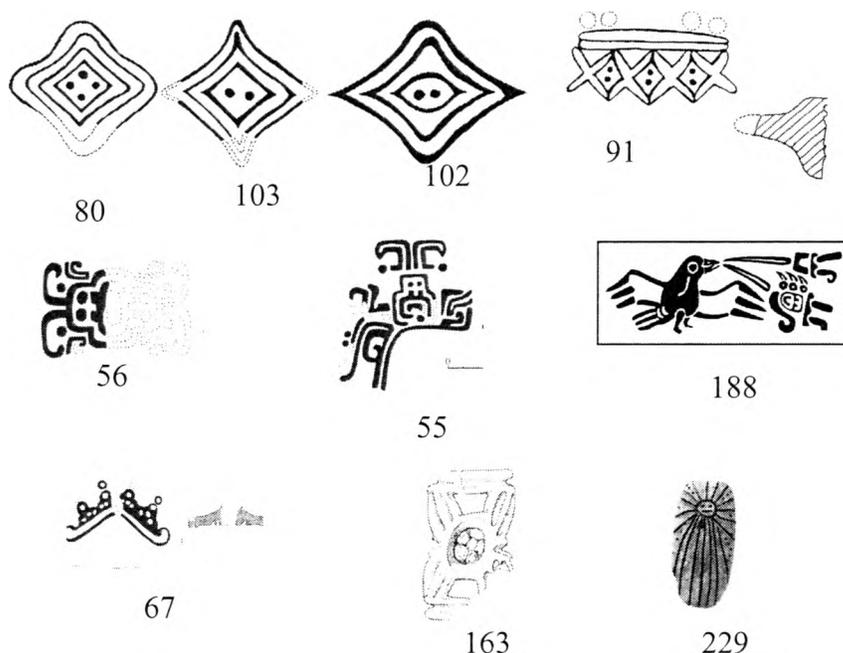


Figure 16. Calendar Signs. Lamat sign (Seals 80, 103, 102) and possible Zip glyph (Seal 91) are from Kaminaljuyu; Ajaw glyphs (Seals 56, 55) are from Chiapa de Corzo, Seal 188 is from San Andres, Veracruz, Mexico; Seal 67 is from Chiapa de Corzo; Seal 163, from Cuello resembles a kin sign; Seal 229 is an anthropomorphized sun from Ecuador

Numeration. The divinatory importance of the Maya calendar cannot be denied, and with the ‘counting of days’, numbers were invented. Mesoamerica employed a simple bar (equals 5) and dot (equals 1) system to express numbers. Numeration is found nine times: twice at Kaminaljuyu, four times at Cuello, and once at Chiapa de Corzo. Only the *Zip* glyph at Kaminaljuyu shows numeration combined with a day sign. Other times, numbers are combined with a U element such as the example from Cuello. At Chiapa de Corzo, a likely numeration is combined in a perpendicular register with the step fret motif on a flat stamp.

Undecorated. Six roller seals are completely undecorated, assumed to make a solid line when imprinted. Three have ‘undecorated’ incorporated as a basic unit. At

Barton Ramie one side is decorated while leaving the other side blank (Seal 156). At Tres Zapotes and La Blanca blank space is incorporated into multiple register designs (Seals 191 and 138).

Birds. Birds played several important roles in Maya and South American iconography such as the renowned quetzal bird and the Principal Bird Deity. Avian deities associate with the sky realm, ruler ship, and accession. Pohl et al. (2002) interpreted a bird on the San Andres seal as a transformed ruler. In addition, birds can symbolize messengers or ferocious fighters (Rice 2007:112). The differences in birds on seals could relate to geography, such as coastal seals having more water birds than landlocked sites. Besides the San Andres seal and the two from South America, two images of birds are found in the Tres Zapotes assemblage and one at Chalchuapa. Images of two-headed birds found on flat seals at Chiapa de Corzo match several flat stamps recovered from Teotihuacan, Colima, and the Ulua Valley as well as a fragmented pottery vessel from Panama (Figure 17) (Enciso 1947:99, Figures VII, VIII, IV; Linne 1929; Ries 1932:447, figures 12 and 13). Lee (1969:77) offers a tenuous connection to the 'double eagle' in codices where a two-headed bird represents a deity of vegetation. These seal motifs demonstrate that specific basic units crossed ethnic, temporal, and geographical boundaries.

Two-Headed Birds Imagery

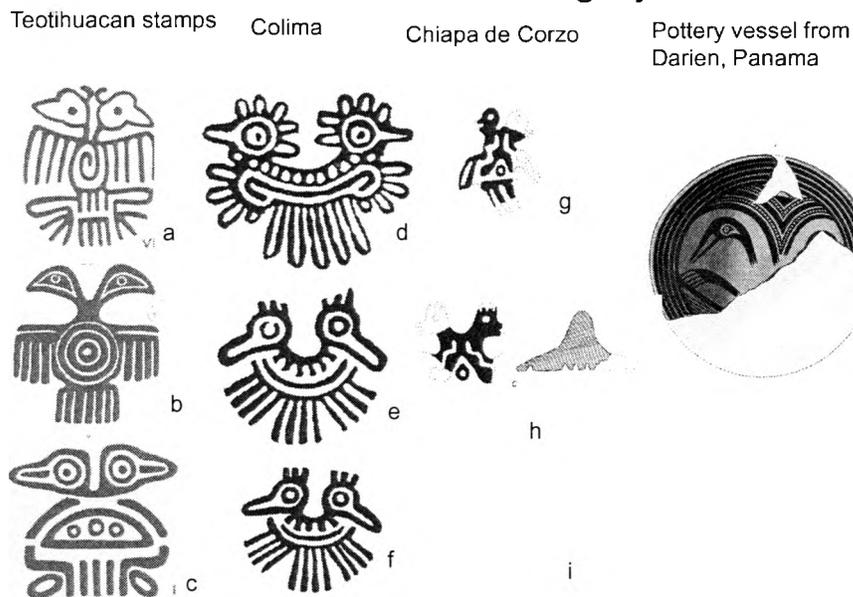


Figure 17. Two-headed birds imagery. Left column (a-c) is from Teotihuacan, d-f Colima, g-h, two headed birds infixed with step fret from Chiapa de Corzo (Seals 29 and 30) and on a pottery vessel from Panama (j) (Linne 1929)

Reptiles. Reptiles are most prevalent in the Maya lowlands: two at Altar de Sacrificios, one at Mirador, and one at Seibal (Figure 18). A flat stamp from Ecuador has a grid pattern that resembles the skin of an alligator. A splayed lizard or stylized turtle from Altar de Sacrificios heavily resembles one from Teotihuacan (Enciso 1947:70, figure VI; Willey 1972:92). A roller seal from La Blanca has a clear representation of a reptile that is stylistically reminiscent of the Izapa Stela 25. On this stela, the alligator appears to be climbing up the tree backward and possibly contains a scene from the Popol Vuh with astronomical connections.



Figure 18. Representations of reptiles and cultural affiliations. The top image on the left is Seal 114 from La Blanca; the image on the top right is of Stela 25 from nearby Izapa. The second row shows parallels between a seal from Altar de Sacrificios (Seal 145) and Teotihuacan (Enciso 1947:70, Figure VI)

Monkeys. In Field's collection, monkeys were second in number after serpents. The representations of monkeys could be related to scribal arts and would reinforce the idea seals were scribal objects. However, the images of monkeys on seals are very naturalistic, carrying no pens in their hands or other anthropomorphized characteristics. They seem like actual depictions of the Central American spider monkey. Within this dataset monkeys are found at Chiapa de Corzo, Alta Verapaz and the Ulua Valley; several have also been found in Costa Rica (Banco Central de Costa Rica 2004). The monkey sign may also relate to the monkey sun god and the calendar day of Chuen. The Mayan religion and calendar were part of the natural environment and vice-versa; some motifs that seem geometrical or like the natural environment may in fact reflect the calendrical system.

Plant. Plant motifs were recorded at Chiapa de Corzo and at Tres Zapotes. This category also shows wide variation of flower shapes and none were recognizable to me as a particular plant. Chocolate is not represented on the seals, even though it may have been one of the binding commodities between communities. Field's collection of stamps included many flowers, which probably reflects a Central Mexican Highland tradition.

Woven. In examining seals from Costa Rica, Robert Carlsen (1989:195) believes various designs come from weaving design. Carlsen believes that geometrical shapes also may reflect weaving since the vertical and horizontal lines make geometry the easiest shape to make. However, he goes on to say that weaving motifs are not as common in seal iconography on the whole as other designs like monkeys, serpents, and severed-head imagery (Carlsen 1989:196). Mirador has what might be woven motif in combination with four different vertical designs aligned next to each other without borderlines (Seal 171). Their separate registers suggest a linear organization that may reflect a coded narrative. Tres Zapotes has the clearest example of a woven mat, with short perpendicular lines in a patchwork motif (Seal 198).

Borders

Field believed that borders on seals appeared on stamps during their resurgence in the Post Classic as response to more rigid control. Although there is a trend to increasing borders with time, this is not a concrete synopsis and many Early and Middle Preclassic stamps have borders, 63 in this dataset. Borders on seals may relate to an early form of a semantic determinative. A cartouche around a day sign is a semantic determinative that indicates the pronunciation as well as the calendrical meaning of the sign. This idea may

connect to monumental sculpture where rulers appear framed. For example in the Olmec heartland, altars show a man emerging from inside the cave mouth that creates a cartouche-like frame around the person. Perhaps this bordering idea is an ancient communication tool, and leads us to ask if borders on seals frame ideas of rulership. Although the majority of seals have no borders (70%), I have noted three types of bordering: a single line border, a double line border and a triangle notched border. Table 6 shows that 14 stamps have triangle border, 40 have single line border, nine have double border and 148 have no border; 26 seals are missing this information due to fragmentation. Although Chiapa de Corzo has the most counts for borders (n=26), this site also contributes the most seals. Based on percentages of borders on the stamps at each assemblage, borders are most prevalent in the Maya lowlands (19/36 =53%). The least amount of bordering is found at Guatemalan highlands (8% of its seals) and Soconusco (5% of its seals). Single and double line borders are also present on 29% of the South American seals (7/24), but no triangle bordering is noted. Some seals have a single line on one end and a double line border on the other, although this distinction is sometimes skewed by distal fragments in the data set. Viewed from a communicative or literary standpoint, the double line on the one end seems to suggest that that end should be the bottom of the imprinted image. Triangle borders extend to 6.6% (n=14/211) seals at Blackman Eddy, Alta Verapaz, the Valley of Ulua, Chiapa de Corzo, and Tres Zapotes. Triangle borders, like most of the seal iconography is also found on bowls and other mediums. I found no apparent relationship or patterning with bordering and basic unit motifs or seal forms. More research with a larger corpus of seals and other forms of artwork may clarify the deeper meaning of borders.

Table 6. Distribution of Borders by Regions.

Region	Triangle border	Single line border	Double line border	No border
Chiapa de Corzo	6	17	3	43
Southern Highlands	0	2	1	37
Soconusco	0	1	1	32
Maya Lowlands	4	13	2	18
Gulf Lowlands	4	2	0	3
South America	0	5	2	15
Total (missing data on 26 seals)	14	40	9	148
	(6 roller, 8 flat)	(31 roller, 9 flat)	(8 roller, 1 flat)	(57 roller, 91 flat)

Flat versus Roller Seal Iconography

Field (1967), Borhegyi (1988) and Drucker (1959) concluded that roller seals were invented first, while Linne (1929) felt that flat stamps were the original form. Ericastilla Godoy (2003) believed that each form had functional features tailored to different use. Bachand noted that roller seals are more common in the Middle Formative, while flat stamps are more common in the Late Preclassic and continue into the Classic. In this group of seals, flat stamps are more common at Chiapa de Corzo, Kaminaljuyu, the Gulf Lowlands, and South America. In the Maya Lowlands, only five of the 36 seals recorded are flat seals, only 7.3%. La Blanca in the Soconusco region matches the Maya Lowlands preference for roller seals. Since both forms have been found in very early contexts in North and South America, I think that they were probably both made within the same period although there are regional preferences.

Exploring the differences in iconography on flat and roller seals, out of the 271 recorded basic units, roller seals have 131 recorded units and flat stamps have 123 recorded units. Roller seals are also more likely to have compound basic units or multiple elements. Circumference lines, monkeys, and undecorated are only found on roller seals, while concentric squares, reptiles, zigzags and several other geometric shapes

are found on both forms but more prevalent on roller seals. By contrast, none of the recorded motifs are unique to flat stamps, but U shapes, calendar, numeration, step fret, concentric circles, birds, and plants are more prevalent on flat stamps. Anthropomorphs and stars are divided between the flat and roller seals in this corpus. Besides the circumference line decorations, which are tied the cylindrical nature of roller seals, there is a fair amount of overlap between the two forms. The differential design treatment of the forms may be regional, although it is possible that the flat stamps carry more elite (or hieroglyphic) symbols like calendar glyphs and numeration, perhaps representing ideological control and a later development in the stamp tradition.

Table 7. Comparison of Iconography on Flat and Roller Seals. Circumference lines (n=17) were not included because they overlap with stacked parallel lines.

	No. on roller	No. on flat
stacked parallel or circumference lines	21	2
Zigzag	12	5
circum. triangle lines	14	0
undecorated	9	0
concentric squares	3	1
Reptile	5	1
monkey	6	0
sidestep	2	1
woven	3	1
crescent	3	1
diamond	5	0
anthropomorph	6	6
Star	2	2
U shape	9	26
Spiral	11	22
step fret	2	16
concentric circles	6	10
calendar	2	8
Bird	2	7
numeration	3	6
Plant	2	4
Cross	3	4
Total	131	123

Regional Coefficients of Similarity

The next section will discuss if there is movement or a definite interaction sphere decipherable from this data. Following Zeitlin's (1994) method of determining coefficients of similarity, I created Table 7 to demonstrate likely cultural connections between regions based on shared iconography of seals. Chiapa de Corzo on the Isthmus of Tehuantepec has the highest correlation with other sites partly because of the amount and expressiveness of the seals. Chiapa de Corzo and the Gulf Lowlands have the strongest correlation with a coefficient of similarity (CoS) of 70; this matches expectations since the Mixe-Zoque people occupied this large area. Chiapa de Corzo correlates next with the Maya Lowlands with a coefficient of similarity of 52. There is also a higher degree of correlation between the Maya Lowlands and Gulf Lowlands with a coefficient of 57. Soconusco relates the closest with the Southern Guatemalan Highlands (CoS of 39), their nearest urban neighbors, and next with the Maya lowlands (CoS of 35). South America has the least associations with any of the other assemblage but relates the most with Chiapa de Corzo on the Isthmus of Tehuantepec. Although several specific motifs seemed to have been shared between South and North America, overall seal iconography does not correlate very highly. It seems likely that both areas used seals and perhaps relied on some of the same motifs, but that each area decorated seals according to their own stylistic choices and cultural images.

Table 8. Regional Coefficients of Similarity. This table shows how basic unit categories are shared across regions. Boxed numbers show the total number of basic units marked for each region.

Region	Chiapa de Corzo	Coefficient of Similarity	Guatemalan highlands	Coefficient of Similarity	Soconusco	Coefficient of Similarity	Maya Lowlands	Coefficient of Similarity	Gulf Lowlands	Coefficient of Similarity	South America	Coefficient of Similarity
Chiapa de Corzo	17											
S.Guat. Highlands	11	47	12									
Soconusco	6	26	9	39	10							
Maya Lowlands	12	52	9	39	8	35	18					
Gulf Lowlands	16	70	10	43	5	22	13	57	17			
South America	9	39	6	26	4	17	8	35	8	35	10	

Interpretation of Analysis

Seal iconography highlights many aspects of ancient symbolic communication. Ancient cosmological symbols are most common and the most widespread in seal iconography. These symbols crossed language barriers, and could be widely diverse in representation or more standardized. Assemblage specific motifs, like stacked or diagonal lines at La Blanca and the step fret at Chiapa de Corzo could be emblematic designs specific to the site, or even perhaps an early form of a place name. They could also relate to particular lineages or represent a step in efficiency on the part of a manufacturer or workshop. Circumference triangle lines and the flat stamps with concentric circles or tight spirals are more standardized representations and I believe indicate direct contact between sites, possibly tied to particular rituals or group identity.

The mid-range frequency group includes images related to the Mayan calendar, numeration and ruler ship. Many of these were included in burials and reflect a more formal use of the seals. In addition, seal iconography expresses ideas about the natural

environment. Flora and fauna motifs seem more tailored to their particular areas, with smaller distributions and wide stylistic variations. Furthermore, inherent in this dataset, and I believe in all large collections of seals, is a category of diverse motifs represented only a few times or only once. This wide but low-level frequency range reflects the multitude of expressive images that could be chosen on a local level for pottery and other mediums, perhaps even personal use and creation. A larger sample size of seals would broaden the list of icons and help determine the range of motifs represented, possibly altering these typologies. I hypothesize that elements of this distribution model would be consistent in future catalogs of Mayan seals.

The analysis suggests that there are some very ancient symbols employed across distances. Some evidence suggests that seals had their own few “basic motifs” overlapping with symbols that became the core of hieroglyphic writing. Other seals display iconography that seems more ideographic, reflecting similar concepts, but with more stylistic choice. I believe artisans chose these motifs from a host of sacred symbols, copying the basic motif, but often re-created them in their own way, reflecting their own stylistic and geographical connections. The elemental messages from the Preclassic Maya on seals are cloud, water, earth, the underworld, humans, animals, ‘preciousness’, and calendar days. Specific glyphs for calendrics, *witz*, and the U shape show that specific and possibly phonetic symbols were also expressed on seals. Having the clearest interpretations, I think they could be chosen for specific uses. The presence of the U shapes and calendar motifs in burials supports the hypothesis that seals could be formal in message and representation in certain contexts.

Interesting in terms of diffusion, certain motifs cross space and time and reappear on stamps. The two-headed birds and the lizard configurations, though not unique to stamps, are recycled on stamps. It could indicate that later manufacturers had knowledge of previous stamps within Mesoamerica. The similarity in design indicates that seals had a few of their own basic core of motifs with long temporal ranges and distributions.

Affiliation or interaction is indicated by “matching” seals in nearby regions, such as the consistent flat concentric circle stamps found on the Pacific coast (La Blanca, La Victoria, Kaminaljuyu). Here we see an ancient ideogram utilized in a more standard design and specific form. Geographic clustering of symbols and matching designs could indicate trade from central manufacturer or a coded meaning related to a specific ritual or cultural group. The South American assemblage of seals has none of the matching seal designs, although they have some of the same symbols (i.e. *muyal*) and constructional forms.

The analysis of structural attributes such as carving orientation and border variations overlap with basic unit categories with no decipherable pattern. A larger sample size may highlight patterns hidden in these stylistic choices.

CHAPTER 6

CONCLUSION

At their roots, seals lie in using ceramics as an expressive medium for religious and social development. Although seals represent a small part of the material culture of the Preclassic period, I believe they are able to demonstrate social relations between sites. As a tool and as a portable object, seals had the power to transfer many layers of meaning through their designs. These messages were imprinted on paper during divinatory and ascension rituals, used in body decorations, possibly also for ritual performances, or simply owned and traded. As tools stamps may have been used to limit access and control ideology or merely to assure symmetry and aesthetic quality. Seal iconography could have been broadcasted in imprints or kept hidden and private since seals are such small objects. The accounts of women stamping decorations on themselves demonstrate the relationship between seals and females and I believe the use of seals relates to the figurine cult that is a widespread hallmark of Early Preclassic Mesoamerica. As armband, face or body tattoos, seals may have developed a fine language with variations in the basic units, and they may show ethnic or gender connections. The detection of stucco and ink residue are valuable insights into the uses of seals and further chemical analysis could clarify their functional role.

By examining frequencies of established basic units or mental categories, I was able to simplify the iconography into types. The frequency model offers a guideline to measure particularities within collections. Assemblage or context specific seals are common in large assemblages. Next, regional clustering of specific stamps probably relates to specific rituals or group identity. Calendar and ruler ship symbols are in the mid-range group and only slightly more common than images of the natural environment. The lowest frequency range of seals demonstrates the wide options that manufacturers had in choosing their designs.

Seal iconography is based on a shared typology of concepts that could be represented with particular motifs with rough translations. Seals relied on ancient and widespread symbols and were willing recipients of the earliest forms of writing. As early or proto- logograms their iconography did not read word for word, but was open for interpretation. Artisans had equal measure of freedom to re-create the early logograms in local stylistic preferences. I believe from the moment of their creation seals have carried sacred symbols with the ability to transfer power, transport messages and infer social identity.

Although it is difficult to understand how the Maya distinguished symbols and their variations, the basic units were recognizable across a wide scope of people and space. Once meeting this criterion, the seals incorporated group or individual aspects (Layton 1991). An essential point in this analysis is how we measure variation. For example, how different are concentric squares from concentric circles or squared spirals from rounded-line spirals? When do changes in representation change meanings? In doing this analysis, I was reminded of a linguistic term that I think is germane to the

discussion of early writing symbols. In linguistics, when two basic sounds (phonemes) contrast in identical environments enough to change the word, then we know that they are separate phonemes. The two contrasting phonemes are called a minimal pair. In writing systems, a grapheme is the smallest unit capable of causing a contrast in meaning. Further interpretations of seal iconography lie in understanding how Maya distinguished symbols as graphemes and their variations.

One of the difficulties in interpreting seals is that we have no pictographic references and few possible semantic indicators for interpretation. As isolated motifs, I believe seal iconography exists as independent and complete concepts. Although scholarship has shown that the Mixe-Zoque language relates phonetically more to the early logograms than Maya language, the variations in representations suggests that many seals incorporated ancient and widespread symbols.

Paste compositional analysis has the potential to illuminate the centers of manufacture and specific trade relationships. The pattern of variations within the basic units has the greatest potential for further analysis. The particularities of the motifs should be compared with the iconography found on other artifacts at each site to further understand local style choices.

APPENDIX A

DATASHEET WITH NUMBERED SEALS, REFERENCES, COMPLETE DESCRIPTIONS OF SEAL ICONOGRAPHY AND BASIC UNITS RECORDED

Isthmus of Tehuantepec								
Seal #	Country	Site	Phase	Roller	Flat	Reference	Motif	Basic Unit
1	Mexico	Chiapa de Corzo	Escalera-Francesa	1		Lee 1969:73, Fig 36a	undecorated, bluntly pointed ends	undecorated
2	Mexico	Chiapa de Corzo	Escalera-Francesa	Data1		Lee 1969:73, Fig 36 b	undecorated, bluntly pointed ends	undecorated
3	Mexico	Chiapa de Corzo	Escalera-Francesa	1		Lee 1969: 74 Fig 36c	undecorated, bluntly pointed ends	undecorated
4	Mexico	Chiapa de Corzo	Escalera-Francesa	1		Lee 1969:74, Fig 37a	concentric circles in concentric squares	concentric circles, concentric squares
5	Mexico	Chiapa de Corzo	Escalera-Francesa	1		Lee 1969:74, Fig 37 b	COE, e comb with 3 short lines, O and U in high relief within a carved-out area (particular shape)	u shape, circle
6	Mexico	Chiapa de Corzo	Escalera-Francesa	1		Lee 1969:74, Fig 37 c	incised lines, volutes?	volutes

7	Mexico	Chiapa de Corzo	Escalera-Francesa	1		Lee 1969:74, Fig 37 d	triangle center like Huastec stamp	circumference triangle lines
8	Mexico	Chiapa de Corzo	Escalera-Francesa	1		Lee 1969:74, Fig 37 e	unique lines, almost makes a skeletal face, one triangle	abstract
9	Mexico	Chiapa de Corzo	Escalera-Francesa	1		Lee 1969:74, Fig 37 f	mostly thin, non-continuous, slightly wavy lines in negative relief.	abstract
10	Mexico	Chiapa de Corzo	Escalera-Francesa	1		Lee 1969:74, Fig 37 g	star with circle-dots carved inside	star
11	Mexico	Chiapa de Corzo	Escalera-Francesa	1		Lee 1969:76, Fig 38 a	vertical lines	vertical line
12	Mexico	Chiapa de Corzo	Francesa-Horcones	1		Lee 1969:76, Fig 38 b	two vertical registers, monkey and Lazy S	monkey, spiral
13	Mexico	Chiapa de Corzo	Escalera-Francesa	1		Lee 1969:76, Fig 38 c	square spiral	spiral
14	Mexico	Chiapa de Corzo	Escalera-Francesa	1		Lee 1969:76, Fig 38 d	horizontal Lazy S and vertical different S	multiple register, two distinct spirals

15	Mexico	Chiapa de Corzo	Escalera-Francesa	1		Lee 1969:76, Fig 38 e	undetermined	unknown
16	Mexico	Chiapa de Corzo	Francesa-Horcones	1		Lee 1969:76, Fig 38 f	vertical monkey and two side by side spiral ends	monkey, spiral
17	Mexico	Chiapa de Corzo	Escalera-Francesa	1		Lee 1969:76, Fig 38 g	square spiral	spiral
18	Mexico	Chiapa de Corzo	Escalera-Francesa	1		Lee 1969:76, Fig 38 h	undetermined	unknown
19	Mexico	Chiapa de Corzo	Escalera-Francesa	1		Lee 1969:76, Fig 38 i	triangle notched design with neg/positive wavy line-design in center	circumference triangle lines, zigzag
20	Mexico	Chiapa de Corzo	Escalera-Francesa	1		Lee 1969:76, Fig 38 k	triangle notched design with circle and maybe U bracket?	circumference triangle lines, u shape
21	Mexico	Chiapa de Corzo	Escalera-Francesa	1		Lee 1969:76, Fig 38 l	triangle notched design with double lines in center (horizontal u bracket)	circumference triangle lines
22	Mexico	Chiapa de Corzo		1		Lee 1969:76, Fig 38 m	diagonal lines and serrated lines, mimics a hollow seal but aperture does not go all the way through	lines, step fret

23	Mexico	Chiapa de Corzo	Francesa-Horcones	1		Lee 1969:76, Fig 38 n	monkey, rather squared limbs	monkey
24	Mexico	Chiapa de Corzo	Francesa-Horcones	1		Lee 1969:76, Fig 38 o	Maya lord side profile, body is woven pattern or an Ollin (movement knot) or diamond with four dots in each triangle, hands at along the bottom and U shape above his head	anthropomorph lord, u shape, woven
25	Mexico	Chiapa de Corzo	Francesa-Horcones	1		Lee 1969:76, Fig 38 p	monkey with spiral tail, cross at his hear and a flower?	monkey, cross, plant
26	Mexico	Chiapa de Corzo	Dili-Francesa	1		Lee 1969:76, Fig 38 r	spiral end	spiral
27	Mexico	Chiapa de Corzo	unknown		1	Lee 1969:79, Fig 40, a	anthropomorph- foot with four short toes and a scroll and dot carved on the bottom.	anthropomorph
28	Mexico	Chiapa de Corzo	unknown		1	Lee 1969:79, Fig. 40 b	bird, side profile, crest and long beak pointing upward, no body attached	bird

29	Mexico	Chiapa de Corzo	unknown		1	Lee 1969:79, Fig 40 c	bird, two headed. Carved triangle with round punctate fillet in the central	bird two heads, step fret
30	Mexico	Chiapa de Corzo	unknown		1	Lee 1969:79, Fig 40 d	bird, two headed. Carved triangle with round punctate fillet in the central and wings	bird two heads, step fret
31	Mexico	Chiapa de Corzo	Francesca		1	Lee 1969:79 Fig 40, e	butterfly configuration with dots, dashes, hand paw	zoomorph- butterfly
32	Mexico	Chiapa de Corzo	Francesca		1	Lee 1969:79, Fig 40 f	Lee interprets this sign as an earth monster	volutes
33	Mexico	Chiapa de Corzo	unknown		1	Lee 1969:80, Fig 41a	flower?	plant
34	Mexico	Chiapa de Corzo	Istmo- Jiquipilas			Lee 1969:80, fig41 b	concentric circles framed by notched lines	concentric circles framed by notched lines

35	Mexico	Chiapa de Corzo	unknown		1	Lee 1969:80 Fig 41, c	square form, a jaguar with mouth open possibly with snake and two "U" against back of head	u shape
36	Mexico	Chiapa de Corzo	Dili		1	Lee 1969:80, Fig 41 d	oval- pig foot print?. V is incised with slight lines	undetermined, u shape
37	Mexico	Chiapa de Corzo	unknown		1	Lee 1969:80, Fig 41 e	rectangle form; opposing design, notches in a u bracket opening to the outside edge	u shape
38	Mexico	Chiapa de Corzo	Istmo-Jiquipilas		1	Lee 1969:80 Fig 41 f	U brackets, presumably open end facing each other with dots in the center?	u shape
39	Mexico	Chiapa de Corzo	Istmo-Jiquipilas		1	Lee 1969:80 Fig 41 g	U brackets, repeat design, two facing one way and another facing the other way	u shape
40	Mexico	Chiapa de Corzo	Istmo-Jiquipilas		1	Lee 1969:80 Fig 41 i	square form, unknown	unknown

41	Mexico	Chiapa de Corzo	Istmo-Jiquipilas		1	Lee 1969:80 Fig 41 j	has triangle notched border with single undulating line and dots in the crest of the waves	zigzag
42	Mexico	Chiapa de Corzo	Francesca-Horcones		1	Lee 1969:82, Fig 42 a	variations of triangle/place/town / witz/mountain with central circle	witz
43	Mexico	Chiapa de Corzo	Francesca-Horcones		1	Lee 1969:82, Fig 42 b	variations of triangle/place/town / witz/mountain with central circle	witz
44	Mexico	Chiapa de Corzo	Francesca-Horcones		1	Lee 1969:82, Fig 42 c	variations of triangle/place/town / witz/mountain with central circle	witz
45	Mexico	Chiapa de Corzo	Francesca-Horcones		1	Lee 1969:82, Fig 42 d	variations of triangle/place/town / witz/mountain with central circle	witz

46	Mexico	Chiapa de Corzo	Francesca-Horcones		1	Lee 1969:82, Fig 42 e	variations of triangle/place/town / witz/mountain with central circle, within a square-notched square (like fig b)	witz
47	Mexico	Chiapa de Corzo	Francesca-Horcones		1	Lee 1969:82, Fig 42 f	variations of triangle/place/town / w'tiz/mountain with central circle	witz with notches line below
48	Mexico	Chiapa de Corzo	Francesca-Horcones		1	Lee 1969:82, Fig 42 g	variations of triangle/place/town / w'tiz/mountain with central circle	witz
49	Mexico	Chiapa de Corzo	Francesca-Horcones		1	Lee 1969:82, Fig 42 h	variations of triangle/place/town / w'tiz/mountain with central circle	witz, numeration
50	Mexico	Chiapa de Corzo	Francesca-Horcones		1	Lee 1969:82, Fig 42 i	variations of triangle/place/town / w'tiz/mountain with central circle	witz

51	Mexico	Chiapa de Corzo	Francesca-Horcones		1	Lee 1969:82, Fig 42 j	variations of triangle/place/town / w'tiz/mountain with central circle within two lines (u brackets?)	witz
52	Mexico	Chiapa de Corzo	unknown		1	Lee 1969:83, Fig 43 a	step fret edge, lines,	step fret L with notched line
53	Mexico	Chiapa de Corzo	Francesca-Guanacaste		1	Lee 1969:83, Fig 43 c	opposing notched angles with stepped fret outside edge	step fret opposing L with notches
54	Mexico	Chiapa de Corzo	Francesca-Guanacaste		1	Lee 1969:83, Fig 43 d	free forms, two look rather like ajaw. Linear shape, with circle-dots in the center and notches on edge, resemble Sejourne's idea of a water symbol	circle triangles

55	Mexico	Chiapa de Corzo	Francesca-Guanacaste		1	Lee 1969:83, Fig 43 e	butterfly? U brackets? Speech scrolls? Anthromorph? Two arms off the head, face with two eyes, mouth with double merlon, upside down T shape to the head, volutas to the sides, Used in the article about san Andres scroll, similar to fig 43 f	ajaw, merlon, spiral, calendar
56	Mexico	Chiapa de Corzo	Francesca-Guanacaste		1	Lee 1969:83, Fig 43 f	free forms, two look rather like ajua phase. Butterfly, speech scrolls? Similar to fig 43 e, same "face" this time two conjoined, sharing the same mouth, rather like a cave mouth, double merlon	ajaw, merlon, spiral, calendar
57	Mexico	Chiapa de Corzo			1	Lee 1969:84, Fig 44 a	free forms, scrolls, volutes	volutes, undetermined
58	Mexico	Chiapa de Corzo			1	Lee 1969:84, Fig 44 c	free forms, scrolls, volutes	u shape

59	Mexico	Chiapa de Corzo			1	Lee 1969:84, Fig 44 d	free forms, scrolls, volutas, spiral in the middle with radial lines surrounding	spiral
60	Mexico	Chiapa de Corzo			1	Lee 1969:84, Fig 44 f	stacked u with two stacked dots in the center, three stacked dots below	u shape
61	Mexico	Chiapa de Corzo			1	Lee 1969:84, Fig 44 g	like a flier de lies, u with a central dot and dash	u shape
62	Mexico	Chiapa de Corzo			1	Lee 1969:84, Fig 44 h	single u with flaring points	u shape
63	Mexico	Chiapa de Corzo			1	Lee 1969:84, Fig 44 i	free forms, scrolls, volutes; lines and an outside line with notching facing out	undetermined volutes
64	Mexico	Chiapa de Corzo			1	Lee 1969:84, Fig 44 j	free forms, scrolls, volutes, two opposing U, one has two dashes in center	u shape

65	Mexico	Chiapa de Corzo			1	Lee 1969:84, Fig 44 k	free forms, scrolls, volutes; lines	undetermined volutes
66	Mexico	Chiapa de Corzo			1	Lee 1969:84, Fig 44 l	free forms, like butterfly wings, one central V with nothing in the center, on the outside edge of the V are dots like dripping down with four high points (like Maya earth symbol repeated four times)	u shape, calendar?
67	Mexico	Chiapa de Corzo			1	Lee 1969:84, Fig 44 m	free forms, spiral inside a cave mouth with double merlon	double merlon, spiral
68	Mexico	Chiapa de Corzo			1	Lee 1969:84, Fig 44 n	squared spiral	spiral
69	Mexico	Chiapa de Corzo			1	Lee 1969:84, Fig 44 o	free forms, five-petaled flower inside concentric circles,	plant, concentric circles
70	Mexico	Chiapa de Corzo			1	Lee 1969:84, Fig 44 p	spiral volutes	spiral volutes

71	Mexico	Chiapa de Corzo			1	Lee 1969:84, Fig 44 r	free forms, scrolls, volutas, connected spirals (like a muyal) with witz on each spiral, two dots	step fret, spiral
72	Mexico	Chiapa de Corzo			1	Lee 1969:84, Fig 44 s	hand inside a u with five long notches (or flames?)	hand, concentric circle
73	Mexico	Chiapa de Corzo			1	Lee 1969:84, Fig 44 t	rectangle with inside fragmented, probably had witz symbol, outside has step fret on each side	witz inside a rectangle with witz on each side
Southeast Maya Highlands								
Seal #	Country	Site	Phase	Roller	Flat	Reference	Motif	Basic Unit
74	Guatemala	Kaminaljuyu		1		Kidder et al 1946:215; Fig 187 n	triangle top register and spirals on bottom	circumference triangle lines, spiral
75	Guatemala	Kaminaljuyu		1		Kidder et al. 1946, Fig 187 o	triangle top register and concentric circles bottom register	concentric circles, triangle

76	Guatemala	Kaminal-juyu		1		Ericastilla 1992:20, Fig 4	solid, no decoration	no decoration
77	Guatemala	Kaminal-juyu		1		Ericastilla 1992: 20, Fig 5	repeated chevrons circumferencing seal	zig zag
78	Guatemala	Kaminal-juyu		1		Ericastilla 1992: 20, Fig 6	three thick, non-connecting, wavy lines	undetermined, volute
79	Guatemala	Kaminal-juyu			1	Ericastilla 1992: 20, Fig 7	like an elephant? With a long nose and two ears, one eye (side profile) and a half-flower with four petals	zoomorph unknown
80	Guatemala	Kaminal-juyu			1	Ericastilla 1992: 20, Fig 8	lamat diamond with four dots in center	Calendar
81	Guatemala	Kaminal-juyu			1	Ericastilla 1992: 20, Fig 9	side profile, two ears, one eye, long nose like a snout	zoomorph unknown
82	Guatemala	Kaminal-juyu			1	Ericastilla 1992: 21, Fig 10	hand paw (5 long bars), three brackets and another bar, and more u. Like a bowl?	u shape/ hand paw

83	Guatemala	Kaminal- juyu			1	Ericastilla 1992: 21, Fig 11	the fragment is identical to bottom of seal in figure 10, the u or bowl	u shape
84	Guatemala	Kaminal- juyu			1	Ericastilla 1992: 21, Fig 12	hand paw (5 long bars), three brackets and another bar, and more u. Like a bowl?	u shape / hand paw
85	Guatemala	Kaminal- juyu			1	Ericastilla 1992: 21, Fig 13	hand paw (5 long bars), then an oval (in place of the three u's) and bottom motif is the same as 10 and 11, u in a bowl?	u shape / hand paw
86	Guatemala	Kaminal- juyu			1	Ericastilla 1992:22, Fig. 14	two opposing S (muyals?) with one dot in middle, resembles the curviness of the u shapes	spiral
87	Guatemala	Kaminal- juyu			1	Ericastilla 1992:22, Fig. 15	two large curvy U's like two horseshoes with outside edges pressed together. Two dots in middle of each U and two dots on each side of each U	u shape

88	Guatemala	Kaminal- juyu			1	Ericastilla1992:22, Fig. 16	two large u shapes, like two horseshoes with outside edges pressed together, like figure 15. The two dots in middle of each U are not there, but the has the same two dots on each side of each U (though some are fragmented).	u shape
89	Guatemala	Kaminal- juyu			1	Ericastilla1992:22, Fig. 17	Two large u shapes back to back like figure 15, with a solitary dot inside the U, the surrounding dots are different. Larger, ore oval like, three on each side of the design, each with two incised dots	u shape
90	Guatemala	Kaminal- juyu			1	Ericastilla1992:22, Fig. 18	One large u shape with two dots in the center and dots on the outside like figure 15. presumably the fragmented portion would mirror the U like for Fig. 15	u shape

91	Guatemala	Kaminaljuyu		1	Ericastilla1992:22, Fig. 19	four X's with two dots between them (forming Lamat in intaglio) below two large, horizontal bars resting on top. Presumably four dots on top of the bars (fragmented), the x is a month sign of Zip sign	calendar numeration
92	Guatemala	Kaminal- juyu		1	Ericastilla1992:22, Fig. 20	at least three stacked horizontal registers. A long bar, then 7 small upside down u shapes and then a line, and then fragmented portion. Ericastilla describes it " 7 U's between two bars, one solid, one hollow, below are 2 motifs that seem to descend from above (rain?). all that remains are 2 large drops but it seems like there had been 4"	numeration, u shape
93	Guatemala	Kaminal- juyu		1	Ericastilla1992:23, Fig. 21	square U within another square U bracket with handle, dots on handle and inside the interior U.	u shape

94	Guatemala	Kaminal-juyu			1	Ericastilla 1992:23, Fig. 22	Squared U within another squared U, center circle with two dots. Presumably repeated (3X) linearly, but fragmented. Dots (circles) on the perimeter.	u shape
95	Guatemala	Kaminal-juyu			1	Ericastilla 1992:23, Fig. 23	stacked U bracket with two dots in the center. Repeated, with perimeter dots (like figure 22)	u shape
96	Guatemala	Kaminal-juyu			1	Ericastilla 1992:24, Fig. 24	tight spiral	Spiral
97	Guatemala	Kaminal-juyu			1	Ericastilla 1992:24, Fig. 25	tight spiral	Spiral
98	Guatemala	Kaminal-juyu			1	Ericastilla 1992:24, Fig. 26	tight spiral with five oval (with two dots in the center) on the round perimeter	Spiral
99	Guatemala	Kaminal-juyu			1	Ericastilla 1992:25, Fig. 27	squared angle (3 lines) and two straight lines, hand paw wing?	geometric

100	Guatemala	Kaminal-juyu			1	Ericastilla 1992:25, Fig. 28	squared angle (6 lines), similar to Fig. 27, hand paw wing?	geometric, undetermined
101	Guatemala	Kaminal-juyu			1	Ericastilla 1992:25, Fig. 29	squared angle (2 lines) opposing each other, hand paw wing?	geometric, undetermined
102	Guatemala	Kaminal-juyu			1	Ericastilla 1992:25, Fig. 30	Lamat diamond (2 lines) with 2 dots in center oval	Calendar
103	Guatemala	Kaminal-juyu			1	Ericastilla 1992:25, Fig. 31	Lamat diamond with two dots in center triangle	Calendar
104	Guatemala	Kaminal-juyu			1	Ericastilla 1992:26, Fig.32	profile with long beak? Two dots, maybe an S?	zoomorph unknown
105	Guatemala	Kaminal-juyu			1	Ericastilla 1992:26, Fig. 33	fragmented, but heart shape with a dot in each lobe	undetermined
106	Guatemala	Kaminal-juyu			1	Ericastilla 1992:26, Fig. 34	3 triangles, lines and dots	undetermined
107	Guatemala	Kaminal-juyu			1	Ericastilla 1992:26, Fig. 35	a lamat triangle with 2 dots? And then a top circle?	Calendar

108	Salvador	Chal-chuapa		1		Ohi 2000 :188, photo I-8-6 (8)	thick uneven lines around the seal	circumference lines
109	Salvador	Chal-chuapa			1	Ohi 2000 :188, photo I-8-6 (1)	3 concentric squares	concentric squares
110	Salvador	Chal-chuapa			1	Ohi 2000 188, photo I- 8-6, (2)	small bird with top wings and circle eyes, small beak	Bird
111	Salvador	Chal-chuapa			1	Ohi 2000 : 188, photo I-8-6 (5)	stacked, squared lined U	u shape
112	Salvador	Chal-chuapa			1	Ohi 2000 : 188, photo I-8-6 (9)	square seal with lines with parallel lines carved	undetermined
113	Salvador	Chal-chuapa			1	Ohi 2000 :188, photo I -8-6 (10)	square seal with lines with parallel lines carved	undetermined

Soconusco

Seal #	Country	Site	Phase	Roller	Flat	Reference	Motif	Basic Unit
114	Guatemala	La Blanca		1		Love 2008, artifact # 100	profile of lizard or monkey, part of animal curves upwards (reminds me of the alligator climbing the tree backwards). Other side is fragment	Reptile
115	Guatemala	La Blanca		1	1	Love 2008, artifact # 55	well executed, three different geometric designs around the seal. One side has half-moon cut-outs, next shows slices from the top, the other is two combined circles with a central hole, reminds a bit of west Mexican hand paw motif?,	hand paw crescentic

116	Guatemala	La Blanca		1		Love 2008, artifact # 297	diagonal, slightly curvy, circumference lines, from top, thin line, then thick, then thin, then an empty space and then a thick line followed by a thick line.	circumference lines
117	Guatemala	La Blanca		1		Love 2008, artifact # 17	circumference diagonal lines, two thick with a thin in middle	circumference lines
118	Guatemala	La Blanca		1		Love 2008, artifact # 81	hour glass geometric pattern, fat in the middle with medium sized central circle	Undetermined
119	Guatemala	La Blanca			1	Love 2008, artifact # 308	concentric circles or spiral	concentric circles
120	Guatemala	La Blanca		1		Love 2008, artifact # 230	circumference horizontal lines	circumference lines

121	Guatemala	La Blanca		1		Love 2008, artifact # 117	lines of different thickness, not exactly horizontal, could have been circumference but frag	Lines
122	Guatemala	La Blanca		1		Love 2008, artifact # 165	thick circumference horizontal lines	circumference lines
123	Guatemala	La Blanca		1		Love 2008, artifact # 168	circumference horizontal lines	circumference lines
124	Guatemala	La Blanca		1		Love 2008, artifact # 210	thick curved circumference lines, side step? Wavy lines, chevron-esque	Chevrons, circumference lines
125	Guatemala	La Blanca		1		Love 2008, artifact # 125	2 seals put together end to end, 7 circumference horizontal lines, attached to seal with repeated vertical zigzags (chevron)	circumference lines, zigzag

126	Guatemala	La Blanca		1		Love 2008, artifact # 91	Diagonal lines, two thick with thin in the middle. There's a difference in spacing between the top thick line and the middle and then more space until the next thick line (which looks like a ribbon)	circumference lines
127	Guatemala	La Blanca		1		Love 2008, artifact # 1506	stacked parallel lines possibly had been something between , or just an exaggerated space in the middle. (two lines then space and then two thicker lines)	circumference lines
128	Guatemala	La Blanca		1		Love 2008, artifact # 1507	circumference thick lines	circumference lines

129	Guatemala	La Blanca		1		Love 2008, artifact # 1096	two images on different sides of the seal. One side has repeated horizontal chevrons with skewed angle and the other side is horizontal lines	Zigzag
130	Guatemala	La Blanca		1		Love 2008, artifact # 1078	thick lines, stacked horizontal chevrons with skewed angle, shard point	zigzag
131	Guatemala	La Blanca		1		Love 2008, artifact # 225	concentric circles on a side view of this fragment	concentric circle
132	Guatemala	La Blanca		1		Love 2008, artifact # 154	concentric circles on side view of this fragment (similar to artifact 225)	concentric circle
133	Guatemala	La Blanca		1		Love 2008, artifact # 134	thick stacked, horizontal lines, too frag to know if circumference	Stacked lines
134	Guatemala	La Blanca			1	Love 2008, artifact # 96	concentric circles (4 with central circle)	concentric circle

135	Guatemala	La Blanca		1		Love 2008, artifact # 107	thick stacked horizontal lines	lines
136	Guatemala	La Blanca			1	Love 2008, artifact # 24	diamond shaped, with central x incised	Cross
137	Guatemala	La Blanca			1	Love 2008, artifact # 162	concentric circles	concentric circles
138	Guatemala	La Blanca		1		Love 2008, artifact # 129	like two seals put together side by side one is plain or corroded and the other has three registers: triangle notching, then two horizontal lines, then triangle notching, like a representation of the multiple registered- circumference triangle lines	circumference triangle
139	Guatemala	La Blanca		1		Love 2008, artifact # 130	horizontal circumference lines, full revolution, deep incising,	circumference lines

140	Guatemala	La Blanca		1	Love 2008, artifact # 22	concentric circles, asymmetrical handle	concentric circle
141	Guatemala	La Blanca		1	Love 2008, artifact # 199	repeated U shapes	u shape
142	Guatemala	La Blanca		1	Love 2008, artifact # 172	repeated concentric squares	concentric square
143	Guatemala	La Blanca		1	Love 2008, artifact # 397	horizontal stacked lines	circumference lines
144	Guatemala	La Blanca		1	Love 2008, artifact # 187	thick stacked parallel lines, well-executed	circumference lines
145	Guatemala	La Blanca		1	Love 2008, artifact # 116	possibly E Comb. Thick lines with half-moon cut-outs. Circle - different designs around the seal	e comb, crescentic, circle

146	Guatemala	La Blanca		1		Love 2008, artifact # 213	thick stacked parallel horizontal lines	circumference lines
147	Guatemala	La Blanca		1		Love 2008, artifact # 232	unknown	Unknown
148	Guatemala	La Blanca		1		Love 2008, artifact # 143	rectangle at diagonal with lines framing it	circumference lines
149	Guatemala	La Victoria	Crucero		1	Coe 1961:109, Fig 61a	3 concentric rings	concentric circle
150	Guatemala	La Victoria	Conchas1	1		Coe 1961, Fig 60 m	diagonal thick lines	circumference lines
Maya Lowlands								
Seal #	Country	Site	Phase	Roller	Flat	Reference	Motif	Basic Unit

151	Guatemala	Dieseldorff collection - Alta Verapaz		1		Borhegyi 1951:17, Fig 1	spider monkey pansudo, tail ending in spiral. Other side has zoomorph- triangular head with dots for eyes and mouth, two appendages on each all pointing up (no elbows) and long tail. Small holes on cheek of face, indicating a mask?	monkey
152	Guatemala	Dieseldorff collection - Alta Verapaz		1		Borhegyi 1951:17, Fig 2	symmetrical, circumference lines and triangles, center motif of diamond with hole in center	circumference triangle lines
153	Guatemala	Dieseldorff collection - Alta Verapaz			1	Borhegyi 1951:17, Fig 5	danzero with hands, arms, head formed by volutes high level of artistry. Very abstract representation.	anthropomorph
154	Guatemala	Altar de Sacrificios	San Felix	1		Willey 1972:94, Fig 78	reptile stylized turtle. Body is double triangle attached with head, legs and tail.	reptile

155	Guatemala	Altar de Sacrificios	Salinas to Early Classic	1		Willey 1972:94, Fig77	arm and claws, possibly a leg. Reptile or monkey, against a background of two horizontal lines of triangles	reptile
156	Belize	Barton Ramie	Jenny Creek to Bayal	1		Willey 1965:403, 410	deeply carved with repetitive crescentic design bordered by a line. other surface is badly eroded, but no decoration. Roller seal is possibly concave in the middle.	crescentic
157	Belize	Blackman Eddy	Jenny Creek	1		Garber 1999	continuous line, anthropomorph on one side with frontal view of eyes, mouth (concentric circles) and arms hanging down the side with hands over stomach area. other side is maze-like geometric lines	anthropomorph

158	Belize	Blackman Eddy		1		Garber 1999	at one end, triangle border circling the seal, then a cut-out line separation, then triangle line circling the seal facing the other direction. Then a cut out space and a thick solid line, a cut out space and another solid line.	circumference triangles
159	Belize	cahal pech		1		Texas State (under direction of J. Garber) 2008 Field Season Personal Notes	lightning or zigzag	zigzag
160	Belize	Cuello	Cocos	1		Hammond 1991:178, Fig 8.23 b	two thick and well cutout out (beveled) horizontal lines. One side of roller seal continuous with two more thick horizontal lines, other side the lines are broken by horizontal, thick lined and squared U. no flaring points.	u shape
161	Belize	Cuello	Cocos	1		Hammond 1991:178, Fig 8.23 c	similar to Fig. b. Double thick line border at one end, then vertical square or U	u shape

162	Belize	Cuello	Cocos	1		Hammond 1991:178, Fig 8.23 d	flower center? Circles bunched like seeds, with a border that rather looks like jagged flames (flaming eyebrow?)	star, plant
163	Belize	Cuello	Cocos	1		Hammond 1991:178, Fig 8.23 e	kin or (4 petaled) flower center, inside an X, with four rays, like a quincunx.	Calendar
164	Belize	Cuello		1		Hammond 2006:27, Fig. 3	Anthropomorp with central hole in chest and head, two feet, two arms with 2 phalanges on each. E-comb w/ 4 prongs, bar (possible numeration), concentric circle for head	Anthropomorph, concentric circle
165	Belize	Cuello		1		Hammond 2006:27, Fig. 3	2 parallel squiggly lines, one ends in asymmetrical cross	zigzag, cross

166	Belize	Cuello		1		Hammond 2006:27, Fig. 3	four bars over circle with central dot and three horizontal bars of that and one below it. Dotted circle with horizontal three short bars on either side and five longer bars spaced around the rest of the perimeter.	Numeration
167	Belize	Cuello	Blanden Phase	1		Hammond 1991: 178, Fig 8.23 a	vertical lines	lines, u shape
168	Belize	Cuello	Cocos		1	Hammond 1991:179, Fig 8.24a	2 rows of dashed lines (SF 833)	Numeration
169	Belize	Cuello	Cocos		1	Hammond 1991:179, Fig 8.24b	three-part design with possibly coefficient for 3, stacked u shape	numeration / u shape
170	Guatemala	Seibal	Escoba	1		Willey 1978:50, Fig 56	reptile claws, with scroll or vine as horizontal border 1 cm below the edge	Reptile

171	Mexico	Mirador	Chiapa H-Quequepac?	1		Agrinier 2000:36, Fig 120 a	lots of dark space, woven pattern (three lines in a patch perpendicular, then like a chain motif going vertically down the stamp (opposing half moons) then the woven pattern again, then three open sideways and connected U with central dot. Rather abstract	Woven
172	Mexico	Mirador	Chiapa H-Quequepac	1		Agrinier 2000:36, Fig b	kan cross . Lots of dark space and abstract,	Calendar, cross
173	Mexico	Mirador			1	Agrinier 2000:36, Fig e	Resembles Arabic writing, squared angles,	Abstract
174	Mexico	Mirador		1		Agrinier 1984:79, Fig. 52	turtle or bird with geometry	Reptile
175	Mexico	Mirador		1		Agrinier 1984:79	horizontal zigzag	Zigzag
176	Mexico	Mirador		1		Agrinier 1984:79	side step	side step
177	Mexico	Mirador		1		Agrinier 1984:79	triangle circumference	circumference triangle lines
178	Mexico	Mirador		1		Agrinier 1984:79	triangle circumference	circumference triangle lines

179	Mexico	Mirador		1		Agrinier 1984:79	undecorated	undecorated
180	Mexico	Mirador		1		Agrinier 1984:79	undecorated	undecorated
181	Guatemala	Uaxactun		1		Kidder 1947:69, Fig 59 c and Fig 145 e, f	woven motif with three bars grouped and in a slanted perpendicular pattern	woven
182	Guatemala	Uaxactun		1		Kidder 1947:69, Fig 59 c and Fig 145 e, f	wide incised concentric circle repeated three times in separate vertical registers	concentric circles
183	Guatemala	Uaxactun		1		Kidder 1947:69, Fig 59 c and Fig 145 e, f	non connecting lines and motifs a star is high relief, while a four- petaled shape is outlined. Lots of dark space	star, quincunx
184	Honduras	Ulua Valley		1		Bachand 2002:542	monkey identical to Costa Rica roller stamp	Monkey
185	Honduras	Ulua Valley			1	Stone 1941	two anthromorphs in loincloths facing each other. "Squared angle" style	anthropomorph

186	Honduras	Ulua Valley			1	Stone, Doris	Rectangular shaped seal with undulating triangles with hatching on the inside. Also is a whistle	Triangles
Gulf Lowlands								
Seal #	Country	Site	Phase	Roller	Flat	Reference	Motif	Basic Unit
187	Mexico	San Lorenzo		1		Drucker 1959	concentric squares	concentric square
188	Mexico	San Andres		1		Pohl et al. 2002	bird with speech scrolls and possible numeration	bird, calendar, numeration
189	Mexico	La Venta		1		Ducker (1959:141-142, Pl.42 and Fig 43)	lines, borders	undetermined
190	Mexico	La Venta		1		Ducker (1959:141-142, Pl.21b and Fig 43a)	lines, trees????	undetermined

191	Mexico	Tres Zapotes		1		Weiant 1943: Pl 63,	4 vertical registers. One end is eroded or had little decoration, the bottom half contains concentric diamonds repeated around the seal. The bottom has stepped fret witz) carved out repeating around the seal.	diamond, step fret, undecorated
192	Mexico	Tres Zapotes		1		Weiant 1943: Pl 63	bird with long beak, and circle eye, geometric squares around body	Bird
193	Mexico	Tres Zapotes		1		Weiant 1943: Pl 63	u bracket with a center dot and other decorations that are obscured.	u shape
194	Mexico	Tres Zapotes		1		Weiant 1943: Pl 63	repeated concentric diamonds in a checkerboard pattern.	Diamond
195	Mexico	Tres Zapotes		1		Weiant 1943: Pl 63	unknown. Thick lines, Olmec side-step motif, squared maize like Costa Rica	side step

196	Mexico	Tres Zapotes		1		Weiant 1943: Pl 63	two refit fragments - danzante (like early Monte Alban), side profile, loin cloth, full body with legs and arms bent. Side is bracketed with U motifs.	anthropomorph, u shape
197	Mexico	Tres Zapotes		1		Weiant 1943: Pl. 63	unknown. Thin lines, (Egyptian writing seal?)	abstract, undetermined
198	Mexico	Tres Zapotes			1	Weiant 1943: Pl 62, 63, & 73	woven pattern, groups of four short bars perpendicular makes checkerboard pattern	Woven
199	Mexico	Tres Zapotes			1	Weiant 1943: Pl 62, 63, & 73	cross with a center hole sheltered inside squared lines (side step motif?). Rectangle or square form.	cross, side step
200	Mexico	Tres Zapotes			1	Weiant 1943: Pl 62, 63, & 73	flower petals with outside perimeter cut following the petal form	plant
201	Mexico	Tres Zapotes			1	Weiant 1943: Pl 62, 63, & 73	bird, short beak	bird

202	Mexico	Tres Zapotes			1	Weiant 1943: Pl 62, 63, & 73	U brackets with two center dots	u shape
203	Mexico	Tres Zapotes			1	Weiant 1943: Pl 62, 63, & 73	two repeated designs. Crab-like legs from a center hole, hooked arms from central design	plant
204	Mexico	Tres Zapotes			1	Weiant 1943: Pl 62, 63, & 73	three stretched out muyal. Notice the design is backwards to show the mirror image in the print.	muyal
205	Mexico	Tres Zapotes			1	Weiant 1943: Pl 62, 63, & 73	three concentric circles. Stamp has circular form.	concentric circles
206	Mexico	Tres Zapotes			1	Weiant 1943: Pl 62, 63, & 73	squat muyal, decorative	Spiral
207	Mexico	Tres Zapotes			1	Weiant 1943: Pl 62, 63, & 73	tight spiral. Circular form stamp.	Spiral

208	Mexico	Tres Zapotes			1	Weiant 1943: Pl 62, 63, & 73	two connecting stretched muyals with radial lines. Square form. Two long bars below, and a star (with central hole) between two circles (like under a cartouche)	muyal, numeration
209	Mexico	Tres Zapotes			1	Weiant 1943: Pl 62, 63, & 73	unusual, non-connecting line designs	Abstract
210	Mexico	Tres Zapotes			1	Weiant 1943: Pl 62, 63, & 73	squared edge spiral	squared spiral
211	Mexico	Tres Zapotes			1	Weiant 1943: Pl 62, 63, & 73	witz , stepped fret rectangular form. Could be made of stone	step fret
212	Mexico	Tres Zapotes			1	Weiant 1943: Pl 62, 63, & 73	cross form with flowers (4-petaled). Could be made of stone. Enciso says it is a game piece, similar to Parcheesi	plant, cross
213	Mexico	Tres Zapotes			1	Bachand 2002:543	lightning/zigzag	Zigzag

South America

Seal #	Country	Site	Phase	Roller	Flat	Reference	Motif	Basic Unit
214	Peru	Paco Pampa	Cupismique-Chavin	1		Burger 1995:108	stylize face in hexagon	anthropomorph
215	Peru	Cupismique	Cupismique-Chavin		1	Burger 1995:108	Lazy S	spiral
216	Peru	Huaca Prieta	Chavin	1		Burger 1995:108	border double on one end and central double border, two identical registers	notched lines in multiple registers
217	Peru	Huaca Prieta	Chavin		1	Burger 1995:108	bird in side profile, long beak	Bird
218	Ecuador	site unknown	Chorrera	1		Lathrap et al. 1980:106, Fig 515	two diamonds (knot bundle?)	Diamond
219	Ecuador	Pedernales, Manabi	Chorrera	1		Lathrap et al. 1980, Fig 516	horizontal zig zags and dots	Zigzag
220	Ecuador	site unknown	Chorrera	1		Lathrap et al. 1980:106, Fig 517	spiral or geometric	Zigzag

221	Ecuador	Loma Alta	Machalilla	1		Lathrap et al. 1980:106 Fig 518, p. 51, fig 73	end of spiral repeated, identical to fig 519	Spiral
222	Ecuador	Loma Alta	Machalilla	1		Lathrap et al. 1980:106 Fig 519	end of spiral repeated	Spiral
223	Ecuador	Chacras, Manabi	Chorrera		1	Lathrap et al. 1980:106, Fig 520	Lazy -S in a scattered pattern, muyal	Spiral
224	Ecuador	Pedernales, Manabi			1	Lathrap et al. 1980:106, Fig 521, p. 51, Fig 73	alternating spirals? Top and bottom register? Similar to 30 and 33	Spiral
225	Ecuador	Crucitas, Manabi	Chorrera		1	Lathrap et al. 1980:106, Fig 522	row of punctated holes, concentric circles, split on a line down middle. The two halves of the circle do not line up, shifted.	concentric circles
226	Ecuador	Tambillo, Manabi	Chorrera		1	Lathrap et al. 1980:106, Fig 523	star with central circle	Star

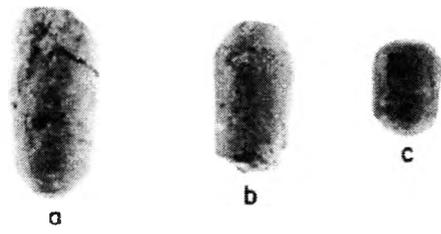
227	Ecuador	site unknown	Chorrera		1	Lathrap et al. 1980: 106, Fig 524	figure 8 design, or muyal	Spiral
228	Ecuador	site unknown	Chorrera		1	Lathrap et al. 1980: 106, Fig 525	five wavy lines? Serpent?	Zigzag
229	Ecuador	site unknown	Chorrera		1	Lathrap et al. 1980:106, Fig 526	face with extending rays	calendar
230	Ecuador	site unknown	Chorrera	1		Lathrap et al. 1980:106, Fig 527	vertical serpent or zigzag with small punctated eye	Zigzag
231	Ecuador	site unknown	Chorrera		1	Lathrap et al. 1980:106, Fig 529	crude serpent? No eyes marked	Zigzag
232	Ecuador	site unknown	Chorrera		1	Lathrap et al. 1980:106, Fig 530	oval, end of spirals, similar to fig 533, and 521	Spiral
233	Ecuador	site unknown	Chorrera		1	Lathrap et al. 1980:106, Fig 531	five human stick figures, full body, arms outstretched, no facial or other details.	anthromorph
234	Ecuador	site unknown	Machalilla		1	Lathrap et al. 1980:106, Fig 533	end of spirals same as fig 521 and fig 530	Spiral

235	Ecuador	Zozote, Manabi	Chorrera		1	Lathrap et al. 1980:106, Fig 534	squares, or alligator skin?	grid, reptile
236	Ecuador	Loma Alta	Machalilla		1	Lathrap et al. 1980:106, Fig 536	central punctations in a double line (like a train track) and wavy lines paralleling	Zigzag
237	Ecuador	Chacras, Manabi	Chorrera		1	Lathrap et al. 1980:106, Fig 537	bird or a fish	Bird

APPENDIX B

IMAGES

Seal 1-3 Chiapa de Corzo



Seal 8



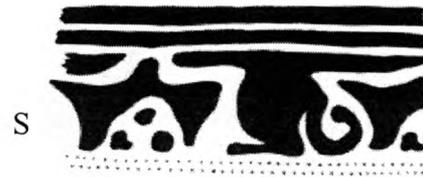
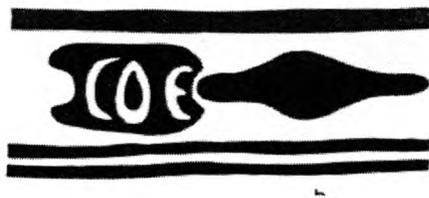
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Seal 4



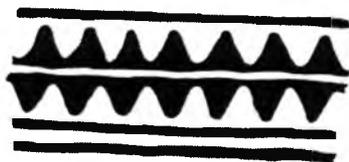
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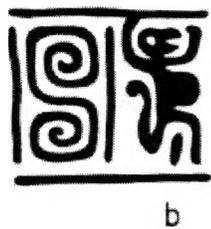


Seal 7



Seal 11

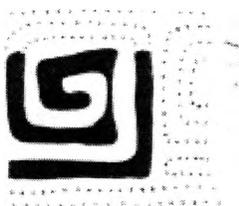
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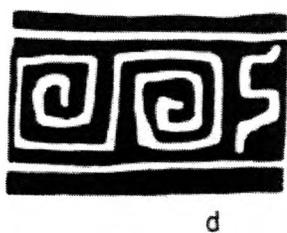
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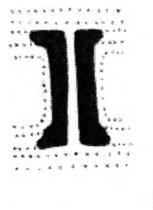
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Seal 14



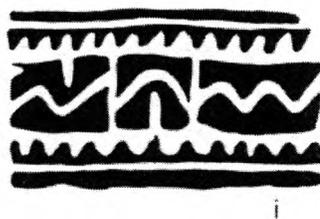
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Seal 15



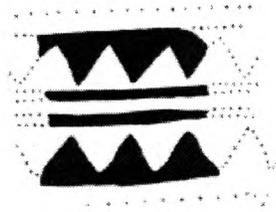
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Seal 20



Seal 21



Seal 22



Seal 23



Seal 24



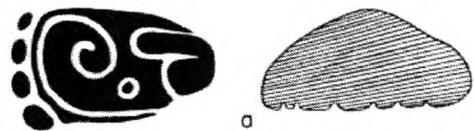
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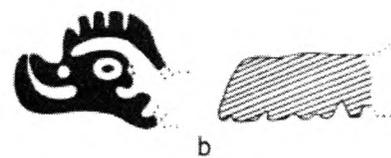
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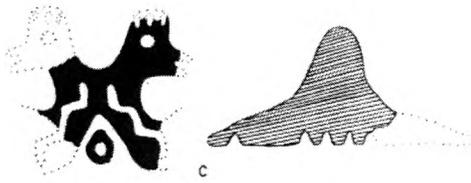
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Seal 28



Seal 29



Seal 34



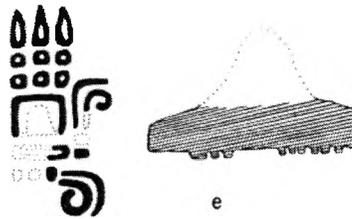
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Seal 35



Seal 31



Seal 32



Seal 33



Seal 36



Seal 37



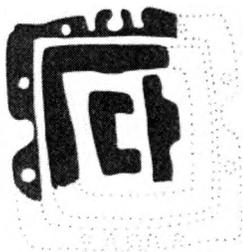
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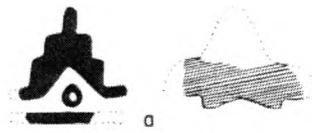
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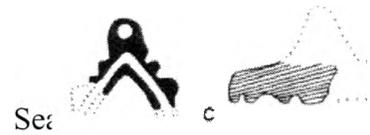
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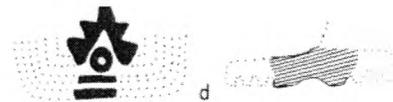
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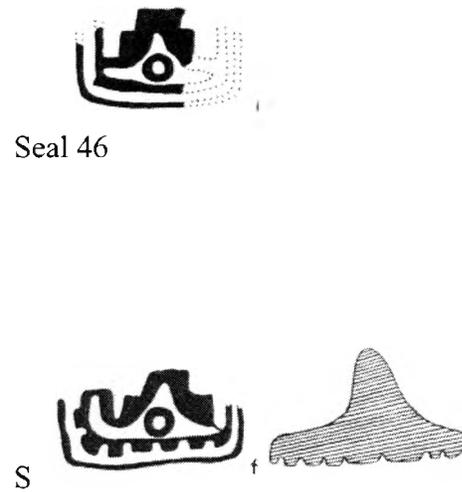
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Seal 45



Seal 46



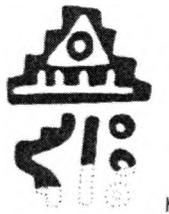
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Seal 54



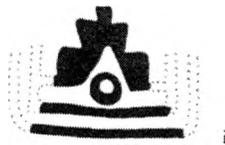
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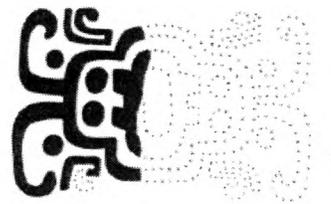
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Seal 50



Seal 56



Seal 51



Seal 57



Seal 52

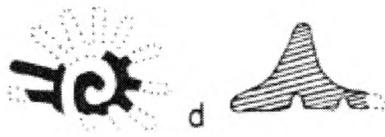


Seal 58

Seal 53



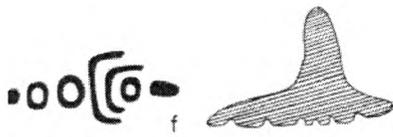
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Seal 64



Seal 60



Seal 65



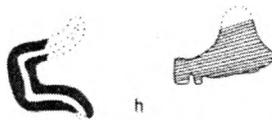
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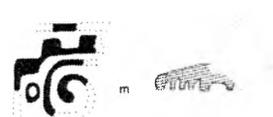
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Seal 62



Seal 67



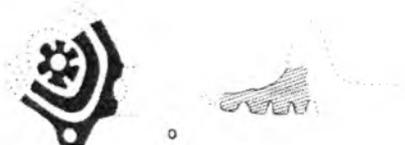
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Seal 63



Seal 69



Seal 70



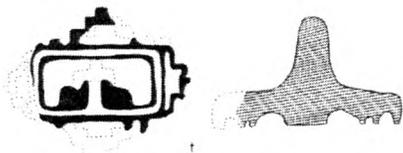
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Seal 72



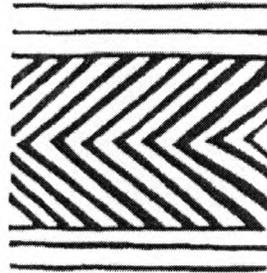
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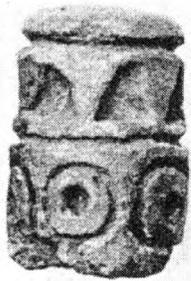
Seal 74- Kaminaljuyu



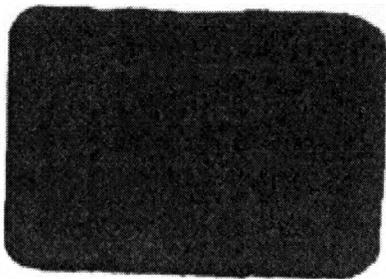
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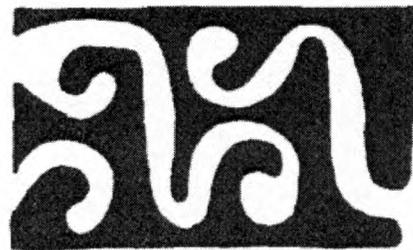
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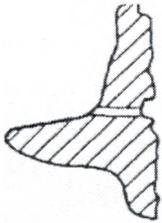
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Seal 78



Seal 79

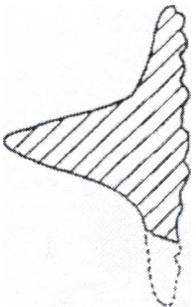


Seal 81



Seal 82

Seal 80



Seal 83



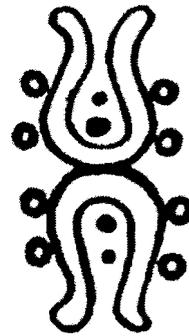
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Seal 84



Seal 87



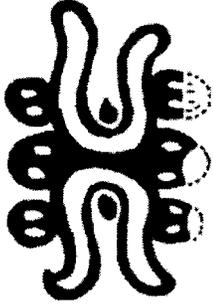
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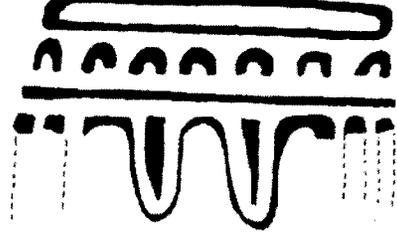
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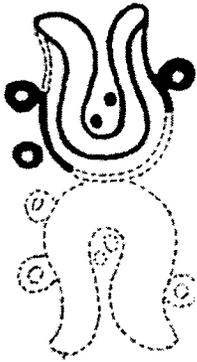
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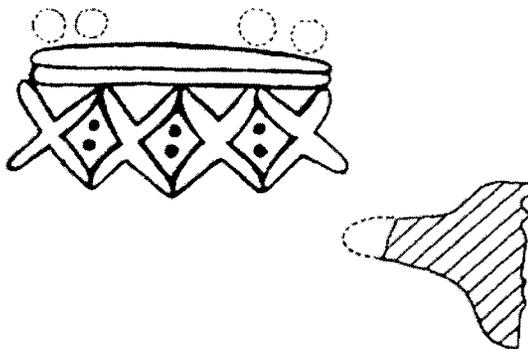
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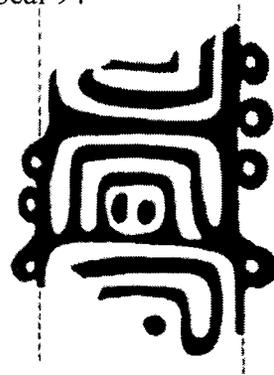
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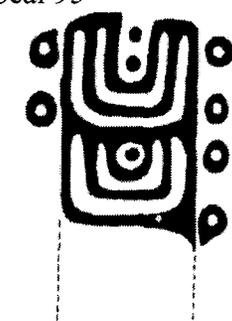
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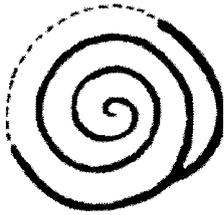
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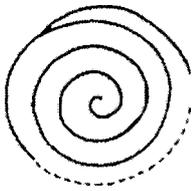
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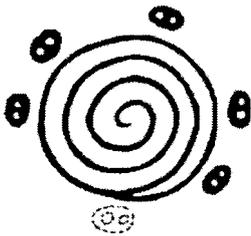
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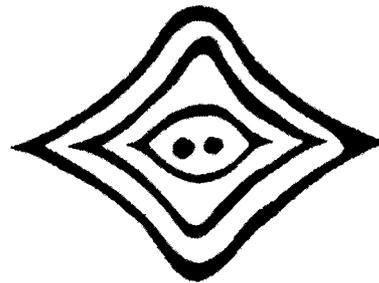
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Seal 98



Seal 102



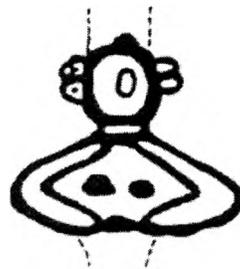
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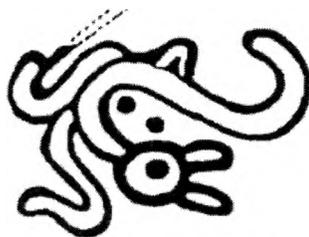
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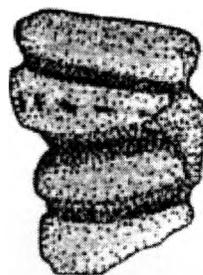
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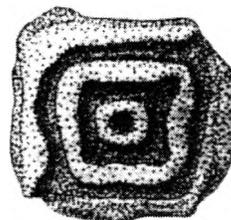
Seal 104



Seal 108 - Chalchuapa



Seal 109



Seal 105



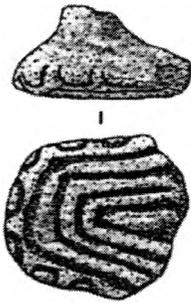
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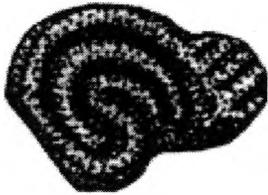
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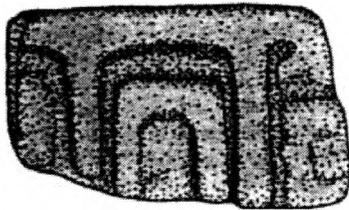
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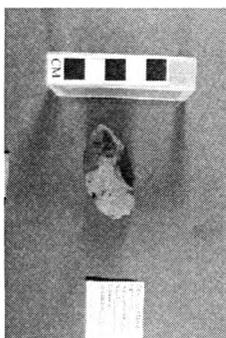
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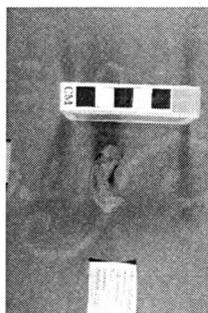
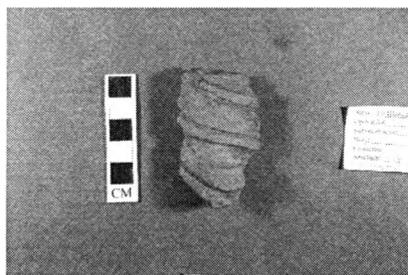
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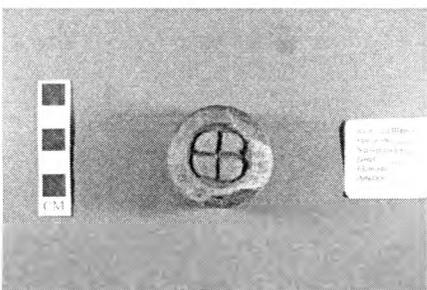
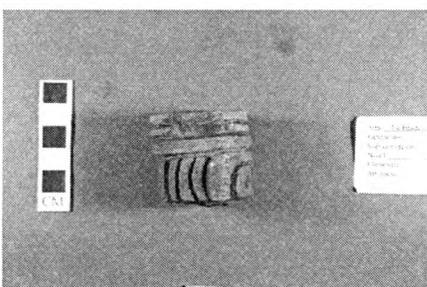
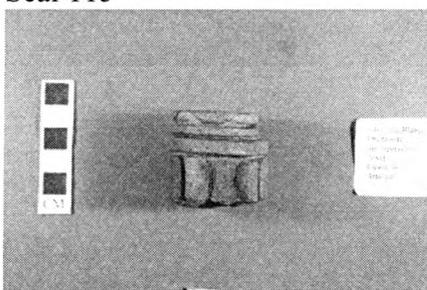
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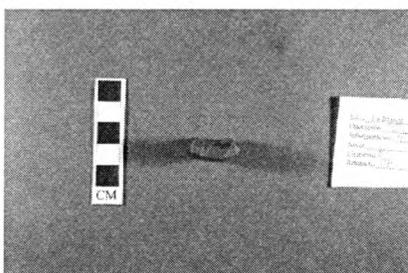
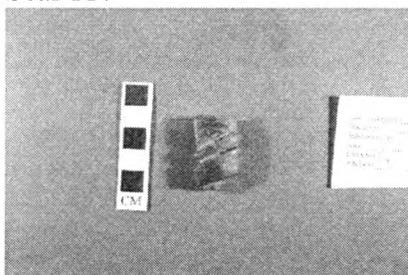
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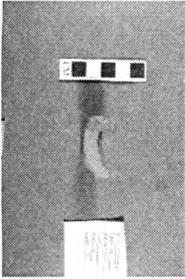
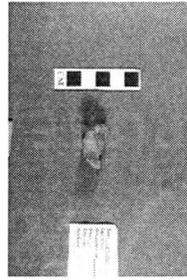
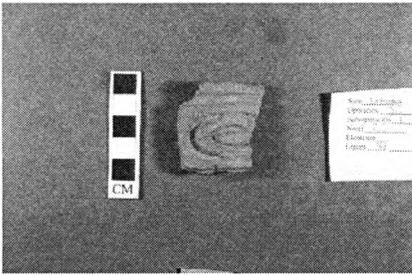
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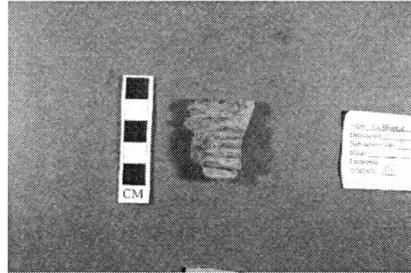
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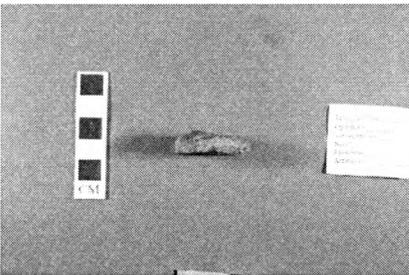
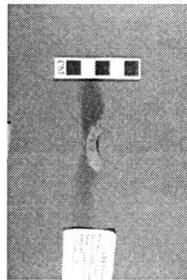
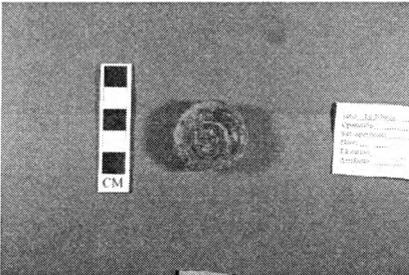
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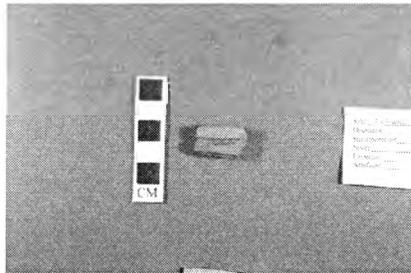
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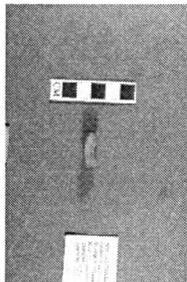
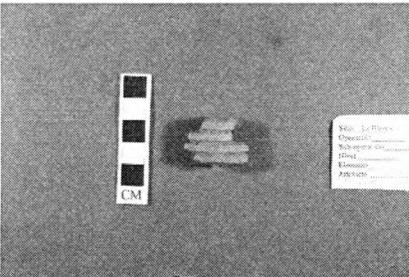
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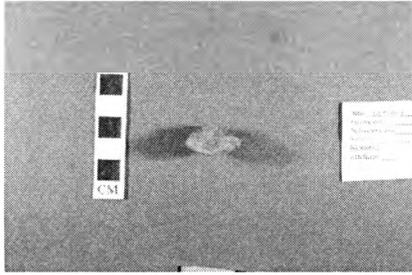
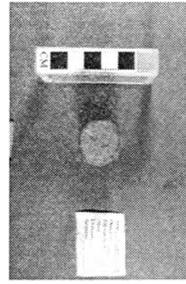
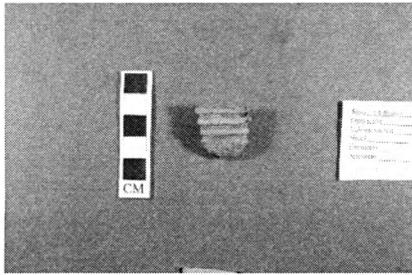
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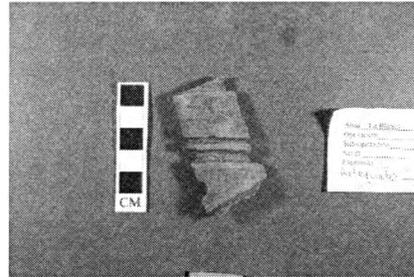
Seal 120



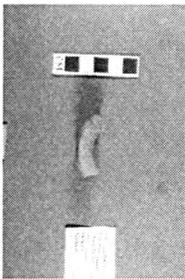
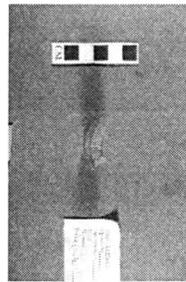
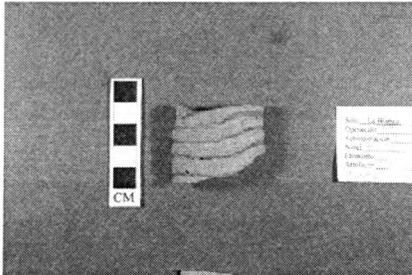
Seal 123



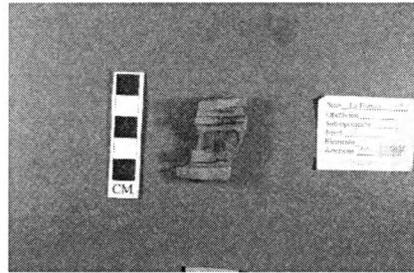
Seal 126



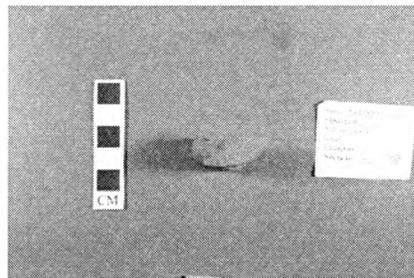
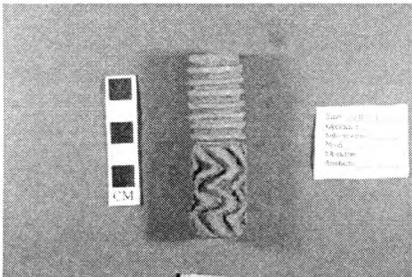
Seal 124



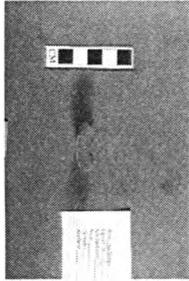
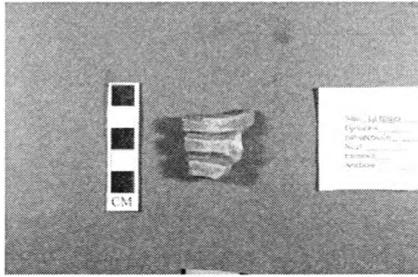
Seal 127



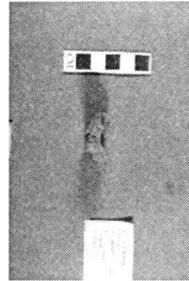
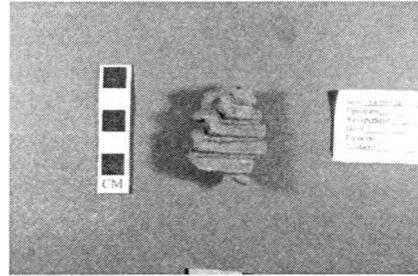
Seal 125



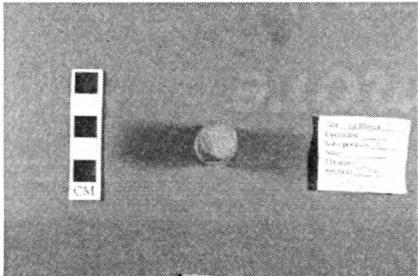
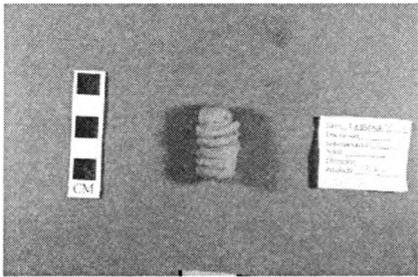
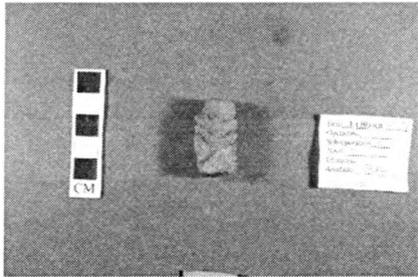
Seal 128



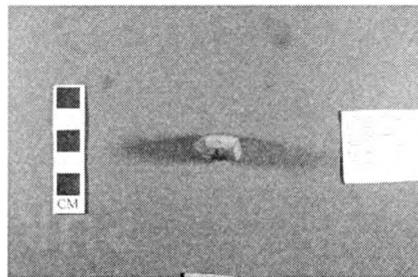
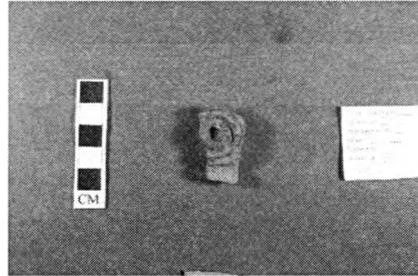
Seal 130



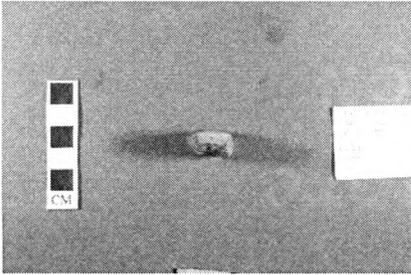
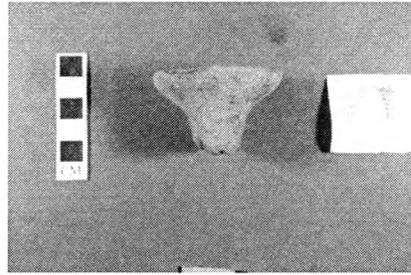
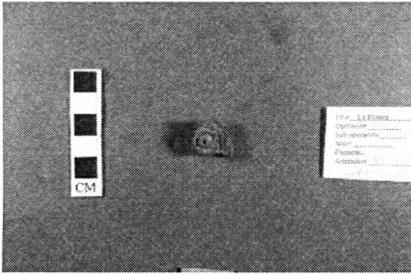
Seal 129



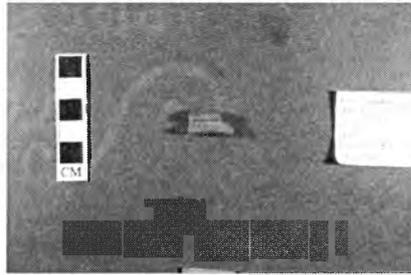
Seal 131



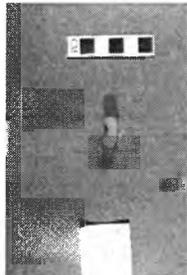
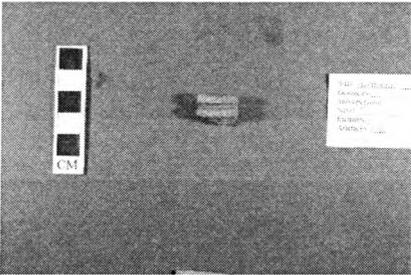
Seal 132



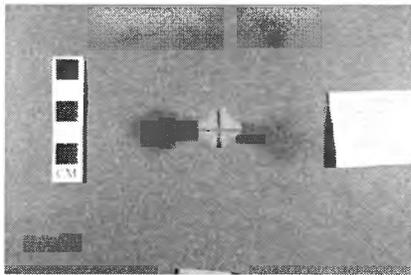
Seal 135



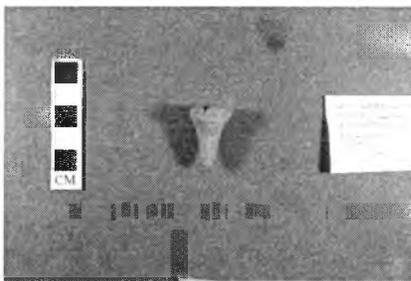
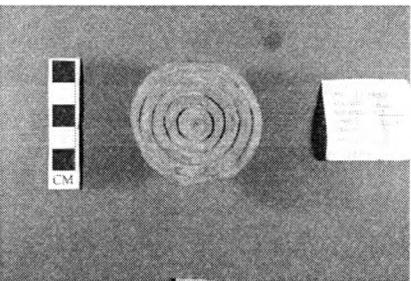
Seal 133



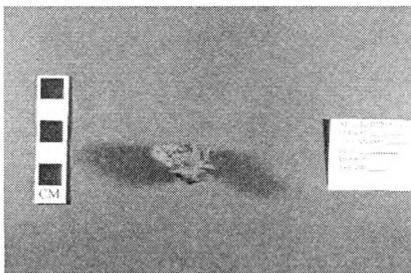
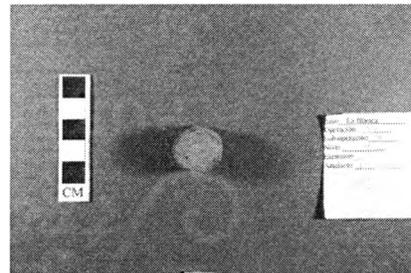
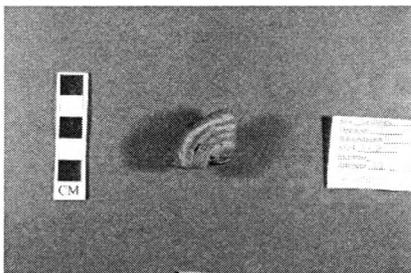
Seal 136



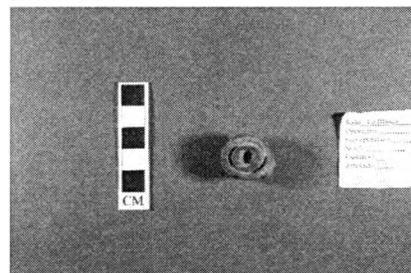
Seal 134



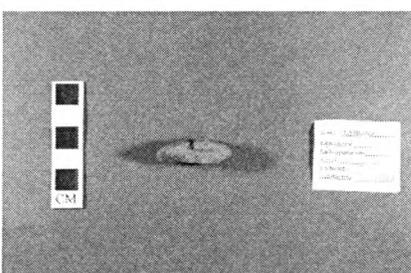
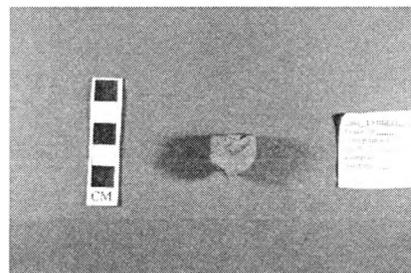
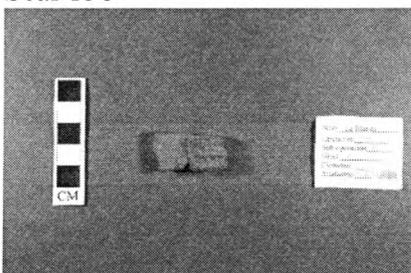
Seal 137



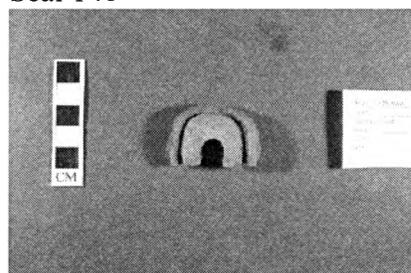
Seal 140



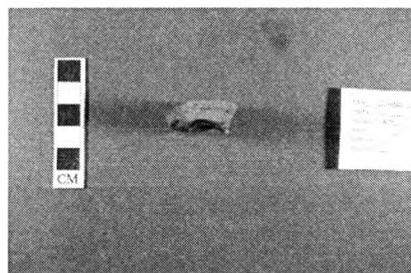
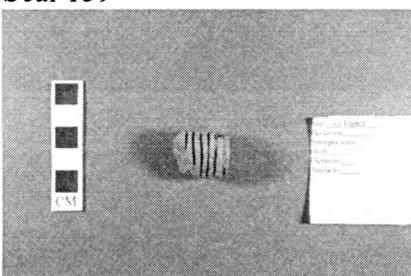
Seal 138



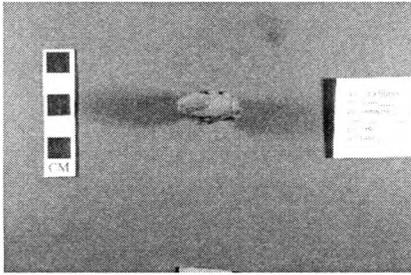
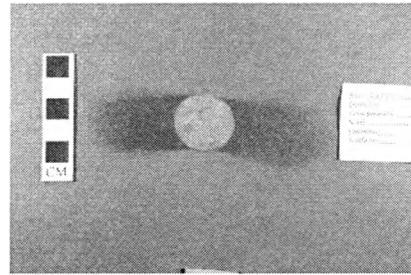
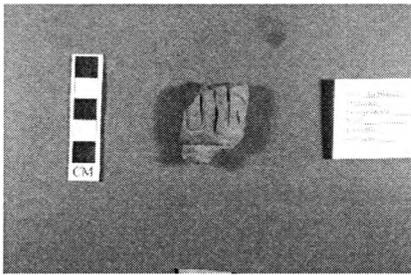
Seal 141



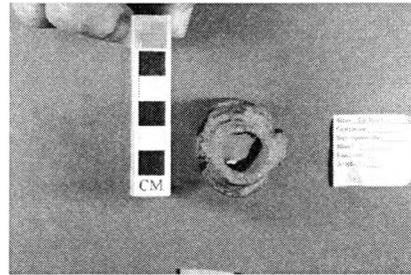
Seal 139



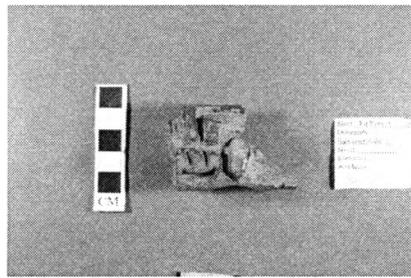
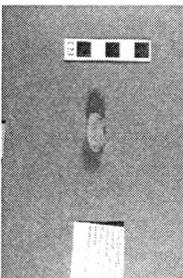
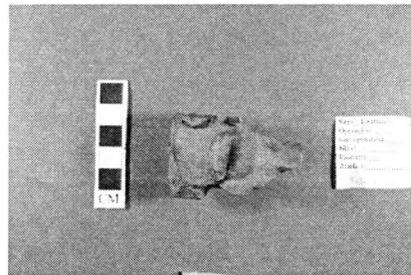
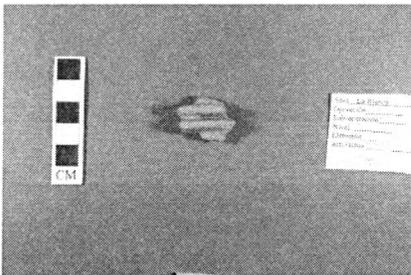
Seal 142



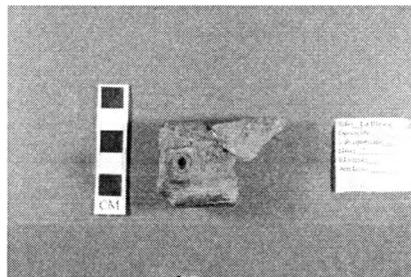
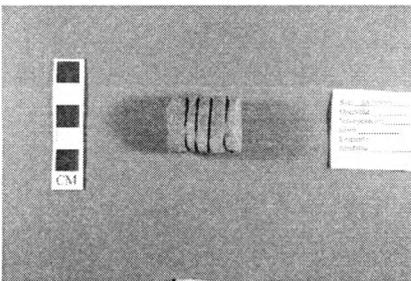
Seal 145



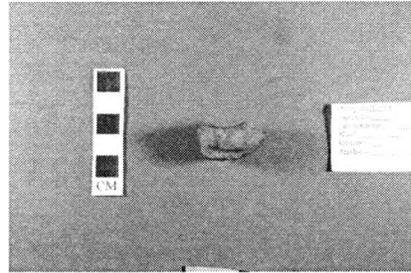
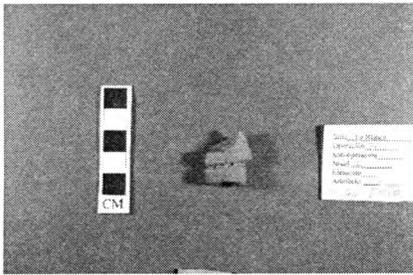
Seal 143



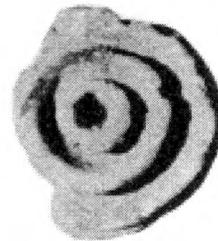
Seal 144



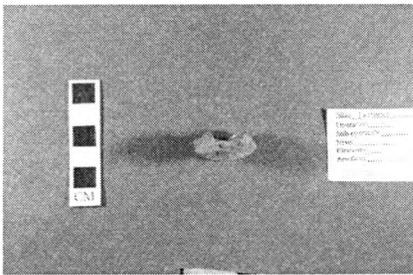
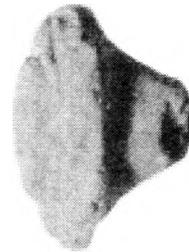
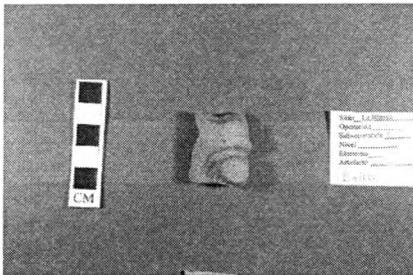
Seal 146



Seal 149- La Victoria



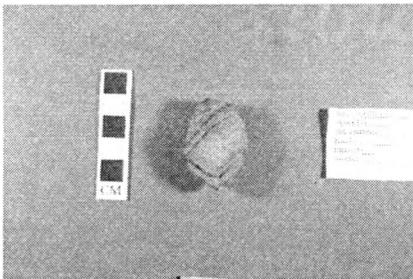
Seal 147



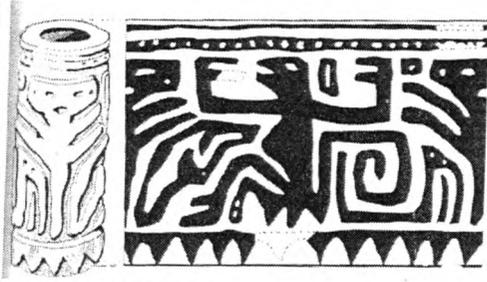
Seal 150



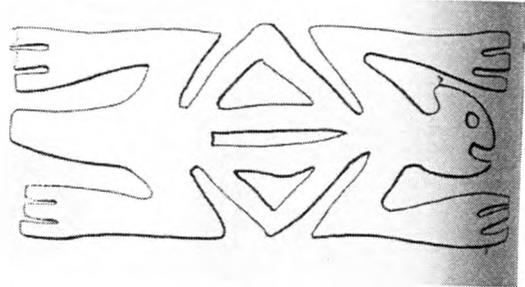
Seal 148



Seal 151- Alta Verapaz



Seal 154- Atlar de Sacrificios



Seal 152

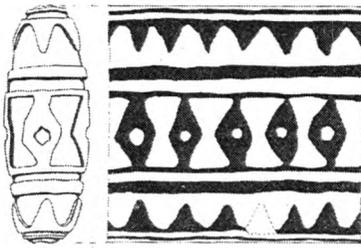
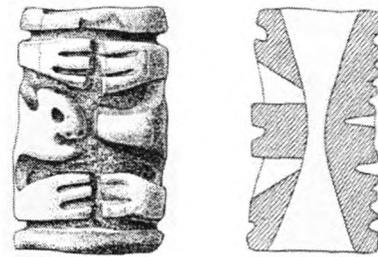
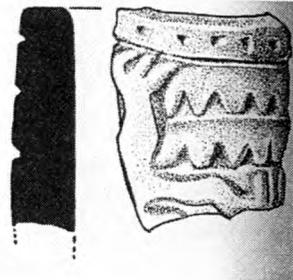


Fig. 2



Seal 155

Seal 153



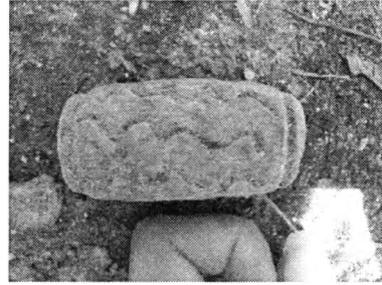
Seal 156- Barton Ramie



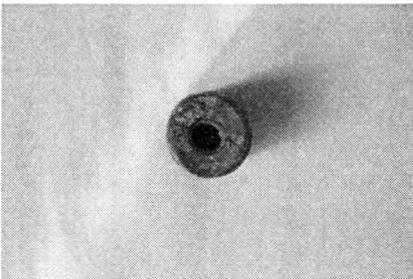
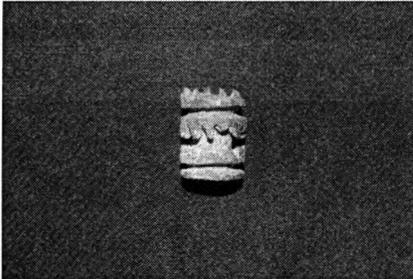
Seal 157 – Blackman Eddy



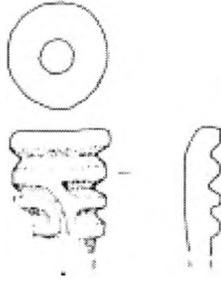
Seal 159 – Cahal Pech



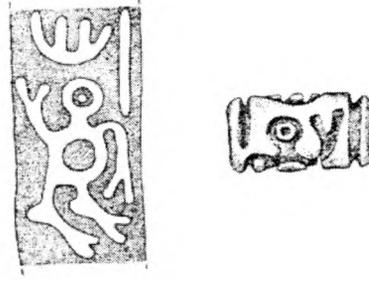
Seal 158



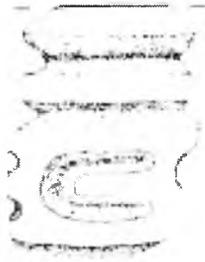
Seal 160 - Cuello



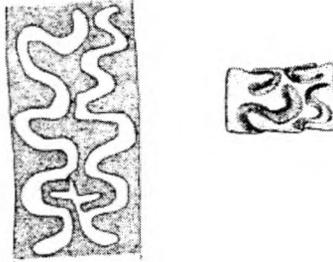
Seal 164



Seal 161



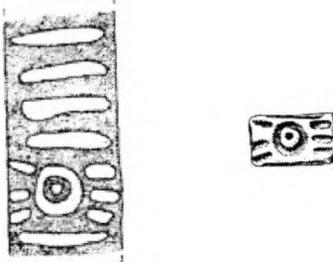
Seal 165



Seal 162



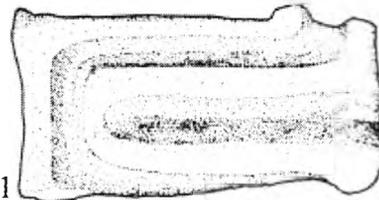
Seal 166



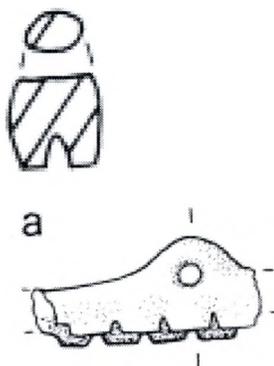
Seal 163



Seal 1



Seal 168



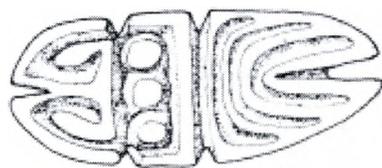
Seal 171 – Mirador



Seal 172



Seal 169



Seal 173



Seal 170 – Seibal



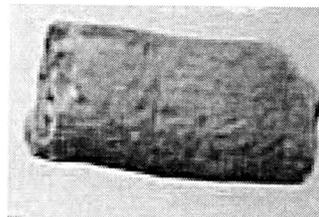
Seal 174



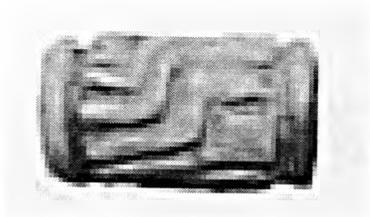
Seal 175



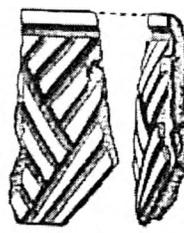
Seal 180



Seal 176



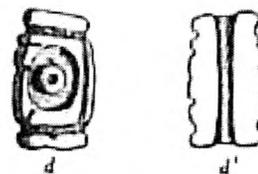
Seal 181 -Uaxactun



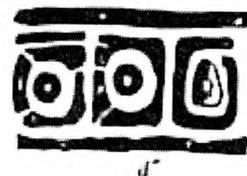
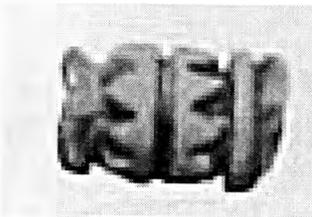
Seal 177



Seal 182

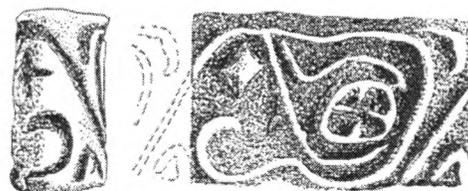
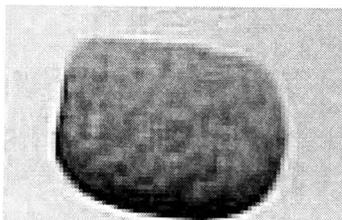


Seal 178



Seal 183

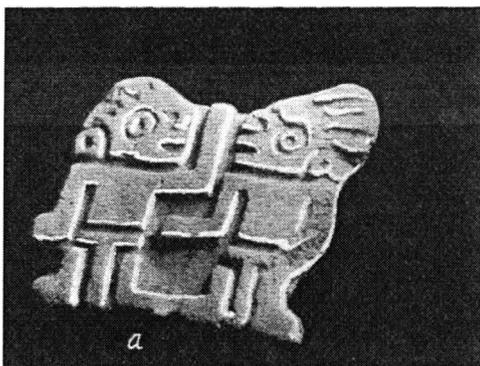
Seal 179



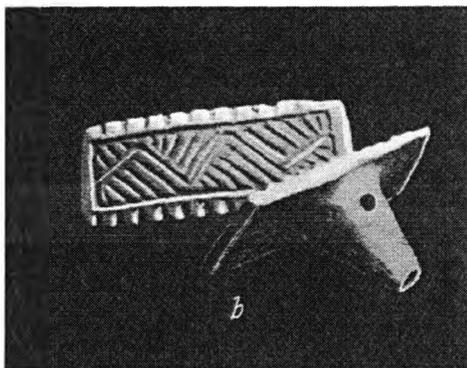
Seal 184



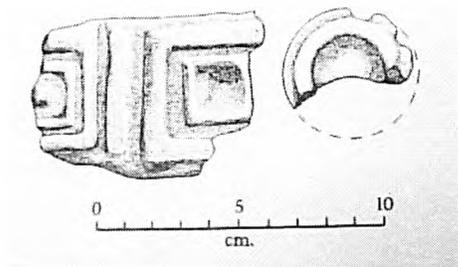
Seal 185



Seal 186



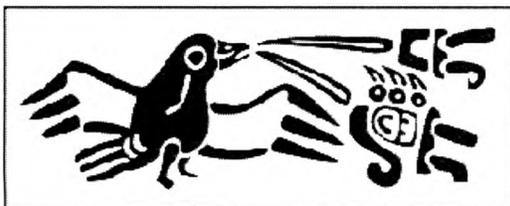
Seal 187 – San Lorenzo



Seal 191 – Tres Zapotes



Seal 188



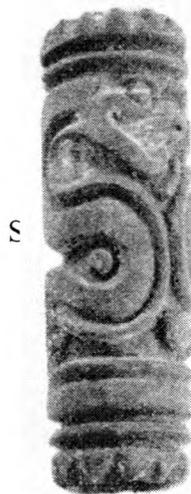
Seal 192



Seal 189- La Venta



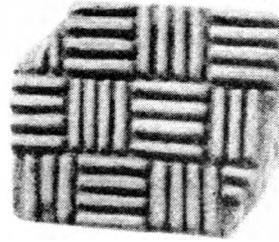
Seal 190



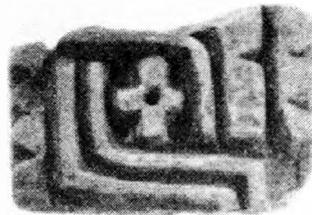
Seal 194



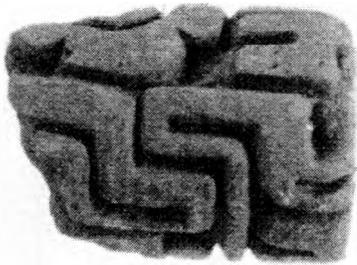
Seal 198



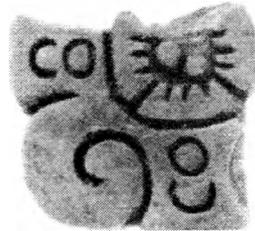
Seal 199



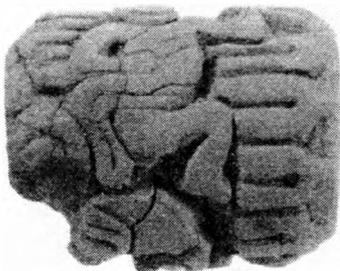
Seal 195



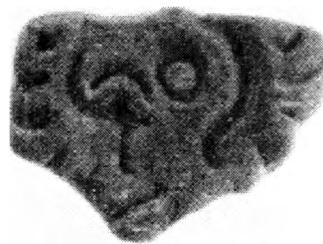
Seal 200



Seal 196



Seal 201



Seal 197



Seal 202



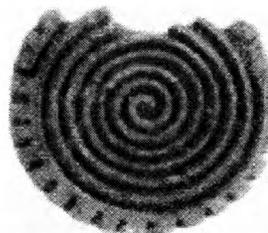
Seal 206



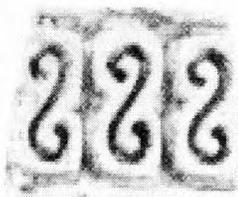
Seal 203



Seal 207



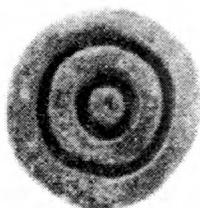
Seal 204



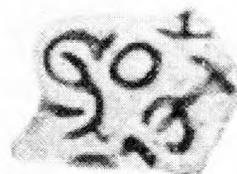
Seal 208



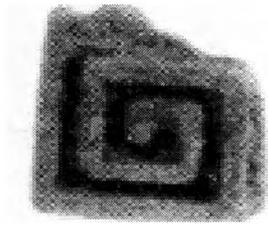
Seal 205



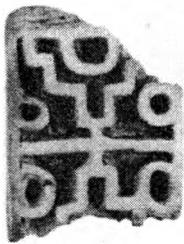
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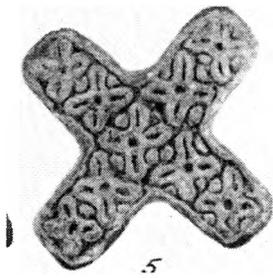
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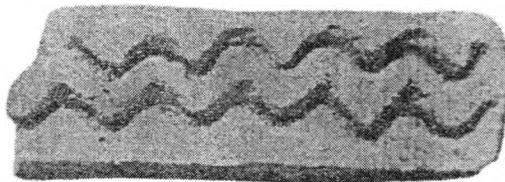
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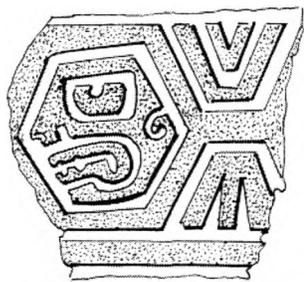
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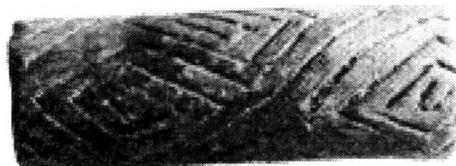
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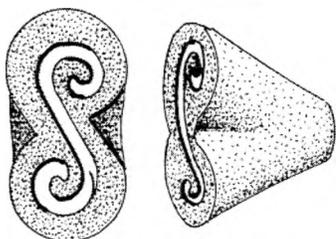
Seal 214 -Peru



Seal 218



Seal 215



Seal 219



Seal 216 & 217



Seal 220



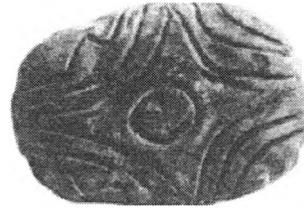
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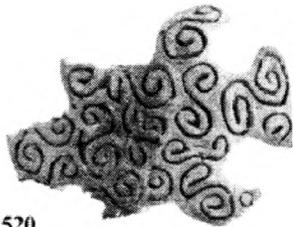
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Seal 226



Seal 223



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Seal 227



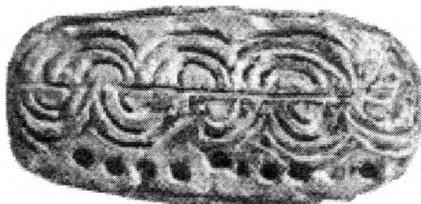
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Seal 228



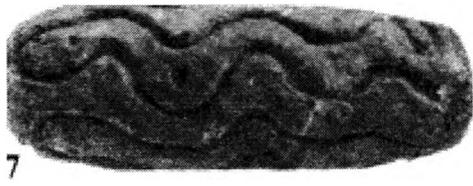
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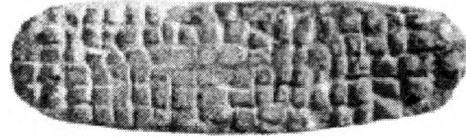
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Seal 230



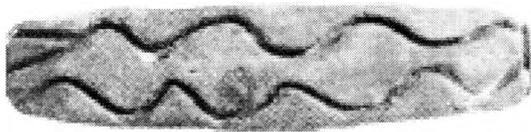
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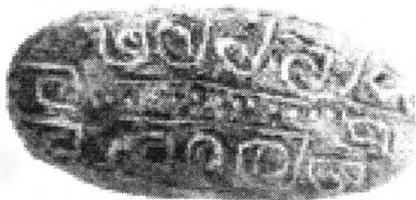
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Seal 231



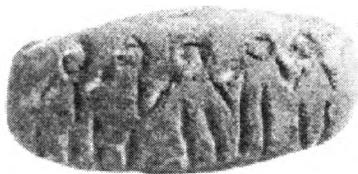
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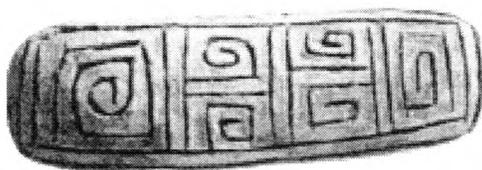
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Seal 233



Seal 234



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This thesis was typed by Suzanne Smith

