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## CONGENITAL DEFORMITIES AND THE OLMEC WERE-JAGUAR MOTIF

Carson N. Murdy

*Although previous studies of Olmec iconography have correctly recognized the importance of the jaguar element and its conceptual origins in the shaman-jaguar transformation complex of beliefs, they have not explained why the Olmec expression of feline features should be different from their expression in other prehistoric American art styles sharing origins in the same complex of beliefs, nor why the Olmec chose to express them in the form of an infant were-jaguar, often held in the arms of a seated adult male. It is here suggested that the majority of the attributes of the were-jaguar motif can best be explained by analogy with the congenital deformities manifested in and associated with multifactorial neural tube defects. The apparent fusion of the portrayal of these defects with the portrayal of feline elements suggests that the art style and religious beliefs were being manipulated for political reasons, which would be most likely in a chiefdom form of sociopolitical organization. Reasons for stylistic variation in the portrayal of the were-jaguar and its widespread distribution are discussed.*

Mesoamerican archaeologists have shown a continuing interest in the Pre-Hispanic art and culture of lowland southeastern Mexico ever since José Melgar (1869) initially reported the find of a colossal basalt head at Hueyapan near the Tuxtla Mountains in the state of Veracruz. Subsequent work in the Mexican Gulf Coast area has shown that the art style represented by this head had a strong conceptual unity and a relatively widespread distribution. In spite of the fact that later work has shown "Olmec" to be a misleading and somewhat inaccurate term for the culture actually represented, its referent is generally known to Mesoamericanists today, and, as Stirling (1968) has noted, present-day research in the area is largely motivated by the "impact of Olmec art." The present essay takes the position that a re-examination of the Olmec art style can shed new light on, and suggest a resolution of, the problem of Olmec sociopolitical organization. Accordingly, a close look will be taken at the were-jaguar motif, and a model for interpretation of its conceptual origins will be suggested. The evidence for the existence of the situation in Olmec society predicted by the model will be discussed and a hypothesis regarding its implications for the structure of Olmec society will be presented.

Saville (1900, 1929) was the first to note that the most common motif in Olmec art is an anthropomorphic figure, apparently that of a child, which shows feline facial features to a varying degree. In its extreme form this were-jaguar motif consists of a round babylike face, often with a

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Carson N. Murdy, Department of Anthropology, Pennsylvania State University, University Park, PA 16802

cleft forehead, characterized by an open mouth with fleshy lips turned down at the corners and canine teeth sometimes shown as protruding fangs. The eyes are usually almond-shaped and often have "flames" arising from the eyebrows. Where the face is accompanied by a body it is sometimes shown as human and sometimes as that of an anthropomorphized jaguar (Furst 1968:Figures 1-3). In its minimum expression this motif is characterized by the round infantile face and the downturned corners of a fleshy-lipped open mouth. In this case the body is usually quite obese, and in both forms the figures are sexless.

Until now the jaguar elements in this motif have received the most attention from scholars. Peter Furst (1968), in perhaps the most lucid treatment of the subject to date, has convincingly demonstrated that among the peoples of the New World tropics there exists a widespread belief that a supernatural jaguar is master of the forest and ancestor of certain social groups, as opposed to other neighboring groups, which Reichel-Dolmatoff (1972a:56-57) believes symbolizes exogamous marriage principles. It may be this belief that is represented in the statues of a jaguar copulating with a human female which have been found at Potrero Nuevo in the Olmec area (Stirling 1955:19, Plate 25) and at the sites of Ullumbe and La Parada near San Agustín, Colombia (Reichel-Dolmatoff 1972b:61, 74-75), although Davis (1978) has recently argued that the Olmec examples do not represent copulations. Such a supernatural union may produce, on the one hand, a race of infants combining the features of jaguars and men, as has been suggested for the Olmec (Stirling 1955; Coe 1962, 1965), and on the other hand, the ability of the offspring to transform alternately at will from the guise of jaguar to man, while at the same time being both in essence (Furst 1968:148). Furst summarizes his discussion by indicating that for the Olmec sculptors, as well as for other Pre-Hispanic Americans, the "feline characteristics become a kind of badge of office, the manifestation of the supernatural jaguar qualities inherent in priest or shaman" (1968:170), which is based on an "archaic substratum [of belief] which runs all through the Americas" (Furst 1972).

#### CONGENITAL DEFORMITIES AND THE WERE-JAGUAR MOTIF

Although the above discussion provides a plausible explanation of the presence of feline elements in the Olmec artistic canon, it falls short of explaining the particular form in which the Olmec artist expressed the concept: the infantile were-jaguar held in the arms of a seated adult male. It is here proposed that the various stylistic elements of the Olmec artistic canon can best be explained by analogy with the congenital deformities manifested in and associated with multifactorial neural-tube (brain and spinal cord) defects. The representation of pathological conditions as an explanation of the Olmec stylistic canon has been suggested previously and is quite reasonable given the propensity in prehistoric Mesoamerica for portraying a variety of conditions and diseases in figurines. These range from cranial deformations and births, including cesarean section (?), to possible phlegmonous infection (extensive carbuncles) of the face, and even the externally visible cancerous tumors of terminal metastatic carcinomatosis (Weisman 1965). Referring themselves specifically to Olmec art, Dávalos Hurtado and Ortiz de Zárate (1953) suggested that the figures represented showed symptoms of acromegaly (enlargement of bones and soft parts of hands, face, and feet), dwarfism, as perhaps caused by cretinism (with underdeveloped sex organs), or leprosy, which perhaps occurred with greater frequency in a certain sector of the population. However, their theory did not stimulate further research along these lines, presumably because of the number of disorders needed to explain the various stylistic elements, and because a study of a supposedly Olmec skeletal population from Cerro de las Mesas (Comas 1945) had failed to reveal any evidence of these defects. Parenthetically, it should be noted here that at most probably only two of the burials from Cerro de las Mesas could be dated to the Formative, the rest of the sample assuredly being Classic or Postclassic in date (cf. Drucker 1943). Thus, it was only some time later that Michael Coe, perhaps alluding to the theory to be supported here, suggested that the cleft heads of the were-jaguars were "perhaps representing some congenital abnormality like *spina bifida*" (Coe 1962:85).

*Spina bifida* is a disease entity which includes a number of developmental defects of the spinal

column in which there is a failure of fusion of vertebral arches or laminae, with or without protrusion and dysplasia of the spinal cord and its membranes. If a sac bulges from the affected area and contains meninges and a portion of the spinal nervous tissue it is called a *myelomeningocele*. Myelomeningocele is most commonly a failure of dorsal midline fusion in the sacro-lumbar region (Simpson 1976:700), although it may also affect other parts of the spinal column ventrally, dorsally, or laterally (Yamamoto 1970; Maciejewski 1972; Chovnik 1971; Vogal 1970; Das et al. 1976). The etiology of the condition, whether environmental or genetic, is still debated, although "studies by both epidemiologists and geneticists have shown that the rate of recurrence in the sibs of affected infants is much greater than the risk in the general population" (Holmes et al. 1976:365). As yet, no economic or environmental influence has been determined, nor does it appear to relate to birth order or maternal age (Cohen 1974). In their investigation, Holmes et al. (1976:366) determined that the majority of cases in their study were caused by multifactorial inheritance.

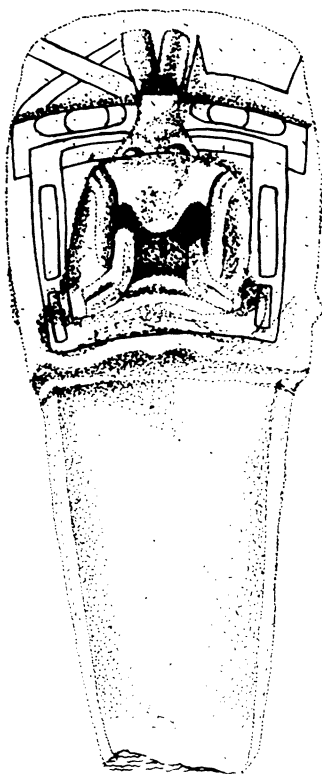
Of greater interest to the present discussion are the various cranial deformities associated with spina bifida, especially *encephaloceles* and *hydrocephalus*. Hydrocephalus, usually manifested as a general herniation (swelling) of the cranium, co-occurs frequently with myelomeningocele (about 77%); if the lesion is in the thoracic region, co-occurrence rises to 90%, if in the sacro-lumbar region, co-occurrence is about 50% (Cohen 1974:301-302). Encephaloceles are herniations of meninges or of brain and meninges, usually covered with skin, which are common in the occipital and frontal regions, where the herniation may be external or intranasal. Encephaloceles may occur with hydrocephalus where the latter has caused separation of the sutures (Shurtleff et al. 1975). They may also occur as a result of the median cleft face syndrome, *cranium bifidum*, which presents as a vertically split cranium. However, this condition may be due possibly to an autosomal dominant gene (De Meyer 1967). Encephaloceles occur in approximately 10% of myelomeningocele cases (Simpson 1976:700).

Myelomeningocele itself is second only to cerebral palsy as a cause of locomotor disability (Cohen 1974). Representative figures for its occurrence range from 0.95 cases per 1,000 live births in the United States (Smith 1965); figures from other countries vary slightly but generally range around 1 case per 1,000 live births for the human population as a whole. As mentioned above, the incidence within affected families is much higher than in the general population. Among these families approximately 7.8% have more than one affected child and, if not within his own family, an affected child has a 2.8% chance of having an affected close relative (Smith 1965). Among siblings within the families in their study, Holmes et al. (1976) found a recurrence rate of 1.7% and a precurrence rate of 5.2%. Other workers have found recurrence rates ranging from 2.8% (Cohen 1974:301) to around 5% (Golbus 1975).

The morbidity and mortality of the condition are high. Symptoms resulting from myelomeningocele relate directly to the location of the lesion and the co-occurrence of cranial deformities and can range from difficulty with urethral and rectal sphincter control to paraplegia with gross bony deformity. Perhaps the most serious aspect of the condition is that

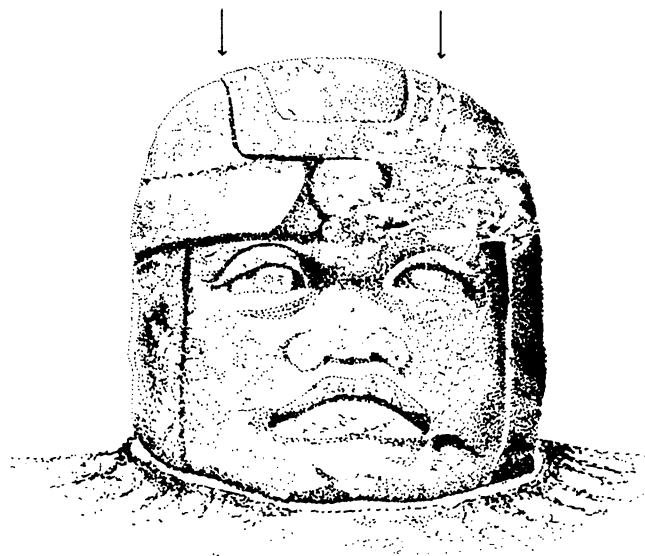
The distal spinal cord may be densely adherent to the overlying meningele and epidermal, both at the distal spinal canal and in the myelomeningocele sac itself. When the differential growth rates of the trunk and spinal cord are taken into account, this tethering may conceivably lead to traction on the spinal cord and loss of neural function with growth [Dunn 1975:19].

The observed close relationship among these various conditions has been analyzed by Gardner (1965, 1968), who has suggested a unifying hydrodynamic theory—that all neural-tube fusion failures may be explained by a single factor: the inadequate escape of cerebrospinal fluid at various stages of embryonic and fetal development. According to this theory an impermeable casing of the medulla and cerebellum early in fetal development results in persistent hydrocephalus, which decompresses through the central spinal canal which would normally become obliterated. Prenatally, the resultant formation of watery spaces within the spinal cord may rupture the neural-tube, producing the myelocele deformities. If this theory is valid, then the majority of the conditions described above can be thought of as different expressions of the same pathology.



**Figure 1. Basaltic votive axe from the Museo Nacional de Antropología, Mexico, showing the cleft forehead represented symbolically by a V-shaped element in the center above the eyes.**

As the configuration of neural-tube defects can probably be explained by the single unifying theory outlined above, so it is here suggested that the majority of the stylistic elements in the Olmec were-jaguar motif can likewise be explained as a unitary phenomenon, using multifactorial neural-tube defects as a model. Previously, the stylistic element in this motif most difficult of explanation has been the cleft forehead, either shown directly as in the monument from the San Martin Pajapan volcano (Bernal 1968:Figure 33a) and the votive axe from Tomb E at La Venta (Drucker 1952:Plate 56 left) or symbolically as in the votive axe now in the Museo Nacional de Antropología de México (Figure 1) and the colossal head from La Venta (Figure 2). Saville (1929) hypothesized that the cleft represented the blow in the head received by Tezcatlipoca from Quetzalcoatl in their mythological battle which transformed him into a jaguar. Furst (1967:42) has suggested that it represents the fontanel of the infant god, widely believed in the New World to be the seat of the soul. Coe has suggested that it may represent the longitudinal furrow formed by the loose folds of skin on the scalp of the adult male jaguar (Coe 1972:3). While it may represent mythologically all of these things, in keeping with the theme of this essay it is here suggested that the cleft forehead represents an encephalocele, perhaps caused by cranium bifidum or more probably by a multifactorial neural-tube defect. Other stone sculptures from the Olmec area which show a longitudinal protrusion on the head, such as Monument 5 ("La Abuelita") from La Venta and a stone figure from Mezcala, Guerrero (Bernal 1968:Figures 31, 82), may also be explained as representations of encephaloceles, here with emphasis placed on the herniations of meninges and brain tissue rather than the fusion failure of the metopic suture. A possible representation of both the suture separation and the herniation of meninges may be the face incised on one of the axes from Offering 2 at La Venta (Figure 3).

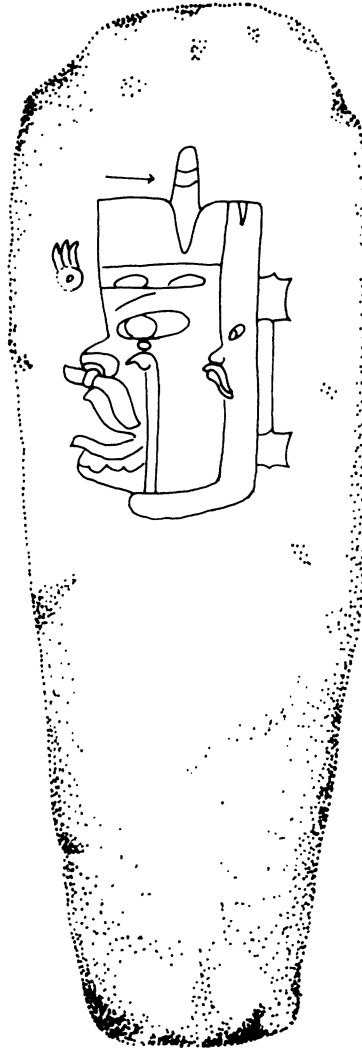


**Figure 2.** Colossal Head number 1 from La Venta, Tabasco, with a U-shaped element on the helmet (between the arrows) symbolically representing the cleft forehead (redrawn after Heizer [1976]).

The other stylistic element in the were-jaguar motif that begs for an explanation is that of the child held in the arms of a seated adult male, which has been interpreted as depicting the rain god (Joralemon 1971, 1976). This scene is most commonly found on the so-called "table-top" altars such as Monument 20 from San Lorenzo (Coe 1968a:Figure 3), Altars 2 (Wicke 1971:Figure 18) and 5 from La Venta (Figure 4), and perhaps the badly damaged Monolith 5 from Laguna de los Cerros (Medellín Zénil 1960), as well as in some portable sculptures such as that in the Museum of Primitive Art, New York (Weaver 1972:Plate 1a). In all of these representations the seated male is almost expressionless, while the child usually has very accentuated "Olmecoid" facial features on an oversized head and a corpulent body, either stiff or with the legs hanging limply. Certainly, this is not a madonna in the usual sense of the term. Again, this scene could be explained by reference to the manifestations of neural-tube defects. The fact that the head is disproportionately large even for a baby, as Coe (1973:11) has commented, could be due to a hydrocephalus; the limply hanging legs may be the result of the paraplegia or even death (cf. Bernal 1968:77), usually associated with myelomeningocele. The accentuated facial features of the child may represent pain, perhaps due to the urethral failure and subsequent infection often associated with myelomeningocele (Watt 1976:403). This pained expression may have reminded the Olmec of the jaguar's snarl which, coupled with the cleft forehead, was sufficient to complete the analogy and fusion of the two representations.

In the preceding paragraphs an attempt has been made to analyze several stylistic elements in the Olmec artistic canon, particularly with reference to the were-jaguar motif, using the various interrelated congenital deformities produced by multifactorial neural-tube defects as an explanatory model. This model has proven quite successful in providing an integrated explanation for seemingly quite disconnected stylistic elements: the cleft forehead and the crying infant held by a seated adult male. The obviously feline elements, such as the protruding fangs and even claws seen on some of the figurines, are probably best considered as a result of the fusion of the portrayal of neural-tube defects with that of the shaman-jaguar transformation complex of beliefs discussed earlier, which produced the unique, powerful Olmec art style.

Acceptance of this model to explain the were-jaguar motif necessitates a hypothetical reconstruction of how and why the motif may have been integrated into Olmec society and art.



**Figure 3. Incised votive axe from Offering 2, La Venta, Tabasco, showing a possible representation of a herniation of meninges (indicated by arrow) protruding from the cleft forehead.**

However, a word of caution must be made explicit here: the use of the present model to explain certain features of Olmec art does not mean to imply that any significant majority of the Olmec population was afflicted with congenital deformities, nor were neural-tube defects more common among the Olmec than the 1 case per 1,000 live births cited as the approximate average incidence in the human population as a whole. On the contrary, it is much more probable that the occurrence of these defects was generally restricted to a certain social group, perhaps to a single extended family in the society. Within this family it is conceivable that any cultural practices that increased their inbreeding frequency such as the brother-sister marriages of the Hawaiian chiefly lineage or the strict endogamy of the European Hapsburg royalty would increase the incidence and persistence over generations of such defects.

Contrary to normal expectations, the probable prepubescent death of such an affected child (cf. Shurtleff et al. 1975:64, 67; Cohen 1974:302-303) could serve to strengthen the faith of the populace in the leadership's supernatural connections if it were believed that the child were to



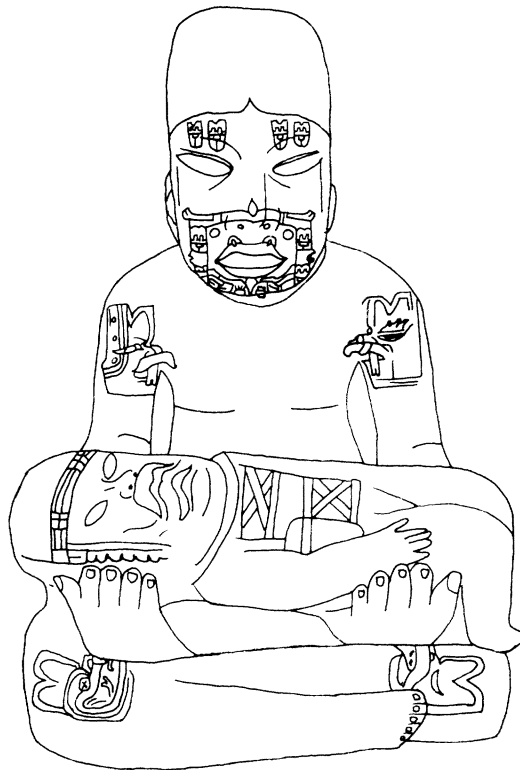
Figure 4. Altar 5 from La Venta, Tabasco, showing a seated adult male holding a child (redrawn after Stirling [1955]).

join his supernatural jaguar father. Thus, if such affected children were born in the ranking family, one would expect to find exceptionally high-status child burials in Olmec sites. That is, such burials would have been of higher status than any other burials in the sites, not just examples of child burials of higher status than some or most adults, as is commonly viewed as evidence of ascribed status and, hence, ranking (cf. Peebles and Kus 1977). Conversely, the finding of exceptionally high-status child burials who definitely did not have neural-tube defects would falsify the present hypothesis and the model of the were-jaguar motif upon which it is based.

Regrettably, data on Olmec burials are as fragmentary as the few bones themselves. To date, the only definite Olmec burials known from the Gulf Coast lowlands are those found in the basalt-columned Tomb A at La Venta, Tabasco.

Within this, heavily coated with red cinnabar (?) paint, were the remains of two bundle burials, each probably containing at least one individual. Little remained of the acid-leached bones save for a mass of splinters, stained a dark chocolate-brown color. They appeared to be remnants of long bones mainly, and gave the impression of small, light bones, probably of juveniles, as did the deciduous teeth found in Bundle 2. With each bundle were associated a number of small objects, for the most part of jade. Bundle 1 contained the following: 1 small seated figure of jade, representing a male; 1 flat conventionalized standing figurine; 1 pendant of jade in the form of an elongate clamshell; 2 matching rectangles of jade, perforated at the center, with engraved designs; 3 small D-shaped jade objects; 2 matching polished obsidian disks (eyes of a mask?); 1 elliptical polished hematite object (mirror?) with three perforations; 5 cylindrical jade beads; and a rectangular block of serpentine 23.5 cm. by 18.1 cm. by 7.9 cm. thick, squared and polished on the sides and one face. Bundle 2 contained: 1 small seated jade figurine, representing a female, with a polished hematite disk ornament on her breast; 1 conventionalized standing jade figurine; 2 matching hands of jade; 1 jade object shaped like a modern awl handle; 1 small disk with a central perforation and a scalloped edge; 1 small jade ornament representing a frog; 1 jade object representing a stingray tail, along with the remains of several real tail tips; 1 small heart-formed object of jade; 4 tubular jade beads and 1 shark tooth (Drucker 1952:23-26).

Although these were the only human bones found at La Venta, from the evidence of red cinnabar and arrangements of artifacts, particularly earspools, it can be inferred reasonably that Tomb C, Tomb D, and Tomb E were also high-status burials along the centerline (cf. Wedel in Drucker 1952:64, 68-73). Based upon the measurements of these caches or cists, if they did contain burials, Tomb C would have been of an adult and Tombs D and E of children; however, none



**Figure 5. The Las Limas figure from Veracruz. According to Coe (1973:5), the faces incised on the shoulders and knees, from left to right and top to bottom, probably represent Xipe Totec, the Fire God, Ehecatl and Quetzalcoatl, and the Death God, placed in visual and conceptual oppositions, with the child of the figure itself representing the Rain God.**

were as richly furnished as the two juveniles in Tomb A. Regarding these latter, I concur with Coe (1962:90) in suggesting that they were "monstrosities who to the Olmec may have resembled were-jaguars and thus merited such treatment."

#### THE WERE-JAGUAR MOTIF AND THE OLMEC CHIEFDOMS

Although either a chiefly lineage or a dynastic family could conceivably interpret and use the occurrence of congenital defects as a religious symbol of their distinct position in society, such beliefs and their function in society as represented in Olmec art are most indicative of a chiefdom level of sociopolitical organization. Recalling that the feline elements in the were-jaguar motif had status-validating functions in Olmec society as a kind of "badge of office" (Furst 1968; Coe 1972), and that since Olmec society was not tribal and egalitarian, they probably did not refer directly to the shaman-jaguar transformation belief complex (Coe 1972) in spite of this being part of their probable conceptual origin. Rather, it seems that among the Olmec the supernatural jaguar was in the process of being transformed into a complex religious pantheon (Joralemon 1971, 1976; Coe 1973), the were-jaguar child himself coming to represent the Rain God (Covarrubias 1942, 1946, see Figure 5). Following Service (1975:78, 102), such a process of elaborating previously existing shamanistic and mythological beliefs and elevating certain supernatural beings to the status of gods for status-validating purposes is just what would be expected of a newly emergent chiefdom. Netting (1972) has documented several ethnological examples of similar processes taking place in Africa, in which polities have become increasingly centralized by using or amplifying the ritual status and functions of the chiefs over and above those of kinship, focusing political and economic power in their hands.



The manner in which such a process of expansion and consolidation of their economic and political power was implemented by the Olmec chiefs through the manipulation of religious beliefs can be envisioned using the congenital neural-tube defects model of the were-jaguar motif discussed above. If an affected child (or children) were born to the leader of the newly emerged Olmec chiefdom, it would be to his definite advantage to identify the child's deformities with the characteristics of the supernatural jaguar and to offer the births to the populace as evidence that jaguar blood ran in the family, producing were-jaguar offspring. That such an event or events may have taken place is perhaps attested by the popularity of the scene of a man holding a were-jaguar child on the table top altars. While the colossal heads probably represent the chiefs themselves (cf. Stirling 1965:721), the tabletop altars may represent the supernatural connections of the chiefly lineages.

### CONCLUSION

The use of the neural-tube defects model as an explanation of the Olmec were-jaguar motif, and the chiefdoms it represents, may also lead to a clearer idea of why and how the Olmec style was so widespread in Mesoamerica. The early visual interpretation of a widespread shamanistic belief complex as a symbol of a precocious Gulf Coast chiefdom was probably readily accepted by the emerging elites of the highlands and elsewhere as a symbol of power easily understood by their social groups. The trading of ritually significant artifacts embodying the motif out of the Gulf Coast heartland over previously established routes, such as Coe's (1968b:102) postulated Jade Route, in exchange for scarce raw materials needed to maintain status differentiations in the lowlands would have facilitated this acceptance. As Flannery (1968) has argued for Oaxaca, the emerging elites of the highlands conceivably became quite acculturated to the lowland form of society, adapting as well marriage partners, customs, religious beliefs, and even language (cf. Campbell and Kaufman 1976) in what was essentially a mutually beneficial trade relationship for both lowland and highland elites. As the were-jaguar motif spread in time and space it was most likely reinterpreted according to the needs of each particular chiefdom both in the highlands and the lowlands through a syncretism of the original religious symbolism with local religious beliefs. The historical cycle of expansion and contraction typical of chiefdoms (Service 1975:79) would have aided in the rapid diffusion of varying versions of the were-jaguar motif, resulting in significant stylistic differences through time even in the Olmec heartland (Grove 1974:110). Thus, once the original meaning of the symbol was lost to the majority of its users, perhaps even in the heartland due to infrequent verification through births of were-jaguars, the constituent parts of the symbol were free to be recombined and elaborated into the complicated pantheons of later Mesoamerican religions.

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## **THE PRODUCTION STEP MEASURE: AN ORDINAL INDEX OF LABOR INPUT IN CERAMIC MANUFACTURE**

Gary M. Feinman, Steadman Upham, and Kent G. Lightfoot

*We present the production step measure, an ordinal scale index of the labor input in ceramic manufacture. The measure is used to compare the relative labor costs of producing different kinds of pottery vessels. It is then employed in an analysis of archaeological ceramic samples from the Late Postclassic Valley of Oaxaca and the Reserve phase in the Pine Lawn Valley, New Mexico.*

The quantity and frequency of ceramics in the archaeological record has allowed ar-

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Gary M. Feinman, Steadman Upham, and Kent G. Lightfoot, Department of Anthropology, Arizona State University, Tempe, AZ 85281