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A LINGUISTIC LOOK AT THE OLMECS

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TERRENCE KAUFMAN

This paper explores the hypothesis that the archaeological Olmecs, at least in part, were speakers of Mixe-Zoquean languages. The hypothesis is supported by not only geographical and temporal correlation, but by Mixe-Zoquean loan words in other Mesoamerican languages, many of which refer to things diagnostic of the Mesoamerican culture area. Also the cultural inventory revealed in Proto-Mixe-Zoquean vocabulary provides additional support.

A paper on Olmec linguistics might seem pretentious, since presumably the last Olmec died long before any linguistic records were made. However, the linguistic identification of the Olmecs is a recurring question in anthropological literature (cf., for examples, Jiménez-Moreno 1942; Coe 1968; Bernal 1969; Joesink-Mandeville 1972; Sharer 1974; and others). This interest, however, seems to have generated little more than poorly founded linguistic speculations, which would seem to justify a re-examination of the linguistic identification of the Olmecs. The purpose of this paper is to examine one particular hypothesis in depth, that the Olmecs, at least in part, were speakers of Mixe-Zoquean languages.

The geographical distribution of speakers of Mixe-Zoquean (henceforth MZ) languages corresponds closely to that of the Olmec archaeological sites (Fig. 1, map of Olmec-MZ area), suggesting as a hypothesis for further investigation that the archaeological Olmecs, at least in part, may have been speakers of Mixe-Zoquean languages. To our knowledge, this hypothesis was first presented by Terrence Kaufman (1969a, 1973, 1974), who argued that the glottochronological time depth of MZ of 3,500 years (around 1500 B.C.) correlates with the first glimmerings of Olmec civilization.

Although the geographical and temporal correlation of MZ languages with Olmec civilization leads to sympathy for the Olmec-MZ identification, the strongest support comes from purely linguistic considerations. We will consider first MZ words borrowed into other Mesoamerican languages, followed by implica-

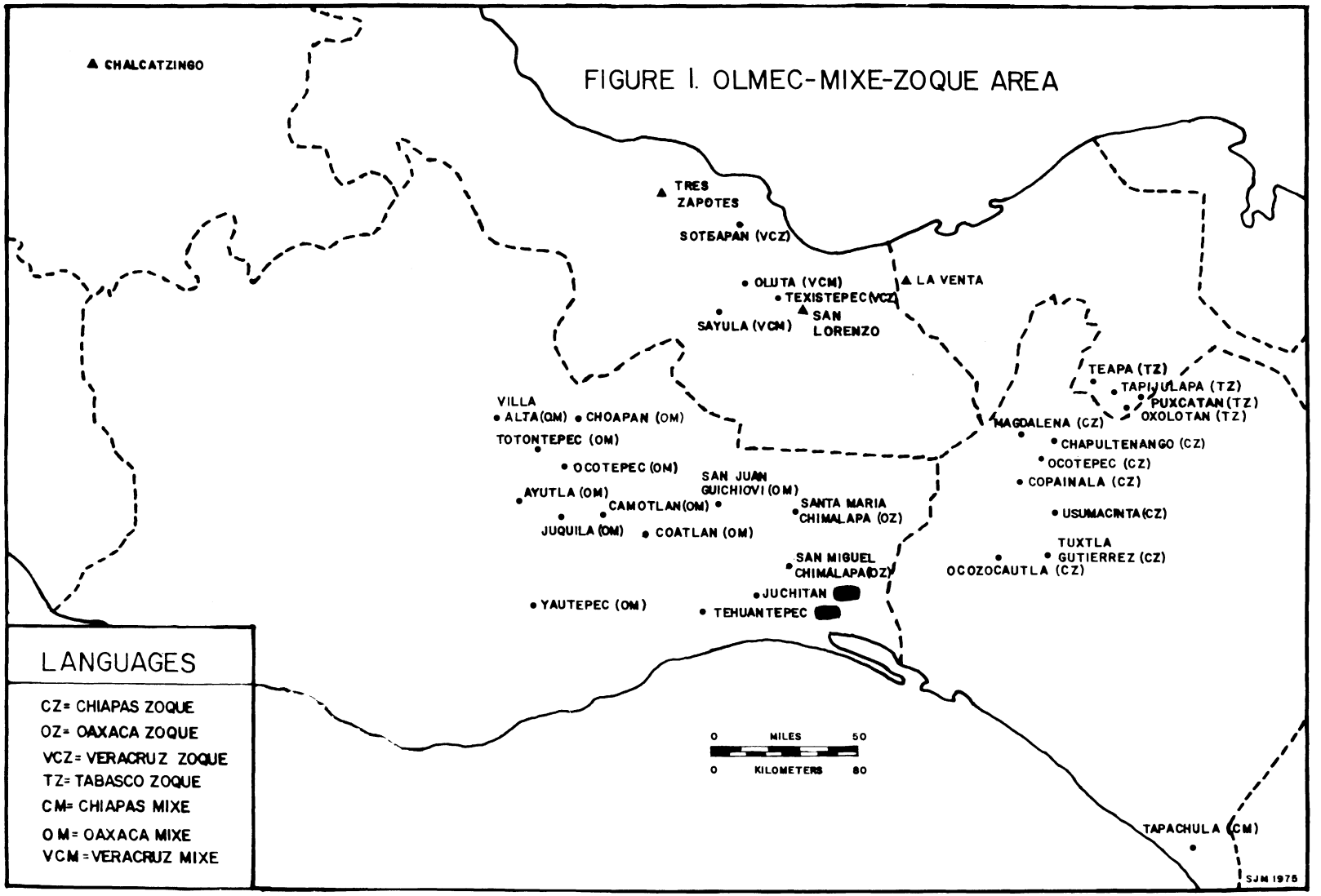

Fig. 1. Olmec-Mixe-Zoque Area.

tions of the reconstructed Proto-Mixe-Zoquean (PMZ) lexical items for this hypothesis.

The Olmecs greatly influenced contemporary groups and later cultures, and some would claim that all the succeeding Mayan and Mexican cultures have their roots in Olmec civilization. The loan words from MZ into other Mesoamerican languages seem to reflect this extensive Olmec influence. Many of the loans refer to things which are diagnostic of the Mesoamerican culture area (cf. Kirchhoff 1943). If a culture must have such items to qualify as Mesoamerican and the terms for the items are borrowed from MZ, then it would seem reasonable to assume that speakers of the MZ languages possessed the uniquely Mesoamerican things early enough and had prestige enough that others borrowed from them. If MZ had the items and others lacked them, it would seem reasonable to equate MZ with a culture known to have had them at the appropriate time, namely Olmec. Like diffused aspects of Olmec material culture, many MZ loans extend into geographically very remote languages, never known to have had a common frontier with MZ (e.g., Xinca, Lenca, Jicaque, Paya, etc.). Below we present the loan word evidence, but first some comments about sources of our information, the MZ languages, and the identification of loan words are in order.

The sources of our linguistic data are: *PMZ* (Kaufman 1963), *Mayan languages* (our own field notes, Kaufman 1964a, 1969b, Campbell n.d.a), *Nahua* (Molina 1571), *Totonac* (Aschman 1962, 1973; Reid and Bishop 1974), *Xinca* (Kaufman and Campbell n.d.), *Lenca* (Campbell n.d.b; Lehmann 1920), *Jicaque* (Campbell field notes), *Paya* (Dennis Holt field notes), *Cacaopera* (Campbell 1975; Lehmann 1920), *Matagalpa* (Lehmann 1920), *Miskito* (Lehman 1920), *Sumu* (Lehmann 1920), *Otomanguean languages* (Rensch 1966; Pickett 1965, Lehmann 1920; Fernández de Miranda 1961; Pride and Pride 1970; Dyk and Stoudt 1965), *Chontal* (*Tequistlatec*) (Turner 1971), *Huave* (Warkentin and Warkentin 1952).

Some of these loans have been identified in different contexts in our previous publications (cf. Campbell 1972, 1975, n.d.a, n.d.b; Kaufman 1969a, 1970, 1973, 1974, etc.).

Finally, it is important to point out that the very limited amount of available material on Zoquean languages has allowed us to reconstruct only a limited PMZ vocabulary (about 450 items). We are relatively certain that as more Zoquean material becomes available we will be able to expand the number of PMZ lexical items. Therefore, items we list as Proto-Mixean (PMi) which are based on the Mixean languages may actually reflect PMZ items for which we as yet lack Zoquean information.

THE MIXE-ZOQUEAN LANGUAGES

Languages of the MZ family are spoken in the southern Mexican states of Oaxaca, Chiapas, Veracruz, and Tabasco. There are two main branches, the Mixe branch and the Zoque branch. There are three main groups in the Zoque branch. *Chiapas Zoque* (CZ) has subtypes: Central Zoque (including Copainalá), Northern Zoque (including Magdalena), Northeastern Zoque (including Chapultenango and Ocotepec), and Southern Zoque (including Tuxtla Gutiérrez and Ocozocuautla). Similarly, *Veracruz Zoque* (VZ) has subtypes: Sierra Popoluca (including Soteapan and about 25 other villages), and Texistepec Popoluca (spoken in Texistepec). Finally, *Oaxaca Zoque* (OZ) is the third main group (spoken in San Miguel Chimalapa and Santa María Chimalapa). There is also *Tabasco Zoque*, apparently a divergent dialect, but we have no information on the language.

There are also three main groups in the Mixe branch. *Veracruz Mixe* (VM) has the two subtypes of Sayula Popoluca (spoken in Sayula), and Oluta Popoluca (spoken in Oluta). *Oaxaca Mixe* (OM) also has two subtypes, one with conservative vocalism (districts of Yautepec, Tehuantepec, and Juchitan, including such towns as Juquila, Camotlán, Coatlán, and San Juan Guichicovi), the other with innovative vocalism (districts of Villalta and Choapam, including such towns as Totontepec and Ayutla). Finally, the third Mixe group is *Chiapas Mixe* (CM) or *Tapachultec* (spoken only in Tapachula, probably now extinct). (Cf. Kaufman 1964b.) (The asterisk we employ is standard linguistic notation to indicate items of the proto language which are not attested but reconstructed using the comparative method.)

LOAN WORD CRITERIA

Questions about how one determines loan words and their direction need to be antici-

pated. Our criteria for determining loans and the direction of their borrowing are rather standard and well known in the linguistic literature.

Etymology (or Morphological Complexity)

The morphological composition of loan words can give an indication of the direction of borrowing. Typically in cases of borrowing (barring unforeseen folk etymologies) the donor language is the one in which the item in question can have an etymology which is morphologically complex while the receiving language does not. For example, English *aardvark* is seen to come from Afrikaans *aardvark*, literally "earth-pig," since the Afrikaans form has a morphologically complex etymology while the English form is monomorphemic. Similarly, PZo **nas-o?na?* 'fog' (literally "earth-cloud") with its morphologically complex etymology is seen to be the source from which Tojolabal, Chuj, Jacaltec, Kanjobal, and Motozintlec borrowed their forms *?asun, ?ason, ?aso:n* 'cloud'.

Geographical and Ecological Clues

The geographical and ecological remoteness of *gnu, impala, aardvark, cola*, etc., make them likely candidates for loan words, and indeed these were borrowed when English speakers entered areas where they are found. Similarly, since *cacao* did not grow in the Uto-Aztecan homeland (somewhere, one supposes, in northwestern Mexico or the southwestern United States), Nahua *kakawa-* 'cacao' is likely to be a loan (it is from PMZ **kakawa*). Although inferences from geography and ecology are often weak, the fact that cacao is thought to have been domesticated in the very area where the MZ languages are spoken strengthens the inference in this case.

Cognates

When a suspected loan occurs in many of the languages of one family with regular sound correspondences so that it is reconstructable in the proto language, but occurs only in one language (or a few languages) of another family, then the source is one of the languages which has cognates in its sister languages. For example, Proto-Mixean (PMi) **ɸi?wa* 'squash' has cognates in the Mixean languages and is reconstructable in the proto-language, but Huastec *ɸiw* 'squash' has no cognate in other Mayan languages, so that PMi is the source (donor) and Huastec the borrower (receiver).

Semantic Domains

A weaker kind of inference comes from the semantic domain of a suspected loan. For example, in English things like *squaw, papoose, wigwam, tomahawk, wampum*, etc., with synonyms involving "Indian," i.e., "Indian woman," "Indian baby," etc., suggest borrowing from Indian languages. Similarly in Xinca most terms for cultigens can be shown to be borrowed from Mayan or MZ languages, so that any other term belonging to this semantic domain can be suspected of being borrowed, and possible sources sought. However, this is a heuristic device and not a proof.

Phonology

The strongest inferences are possible using phonological criteria. Words that violate typical canonical forms (or morpheme structure) are highly likely to be loans. English, for example, typically lacks initial clusters such as *šm, šn, šl* (some speakers are incapable of pronouncing these), so that words like *schmaltz, shnook*, and *schlemiel* are nearly obvious loan words. Proto-Mayan typically had monosyllabic roots (with very few disyllabic forms), and most roots in modern Mayan languages are monosyllabic, so that most polysyllabic forms can be suspected of being loans or morphologically complex. So *tunuk'/tuluk'* 'turkey' in Tzeltal, Tzotzil, Chuj, Jacaltec, and Motozintlec is a probable loan, and comparison to PZo **tu?nuk* 'turkey' proves it to be so. Also *(š)ko:ya:?* 'tomato' in Cakchiquel, Tzutujil, Mam, Aguacatec, and Chol is from PMZ **koya*. For another kind of example, Proto-Uto-Aztecan **p-* was lost initially in Nahua words, so any word containing an initial *p-* in Nahua is likely to be borrowed. Nahua *petla-* 'woven mat' (petate) has the aberrant *p-*; it is from PMZ **pata*.

Obviously the best cases for identifying loans and the direction of their borrowing are those in which a number of these criteria converge to leave little doubt. The Nahua case of "woven mat" is a good example. Nahua *pet(l)a-* has no cognates in other Uto-Aztecan languages (though some have borrowed this term from Nahua quite late); there are cognates in MZ. Furthermore, it has the unexpected

initial *p-* in Nahua. Another good example is *(š)ko:ya:ʔ* 'tomato' in a few Mayan languages, which lacks cognates in the rest of the family. It also violates the typical monosyllabic root structure of Mayan languages.

We have employed these criteria in considering the loan words presented in this paper.

LOAN WORDS

Now we turn attention to the MZ loans found in other Mesoamerican languages.

Borrowed Cultigens

(1) Cacao: PMZ **kakawa*–pan-Mayan *kakaw* (Chol *kəkəw*, Tzotzil *kokow*) (violates typical Mayan monosyllabic canonical form); Nahua *kakawa-* (lacks cognates in other Uto-Aztecan languages, not found in the Uto-Aztecan homeland); Totonac *kakaw*; Jicaque *k^{h}aw*; Paya *kaku*; Huave *kakaw*; Lenca *kaw*; Tarascan *kahékua*; etc.

(2) Gourd: PMZ **ɸima*–pan-Mayan *ɸima* (not the expected monosyllabic form, sometimes accented on the first syllable); Jicaque *sem*; etc.

(3) Squash (ayote): PMi **ɸiʔwa*–Huastec *ɸiw* (lacks cognates in other Mayan languages); Salvadorean Lenca *ɸ'iwan*; Xinca *ɬiʔwa* (perhaps); Tequistlatec (Chontal of Oaxaca) *-eɸwa* (a kind of squash, Calabaza de vichi); Ixcatec *ču*^{2}; Chortí *č'iwan* chayote (huisquil).

(4) Squash, Gourd (calabaza): Oaxaca Zoque *ʔawa*–Tequistlatec *-ʔawa*; perhaps also Miskito *iwa*, Honduran Lenca *ewa*, Matagalpa *iwa*, and Cacaopera *iwa*. Compare also Xinca *ɬiʔwa* 'squash' and Chontal *-lewáʔ* 'gourd'. We feel that probably Paya *teʔwa* 'chile pepper' is related also, since one species of squash has chile in its name, e.g., Ixcatec *ču*^{2}*-hña*^{1} (literally *ču*^{2} 'squash' and *-hña*^{1} 'chile pepper').

(5) Tomato: PMZ **koya*–Chol *koyaʔ*; Mam, Aguacate, *ʔiš-ko:yaʔ*; Teco *š-ko:yaʔ*; Cakchiquel, Tzutujil *(š)ko:ya:ʔ*.

(6) Bean: PMZ **sək*–Paya *sak-*. Most of the other languages of the southern periphery of Mesoamerica have borrowed the term for beans from Mayan languages.

(7) Sweet Potato (camote): PMZ **mənE*–Totonac *manta*; Jicaque *mɨna*; Xinca *mułą* (perhaps); Chinantec *mɨ̄*^{31}; Cuicatec *ʔmi*^{1}*ɨ̄*^{3}.

(8) Edible Tuber (chayote [huisquil], camote): PMZ **kəh*–Zapotec *gu*; Chatino *kuu* 'sweet potato' (camote).

(9) PMZ **sapani* 'plantain'–Huave *sapən* 'zapotillo' (there are very few Huave forms with initial *s-*; mostly they are Spanish loans). Plantains, though of recent introduction, were very often added to the Zapote semantic domain in many Mesoamerican languages.

(10) Guava: Sierra Popoluca (Zoque) *pátaŋ*–Tzeltal *páta*, Tzotzil *póto*, and in several other Mayan languages (the native Proto-Mayan form is **kaq'*). The exceptional first syllable stress in Tzeltal and Tzotzil show these forms to be loans.

(11) Papaya: Copainalá Zoque *ʔoɸo*–Xinca *učun*, Nahua *očonih-tli*, perhaps Ixcatec *tʸu*^{2}*ču*^{2}.

(12) PMZ **kaʔwak* 'zapote'–Huave *kawak* 'chico zapote'; Mixtec *ti-ka:ʔwa* 'ciruela' (plum?).

(13) PMZ **pisi* manioc (yuca)–Totonac *pisisi* guacamote. Perhaps also borrowed are: PZo **ɸoha* 'cotton'–Salvadorean Lenca *ɸ'uwi* 'cotton' (since cotton terms are widely borrowed elsewhere from Mayan and other languages); PMZ **ɸəpə* 'greens' (quelite)–Huave *čapin* 'tomato'; Xinca *ša·pə* 'huisquil' (chayote).

It is significant that such important Mesoamerican cultigens as beans, squash, tomatoes, gourds, cacao, etc., were widely borrowed in Mesoamerican languages from MZ. It supports the MZ-Olmec hypothesis, since we can expect others to borrow cultigens from the Olmecs as the first highly civilized agriculturalists of Mesoamerica. Many of these cultigens are diagnostic of Mesoamerica, and that such typically Mesoamericans as Mayans and others should borrow these terms attests the prestigious and powerful position speakers of MZ languages must have had.

The Maize Preparation Complex

Terms involving maize and its preparation for food are widely borrowed in Mesoamerican languages. Though many of these were perhaps diffused widely at an earlier time than the

cultigens discussed above, some seem to support the MZ-Olmec hypothesis.

(14) PMZ **way* 'to grind corn', **waye* 'pozole'–Proto-Mayan **wah* tortilla; Totonac *wa? t* tamal; Xinca *iwa* to make tortillas; Jicaque *we* nixtamal (leached corn), tamal, *we pim* corn dough; Proto-Chiapanec-Mangue **wih?* tortilla; Proto-Chinantecan **wih(n)* tortilla; etc.

(15) PMZ **piɸi* nixtamal (leached corn)–Totontepec Mixe *po·ɸa* tamal–Tzeltal, Tzotzil *paɸ* tamal; Xinca *pa·ɸ'i* to grind, corn dough; Totonac *pa? s(a)* to shell corn; Nahua *paɸa* to grind, mash (perhaps, Tequistlatec *-špaɸ'a?i* tamal de elote; Huave *peaɸ* tortilla.

(16) PMZ **po?t* to grind corn, **po?te* pinole–Nahua *potonki* harina muy molida.

(17) To grind: PMZ **həɸ*–Proto-Mayan **xuč'*; Xinca *huɸ'i* nixtamal, corn dough.

(18) Maize: terms for maize itself are widely borrowed throughout Mesoamerica, though probably not from MZ. Examples: Proto-Mayan **?e?m*; Tarascan *ema*; Xinca *ayma*; Lenca *ima, ema, ama*; Cacaopera and Matagalpa *ayma*; Sumu *ama*; Proto-Mixtecan **yam*; Proto-Chiapanec-Mangue **-ma*; PMZ **mo·k.*

Perhaps also borrowed is PMi **na(?)n* to eat atole–Mangue *nambo* atole.

Ritual and Calendric Terms

(19) Incense (copal): PMZ **po·mV*–general-Mayan *po·m* (but Huastec *hom*); Xinca *pu·mu*; Totonac *pu·m*; Tepehua *pu·m*; Tequistlatec *-boma*; Huave *pom*. Incense seems always to have been indispensable to Mesoamerican ritual.

(20) PMZ **may* 'to count, to divine'–Kekchí *may* twenty, twenty years; Pokom *may* twenty years; Quiché and Cakchiquel *may* twenty years of 400 days each, *may q'i·x* the calendar; perhaps also Kekchí *mayex* sacrifice, offering; Otomí *mai·* measure(ment).

(21) PMZ **?ukA*, PMi **?ok* dog–Yucatec *ok* 'dog' calendric day name: Huastec *ok* fox. The Kanjobalan group of Mayan languages has *?o?q, ?oq* 'coyote', which may be a possible cognate of the Huastec word, although we think the Yucatec form is a true borrowing from MZ.

(22) Axe (human sacrifice?): PMZ **pus* to cut with a knife or axe, **pusan* metal (axe?)–Nahua *pus-teki* to cut, *te-pos-(tli)* axe, metal (literally *te-* 'someone' plus *-pos* 'cut', or "people cutter"); Pokom *pos* stone war axe, *ax pos* 'wonder worker', *pus* 'witch' (encantador); Cakchiquel *pos* polished stone: Quiché *pos, pus* 'to sacrifice men by removing their hearts', to cut, polished stone, magic power; Cakchiquel and Quiché *pus-nawal* 'magic power, witch'; Huave *apəš* to chop with axe (hachear); Proto-Central Otomian **bes-na* metal, lead; Proto-Popolocan **pos* hard stone. From these examples it seems certain that terms for "axe" were widely borrowed from MZ, and probably its ritual significance was borrowed as well. Both Caso and Bernal (reported in Bernal 1969) believe the Olmecs practiced human sacrifice, which is also suggested in these loans. Certainly, in any case, the Olmec votive axes are well known.

(23) PMi **na?wa(y)* old man (also husband)–Huave *neawəneay* witch; Nahua *nawal* witch, transformer, alter ego, na-*nawa*-tia to transform oneself into an animal; Proto-Chiapanec-Mangue **nu-hwa* witch; etc. The notions "(old) man" and "witch" are related in languages throughout Mesoamerica, e.g., in many Otomanguean languages (cf. Rensch 1966). Xinca borrowed the Mayan word for "man" with the meaning "witch." The Nahua (Nahuatl and Pipil speakers) call themselves *nawa* 'people', showing the man-witch association even within Nahua. Though nagualism is widespread, it seems not unlikely that the term widely borrowed in Mesoamerican languages came from the Olmecs.

(24) Woven Mat (petate): PMZ **pata*–Nahua *pet(l)a-tl* (from Proto-Aztec **pəta*); Proto-Otopamean **pe*. The petate is well known as a symbol of both secular and religious rank and power in Mesoamerica. Aztec rulers and Jaguar and Eagle warriors were seated on them, as were the Quiché leaders (hence the name of the *Popol Vuh* "Book of the Council" from *po·p-o·l* 'council', from "mat"). The direc-

tion from MZ into Nahua is quite clear. Nahua's *pet(l)a-tl* lacks cognates in other Uto-Aztecan languages (though some Mexican Uto-Aztecan languages have borrowed the term from Nahua). Proto-Uto-Aztecan initial **p-* was lost in Nahua, so that this form with its initial *p-* is anomalous. Finally, the Pochutec form is *pot*, where the *o* (corresponding to other Nahua *e*) reflects Proto-Aztecan **ə*, making Proto-Aztecan **pəta* much more like PMZ **pata*, from which it was borrowed.

(25) Paper: PZo **toto*–Mixtec *tutū*. Perhaps also, PMi **nokE*–Huave *nawi·g*.

(26) Turkey: Pzo **tu? nuk*–Tzeltal, Tzotzil, Chuj, Jacaltec, and Motozintlec *tunuk'/ tuluk'*. This violates the typical Mayan monosyllabic root structure (the native Mayan form is **?ak'*). The PMi form **tu·tuk* (and **tu·t* to lay eggs) together with the PZo form, is probably related to Tequistlatec *-dulu* turkey; Jicaque *tolo*; Huave *tel* female turkey; Zapotec *tou?* turkey; Nahua *totol-* chicken (*toto-tl* bird); and Paya *totoni-* chicken. Since domesticated turkeys appear quite late in Mesoamerica (around A.D. 300; Michael Coe personal communication), it is not certain how these forms are to be interpreted, perhaps as later loans.

(27) Bee, Wasp, Wasp's Nest: PMZ **?a·kaw*, Sierra Popoluca (Zoque) *?okwoŋ*–Huastec *?okow*; Tzeltal, Tzotzil, Tojolabal *?áko* (with unexpected first syllable stress); perhaps also Mixtec *yokō*.

(28) Sandals: PMZ **ke?ak*–Nahua *kak-(tli)*; compare this to Proto-Otomanguean ***(h)k^{w}a(h)(n)*[2] (which may not be based on real cognates); Proto-Popolocan **ka*[2]; Proto-Chiapanec-Mangue **hkali?*; the other Uto-Aztecan languages which have borrowed this form are: Varohio *kahkrá*; Cora *ka?akaí*; and Huichol *ka·kái*.

(29) PZo **?oH* pulque, maguey–Nahua *ok-(tli)* pulque.

(30) Perhaps PMZ **ka·na* salt–Huave *kiniək*.

(31) Perhaps Woven Mat (petate): PMi **to?kE*–Huave *tek*; Totonac *š-ti?kat*.

(32) Perhaps Sayula Popoluca (Mixe) *suy* pot (olla); Sierra Popoluca (Zoque) *su? ŋ* pot–Jicaque *soy*; Pipil *šuh-*; Nahua *šok-*; Xinca *suh-*; Proto-Otopamean **su*; Proto-Chatino **su*; etc.

(33) Perhaps PMZ **sam* to heat something–Western Mayan **sa? m(-et)* comal griddle.

(34) Perhaps Copainalá Zoque *ko-paȼe* trap–Western Mayan **pehȼ'*.

Other Loans

(35) PMZ **ȼuk* mouse–Chol *ȼuk*. (The Proto-Mayan word is **č'o? h.*)

(36) PMZ **ȼa·m* ripe, good–Tzeltal *ȼam* good; Xinca *ȼ'ama* good.

(37) PMi **wa·s* fox–some Mayan languages have *wa?š*; Tarascan *xiwaȼi*.

(38) PZo **we·tu* fox–Tzotzil, Yucatec, Tojolabal, Jacaltec, Mam **we·t*; Xinca *we·to*; Mixtec ⟨*vidzu*⟩ (calendric day name) fox.

(39) PZo **nas-o? na* fog (from **nas* 'earth' + **?o?na* 'cloud')–Tojolabal *?ason* cloud; Motozintlec *?aso·n* cloud; Kanjobal, Jacaltec, Chuj *?asun* cloud.

(40) PZo **?une* PMi **?unak* child–Tzeltal, Tzotzil, Tojolabal, Chuj, Kanojabal, Jacaltec, Cholti, Mam *une/unin*; Xinca *?one* child, immature; Otomí *uɛne* baby; perhaps also Nahua *kone-tl* child (which lacks cognates in other Uto-Aztecan languages). Perhaps the importance of infants in Olmec art motifs, and therefore presumably also in Olmec religion, contributed to the wide-spread borrowing of this term from MZ languages.

(41) PMZ **u·ma* deafmute–Chol, Tzeltal, Motozintlec *?uma* (the native Proto-Mayan word is **me·n* or **me·m*).

(42) PMZ **paȼi* lizard–Cakchiquel, Quiché *(š)pa?č*, Pokom *patiš*; Tequistlatec *-baȼi?*. This may have been borrowed as a calendric term, compare the Otomí day name *am-befǎga* lizard.

(43) PMZ **?uspi(n)* alligator–Totonac *ušpi, u?čupi;* Tepehua *húkšpi*; Tarascan *uspi*. This also may have been a calendric term.

(44) PMZ **koya* rabbit–Huastec *koy*; Huave *koy*. Perhaps also comparable are Totonac *skaw*; and Otomí *khwa*; Matlazinca *kwha*. These are also day names in Otomí and Mixe, and probably in the others as well, which may account for why they were borrowed.

(45) PMZ **(hah)ȼuku?* ant–Mixtec *čókó, tiyókó*; Nahua *ȼika-(tl)* (from Proto-Aztecan **ȼikV*, from earlier **ȼukV-*); Huave *čok*; Cacaopera *suku-l*; etc.

(46) Perhaps PZo **ʧi(ʔ)* opossum (tacuazin, tlacuache)—Xinca *seʔ*, *cʼəˑpə*; Nahua *siʔ (-tli)* liebre (jackrabbit?); Salvadorean Lenca *se-suli*; Honduran Lenca *sewe*.

(47) Perhaps PMZ **paˑhuʔ* coyote—Paya *paˑkuʔ* ; Mixtec *wáʔ ū*.

(48) Perhaps PMZ **pok(A)* gourd—Chol *pokʼ*; Totonac *poˑqoʔtnuʔ*; etc.

(49) Perhaps PMZ **ʔaʧi* elder brother—Quichean **ʔaʧ*; Mamean **ʔaʧik;* Tarascan *aʧ-i* woman's younger brother.

(50) The Mixe day name ⟨*Juun*⟩ corresponding to iguana, is probably the source of these loans (which are not cognates) in Mayan languages meaning iguana: Mam *ʔoʔn*; Teco *xoˑʔon*; Motocintlec *ʔoˑhaʔn*; Quiché *ʔoʔon*; Yucatec *huh*; Choltí ⟨*hu*⟩; Chortí *hu(h)*; (cf. also Aguacatec and Ixil).

These loan words provide rather strong support for the hypothesis that the Olmecs (at least in part) spoke MZ languages. The fact that many of these are in geographically quite remote languages shows their importance. The number and extent of these borrowings suggest the same. Because so many are so central to everything Mesoamerican, and because MZ seems always to be giving but very rarely receiving these early loans, it does not seem to be overstating the case to conclude that the Olmecs probably spoke MZ languages.

Of course in a brief paper with the goal of presenting a hypothesis to be tested in further research one cannot anticipate all possible objections, or even raise all the important questions. For those who would like to see these as mutual loans from some other undesignated language into MZ and the languages listed here, it is important to point out that on the whole these fit MZ phonology and canonical patterns with no difficulty, but not those of any other Mesoamerican language or language family we know of. Furthermore, there seems little reason to seek phantom languages, since even without the loan word evidence, the matching location of MZ languages and Olmec culture in time and space would suggest that MZ languages are the best candidate.

IMPLICATIONS OF PMZ VOCABULARY

We assume that the loan word evidence presented is sufficient support of the MZ-Olmec hypothesis to entertain it as a plausible, if not yet provable, hypothesis. On the basis of this assumption, we now turn to the potential contribution of comparative linguistics to the understanding of Olmec culture. We will investigate the reconstructed PMZ vocabulary for cultural content. In the interest of space we do not discuss the method in detail (for other examples of this approach to culture prehistory see Longacre and Millon 1961 and McQuown 1964). However, briefly stated, when firm linguistic data are sufficient to reconstruct an etymon in the proto language, one usually assumes (barring undiscovered complications) that the referent of the etymon was part of the cultural inventory of the speakers of the proto language. Since this study shows that the PMZ speakers had a rather sophisticated Mesoamerican culture around 1500 B.C., this information can be viewed as an additional argument for the Olmec-MZ hypothesis. Furthermore, one can speculate, in accordance with our hypothesis, that the cultural inventory of PMZ was also part of the cultural inventory of the Olmecs:

Agriculture: *kama(ʔ/n) *milpa*, *yuˑh *to clear land*, *niˑp *to sow* (*plant*), *təm *seed, fruit*, *puh *seed*, *ʧik *to harvest*.

The Maize Complex: *moˑk *maize*, *way *to grind corn*, *piʧi *leached corn* (*nixtamal*), *həˑpak *corncob*, *waye *posole*, *poʔte *pinole*, *poʔt *to grind* (*grains*), *ʔəks *to shell corn*, *ham *lime*.

Other Food Plants: *niˑwi *chile peppers*, *sək *beans*, *koya *tomato*, *mənE *sweet potato* (*camote*), *pisi *manioc* (*yuca*), *kəh *edible tuber* (*chayote, camote*); *nuhpe(n) *chokecherry*, *(y)aˑti(n) *custard-apple* (*anona*), *ʔowiʔ *avocado*, *kaʔwak *zapote*, *kuma *coyol palm*, *poʔos *guava*, *kakawa *cacao*, *ʧəpə *greens* (*quelite*).

Important Animals: *məʔa *deer*, *nəˑʧ *armadillo*, *təʧə *iguana*, *koya *rabbit*, *ʧiku *coati*, *ʧiˑnu *honey*, *ʧawiʔ *monkey*, *kahaw *jaguar*.

Fishing: *ʧak *fish*, *ʔeˑsi *crab*, *maˑk *to fish*, *suy *to fish with hook and line*, *ʔaʔ *canoe*.

Textiles, etc.: *pit *to spin thread*, *nawin *agave* (*maguey*) *fiber*, *təps *to twist rope*, *kahʧay *hammock*, ʧay *cord, vine*.

Ritual, etc.: *maˑsan *holy*, *poˑmV *copal incense*, *pus *to cut with knife or axe*, *pusan

metal (aboriginally *axe*?), *ha·y *to write*, *may *to count, to divine*, *ʔeɬ *to dance*, *kow *to play a musical instrument*, *kowa *drum*, *səw *festival (fiesta)*, *ʔame *year*, *ʔips *twenty*, *moʔne *bundle of 400*, *ɬəwi *tobacco*, *hu·kV *cigarette*, hu·k *to smoke.*

Commerce: *toʔk (Mi) *to sell something*, (Zo) *to spread something out*, *yoh *to pay for*, *ɬow *to cost, be worth*, *huy *to buy something*, etc.

Other: *ɬoy *liquor, remedy*, *pok(A) *water gourd*, *ɬima *gourd (jícara)*, *teʔn *ladder*, *tək *house*, *kom *house pole (horcón)*, *meʔesi *adobe wall*, *naʔa *rubber, chicle*, *kəʔ-kuma *ring*, *təp *to shoot an arrow*, *ɬeʔes *bed*, *ɬeɬ *to plane wood*, *kəʔak *sandals.*

From the reconstructed lexical items of PMZ it seems that the speakers of PMZ practiced slash and burn agriculture (milpa, to clear land, etc.), and had a full complement of Mesoamerican cultigens (maize and its preparation complex, chile, beans, tomatoes, several root crops, many fruits, and gourds). Fishing was important. They had textiles. If the MZ-Olmec hypothesis is true, then this linguistic evidence confirms the archaeological evidence of these things (cf. Bernal 1969). Furthermore, it seems that PMZ had already developed the vigesimal numeral system (twenty, bundle of 400). They also must have had divination, nagualism, and some form of writing, among other things.

CONCLUSIONS

Because the geography and chronology of PMZ and the Olmec correspond closely, we suggested MZ languages as the most probable candidate for the linguistic identification of the Olmecs. We considered loan forms from MZ into other Mesoamerican languages. Because many of these loans refer to items diagnostic of Mesoamerican culture, and some occur in geographically quite remote languages, we find that the MZ-Olmec hypothesis has considerable support. Furthermore, the reconstructed PMZ vocabulary items of cultural content suggest a rather sophisticated Mesoamerican culture for speakers of PMZ around 1500 B.C., additional support for the hypothesis.

Finally, it is important to point out that our hypothesis that at least some Olmecs spoke MZ languages is in no way dependent upon any particular solution to the questions of Olmec origins or geographical extensions. It makes no difference to our hypothesis if the Olmec origins are found in the heartland (Veracruz, Tabasco), the Pacific slopes of Guerrero or Oaxaca, or the Morelos or Northeastern Oaxaca area (cf. Wicke 1971). The only thing crucial to our hypothesis is that the Olmecs did occupy the heartland in the period we are talking about, and that does not seem to be very controversial. Furthermore, the distribution of MZ languages would seem to allow for any of these hypotheses of Olmec origins without difficulty.

We conclude that probably the Olmecs, at least in part, spoke MZ languages. We hope this hypothesis with our supporting evidence will generate further research on the topic.

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ARCHAEOLOGICAL DATA BANKS IN THEORY AND PRACTICE

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Although archaeologists have experimented with computers since the early 1960s, with a few exceptions, the concept of an archaeological data bank has not been readily accepted. The authors believe that data banks can be usable tools, but that they will be used only if they are designed to satisfy realistic and precisely defined needs, and only if adequate consideration is given to data structures, human problems, and theoretical issues. Just finding the right computer system is not enough.

The objectives of this paper are: (1) to briefly trace some of the authors' experiences in ten years of data banking; (2) to report on an archaeological data bank project presently being carried on by the Arkansas Archeological Survey; and (3) to delimit both the possibilities and the limitations that appear to be inherent in the storage and retrieval of archaeological data on computers. We strongly believe that data banks can be usable, but we have learned from experience that this does not happen just by finding the right "black box" computer system and then recording a large number of field or laboratory observations. Data banks must be created to satisfy realistic and precisely defined needs, and they must be implemented with adequate consideration for the theoretical, human, and data structuring problems.