

UC Berkeley

Contributions of the Archaeological Research Facility

Title

Observations on the Emergence of Civilization in Mesoamerica

Permalink

<https://escholarship.org/uc/item/6bj7q72d>

Authors

Tolstoy, Paul
Paradis, Louise I.
Bernal, Ignacio
[et al.](#)

Publication Date

1971-04-01

Copyright Information

This work is made available under the terms of a Creative Commons Attribution License, available at <https://creativecommons.org/licenses/by/4.0/>

Peer reviewed

CONTRIBUTIONS
OF THE
UNIVERSITY OF CALIFORNIA
ARCHAEOLOGICAL RESEARCH FACILITY

Number 11

April, 1971

**OBSERVATIONS ON THE EMERGENCE OF
CIVILIZATION IN MESOAMERICA**

Edited by
Robert F. Heizer and John A. Graham
with the assistance of
C. W. Clewlow, Jr.

Papers presented at the Wenner-Gren Foundation for Anthropological Research Symposium on "Observations on the Emergence of Civilization in Mesoamerica" held at Burg Wartenstein, Austria, July 4-13, 1970.

Published with a grant (No. 2744) from the
Wenner-Gren Foundation for Anthropological Research

UNIVERSITY OF CALIFORNIA
DEPARTMENT OF ANTHROPOLOGY
BERKELEY, CALIFORNIA

CONTRIBUTIONS
OF THE
UNIVERSITY OF CALIFORNIA
ARCHAEOLOGICAL RESEARCH FACILITY

Number 11

April, 1971

OBSERVATIONS ON THE EMERGENCE OF CIVILIZATION IN MESOAMERICA

Edited by Robert F. Heizer and John A. Graham
with the assistance of C. W. Clewlow, Jr.

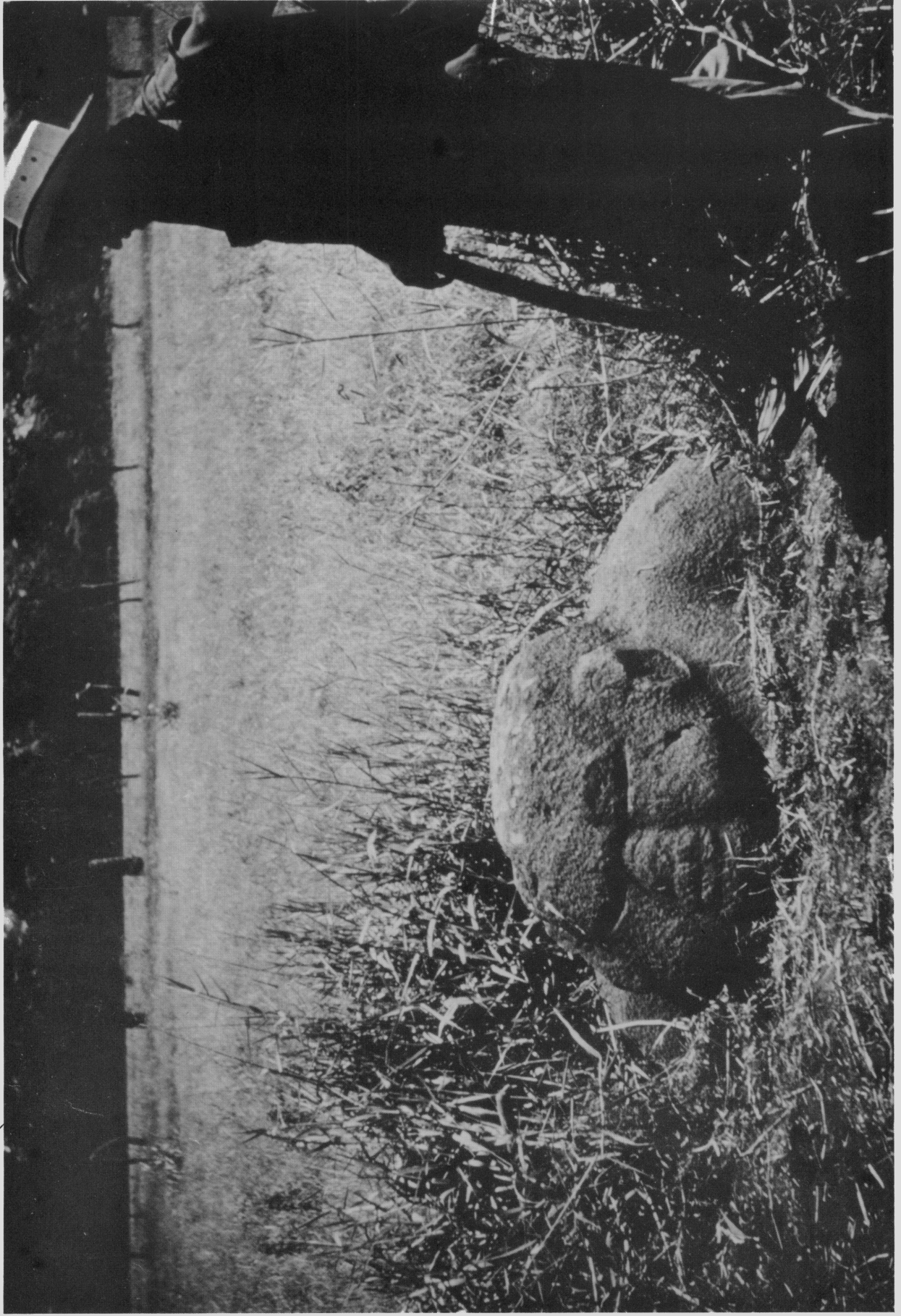
Papers presented at the Wenner-Gren Foundation for Anthropological
Research Symposium on "Observations on the Emergence of Civilization
in Mesoamerica" held at Burg Wartenstein, Austria, July 4-13, 1970.

Published with a grant (No. 2744) from the
Wenner-Gren Foundation for Anthropological Research

(Reprinted July, 1972)

Open Access Available at:
<http://escholarship.org/uc/item/6bj7q72d>

UNIVERSITY OF CALIFORNIA
Department of Anthropology
Berkeley



Mesoamerican civilization emerging

Photo by L. Parsons

CONTENTS

| | | Page |
|-------|--|------|
| I. | EDITORS' PREFACE by Robert F. Heizer and John A. Graham..... | 1 |
| II. | EARLY AND MIDDLE PRECLASSIC CULTURE IN THE BASIN OF MEXICO by Paul Tolstoy and Louise I. Paradis..... | 7 |
| III. | THE OLMEC REGION - OAXACA by Ignacio Bernal Added Remarks by Ignacio Bernal | 29 |
| IV. | COMMENTARY ON: THE OLMEC REGION - OAXACA by Robert F. Heizer | 51 |
| V. | INVENTORY OF SOME PRE-CLASSIC TRAITS IN THE HIGHLANDS AND PACIFIC GUATEMALA AND ADJACENT AREAS by Edwin M. Shook | 70 |
| VI. | COMMENTARY ON: INVENTORY OF SOME PRE-CLASSIC TRAITS IN THE HIGHLANDS AND PACIFIC GUATEMALA AND ADJACENT AREAS by Claude F. Baudez | 78 |
| VII. | THE EMERGENCE OF CIVILIZATION IN THE MAYA LOWLANDS by E. Wyllys Andrews IV | 85 |
| VIII. | COMMENTARY ON: THE EMERGENCE OF CIVILIZATION IN THE MAYA LOWLANDS by Gordon R. Willey | 97 |
| IX. | CALENDRICS AND WRITING IN MESOAMERICA by Hanns J. Prem | 112 |
| | Added Remarks by Hanns J. Prem | |
| X. | COMMENTARY ON: CALENDRICS AND WRITING IN MESOAMERICA by John A. Graham | 133 |
| XI. | EARLY ARCHITECTURE AND SCULPTURE IN MESOAMERICA by Tatiana Proskouriakoff | 141 |

| | | |
|-------|--|-----|
| XII. | COMMENTARY ON: EARLY ARCHITECTURE AND SCULPTURE IN MESOAMERICA by George Kubler | 157 |
| XIII. | MESOAMERICAN TRADE AND ITS ROLE IN THE EMERGENCE OF CIVILIZATION by Lee A. Parsons and Barbara J. Price | 169 |
| XIV. | COMMENTARY ON: MESOAMERICAN TRADE AND ITS ROLE IN THE EMERGENCE OF CIVILIZATION by Anne M. Chapman | 196 |
| XV. | THE CIVILIZATIONAL CONSEQUENCES OF VARYING DEGREES OF AGRICULTURAL AND CERAMIC DEPENDENCE WITHIN THE BASIC ECOSYSTEMS OF MESOAMERICA by Gareth W. Lowe | 212 |
| XVI. | COMMENTARY ON: THE CIVILIZATIONAL CONSEQUENCES OF VARYING DEGREES OF AGRICULTURAL AND CERAMIC DEPENDENCY WITHIN THE BASIC ECOSYSTEMS OF MESOAMERICA by Geoffrey H. S. Bushnell | 249 |

I. EDITORS' PREFACE

Mesoamerican prehistory represents a unique cultural experiment of man. Unfortunately, that great experiment was cruelly and abruptly terminated by the Cortesian conquest of Mexico in 1519, to be followed shortly afterwards by the "pacification" of Central America and western South America. The inevitable day of the meeting of representatives of the Old and New World traditions of civilization came when Columbus touched the ground of North America in October, 1492. This great event came, unfortunately, at a time when the Europeans were still imbued with the less refined aspects of medieval chivalry and militarism, and the steel-armored horsemen and guns of Pizarro in Peru, Alvarado in Guatemala, and Cortes in Mexico succeeded within a decade in destroying the functioning native cultures (though not in many cases, their entire populations). And so the greatest American experiment of all times - we speak here in the larger sense and include atomic bomb perfection, and manned moon-landings -- namely the invention of civilization, came in itself to nothing because it was overwhelmed by a superior technology in the form of better military tactics, better transport in the form of sailing ships and the horse and wheeled wagons, and better defensive and offensive devices in the form of steel armor and cannons. In earlier times outwardly similar events on a smaller scale must have occurred, as we know from the examples of the once-vigorous Olmecs of the tropical lowlands of southeastern Mexico, the Izapan culture, the Teotihuacanos, and the Maya of lowland Guatemala who had earlier passed from sight. But, whatever the cause or causes of the passing of these peoples from the scene, their decline, or even their disappearance, did not affect the general continuation of the native American style of civilization since no single and entirely alien society ever became, as did that of the Spanish conquistadores, predominant and so effectively destructive. Human history probably cannot demonstrate a more rapid and thorough-going acculturation on such enormous scale than that of the Spanish-induced example in the New World in the first half of the sixteenth century.

If the native cultures of the New World had been better recorded than they were, we would probably understand much better what their history had been. But the sudden truncation of the literate elements of the populations had the effect of creating voids in our understanding. We shall never know to what level of development the human experiment in civilization which was in process in native America might have reached. That is purely a matter of historical speculation. Such speculations are a valid subject of inquiry, if only for the reason that men of every generation find themselves in crisis and often resort (usually with little solace) to a consideration of historic precedent.

What archaeologists can do is to examine, insofar as the archaeological evidence permits, the process of the origins of civilization and to study the complicated course of the rise and spread of ideas that went into the makeup of Mesoamerican civilization. We proposed in 1968 to the Wenner-Gren Foundation for Anthropological Research authorization to organize a symposium to concentrate on an examination of the way or ways in which civilization took form in prehistoric Mesoamerica. To make this inquiry more stimulating in wider culture-historical terms, we originally proposed further to compare and contrast the Mesoamerican experiment in a number of ways (sociologically, chronologically, qualitatively) with the generally parallel development which took place in the Old World. This was, of course, a large order, and as the various details of the symposium were worked out, it became increasingly clear that to adequately discuss the various substantive interpretations of the Mesoamerican evidence there would not be time to consider the Old World parallels in detail. In the end we decided to limit our Old World comparisons to a single summarizing overview and this considerable task we entrusted to our colleague Robert Rodden who undertook the difficult and taxing chore of listening to Mesoamericanists thrash out their problems of sequence and chronology, cause and effect, and then to offer an overview of comparisons with the Near Eastern hearth of civilization. Unfortunately, it has not been possible to include Dr. Rodden's remarks here, but, hopefully, they will see the light of publication elsewhere.

The past several years have seen a prodigious growth of information on the chronology, content, organization of culture groups, beginnings of plant domestication, pottery, religion, architecture, and trade in ancient Mesoamerica. This is particularly true of the once very dimly perceived, often elusive, PreClassic period during which many characteristic Mesoamerican cultural patterns took form and crystallized into traditional designs. Although it seems a certainty that another decade will witness continued discoveries of such a magnitude as to thoroughly revolutionize our present picture and conceptions, the present stage of research has seemed to us opportune for an assessment of these new insights and a consideration of the variety of processes that contributed to the emergence of civilized life.

In a symposium treating so complex a subject as the emergence of Mesoamerican civilization, there were many more appropriate authorities and obvious candidates for participation than could possibly be accommodated in the format and practical size limitations imposed. In planning the conference we attempted to insure that a wide spectrum of views, background and field experience would be represented, and we feel this is evidenced in the variety of approaches and attitudes brought to bear on the subject in the following papers.

At the suggestion of Dr. T. Proskouriakoff, invitations to attend the Conference were extended to Drs. R. V. Kinzhalov and Y. V. Knorozov (American Section, Institute of Ethnography, Leningrad, USSR), but these two colleagues

did not find it possible to attend. Dr. Rainer Berger (Institute of Geophysics and Interplanetary Physics, UCLA) attended the Conference but did not prepare a paper. Mr. C. William Clewlow, doctoral candidate in Anthropology at the University of California, Berkeley, served as Rapporteur. The other participants were: Dr. E. Wyllys Andrews (Middle American Research Institute, Tulane University, New Orleans, La.), Dr. Claude F. Baudez (Musée de l'Homme, Paris), Dr. James A. Bennyhoff (University of California, Berkeley), Dr. Ignacio Bernal (Instituto Nacional de Antropología e Historia, Mexico City), Dr. G. H. S. Bushnell (Corpus Christi College, Cambridge University), Dr. Anne Chapman (Centre National de la Recherche Scientifique, Paris), Dr. George Kubler (Department of History of Art, Yale University), Mr. Gareth W. Lowe (New World Archaeological Foundation, Tuxtla Gutiérrez, Chiapas, Mexico), Dr. Lee A. Parsons (Department of Anthropology, Harvard University), Dr. Hanns J. Prem (Institut für Völkerkunde der Universität München, Germany), Miss Tatiana Proskouriakoff (Peabody Museum, Harvard University), Dr. Robert J. Rodden (University of California, Berkeley), Mr. Edwin M. Shook (Antigua, Guatemala - Field Director of the Monte Alto Project, Peabody Museum, Harvard University), Dr. Paul Tolstoy (Queens College, New York), and Dr. Gordon R. Willey (Peabody Museum, Harvard University).

While the traditional Mesoamerican patterns of civilization and the variety of their interpretation would obviously be quite familiar to the participants and thus not require special characterization, the obvious question did arise as to whether a definition or characterization of the phenomenon of civilization itself should be provided. Although it was a temptation to profer our own views on this complex issue for the symposium, we concluded that in the long run it was more advantageous to have each participant work with the concept he found most useful, and we restrained ourselves to a recommendation of perusal of A. L. Kroeber's A Roster of Civilizations and Cultures: An Essay on the Natural History of the World's Cultures, Living and Extinct (Aldine Publishing Company, 1962) and Eric Wolf's "Understanding Civilizations: A Review Article" (Comparative Studies in Society and History, Vol. 9, pp. 446-465, 1967). These two papers were read by all conference participants and their content can be assumed to have been known to each.

There was no unanimous agreement among participants upon the primacy of certain types of processes. This clearly emerges from a reading of the position papers and the commentaries. There was a definite feeling expressed by many of the participants that materialistic/economic explanations have tended to be overemphasized, though without denying their fundamental importance, and that greater effort and attention need be to the more difficultly perceived cultural realms beyond basic technological/economic factors. The lack of consensus evident in the papers is understandable in view of the varied experience of the participants as well as reflecting the current state of archaeological knowledge. While not making for a neat and comprehensive

intellectual package, we cannot help but feel this diversity to be a healthy and encouraging condition.

It will be noted in a survey of the following papers that we made no provision for a consideration of the possible role of trans-Pacific contacts or South American influences in the emergence of Mesoamerican civilization. This does not reflect a belief on our part that the question of whether trans-Pacific contacts or inter-hemispheric communications did or did not take place during the period under consideration has been settled; it will, after all, probably never be possible to "prove" that significant trans-Pacific contacts did not occur. It is our opinion, however, that if such contacts did occur, they did not substantially affect the course of native cultural development and consequently would not be of primary significance for the symposium's concerns.

With only very minor revisions the papers and the commentaries upon them stand as originally prepared for the conference. As editors we have preferred to leave the papers as written rather than impose editorial uniformity of style. Several authors had planned major revisions after the conference, but in order to preserve the relevance of the commentaries without an overly complex series of renewed exchanges and revisions, which would also have greatly delayed publication, it was decided at the final Conference session in a spirit of very generous cooperation to allow contributions to stand as prepared. The reader of this volume should, therefore, bear in mind this situation.

A word of explanation is in order with respect to one of the papers of joint authorship in this collection. After submitting his original paper, but before the Conference took place, Dr. Lee Parsons decided to undertake revision of his paper in collaboration with Miss Barbara Price, resulting in the present paper. Although Miss Price was not a member of the conference, Dr. Parsons undertook to represent their combined views.

It is with regret, and for reasons beyond our control, that it has not been possible to include Dr. James A. Bennyhoff's inventory paper on the emergence of civilization in Central Mexico. Because it seemed unfortunate to omit Central Mexico, we invited Dr. Paul Tolstoy who was the commentator on Dr. Bennyhoff's paper at the Conference, to submit, with any changes or additions he thought desirable, a version of the important summary article published by him and Dr. Louise I. Paradis in Science (Vol. 167, pp. 344-351, 1970). We are appreciative of Dr. Tolstoy's agreeing to perform this extra task, and believe that the present volume is much improved by his contribution.

The sessions were held as follows at Burg Wartenstein:

| <u>Date</u> | <u>Subject of Session</u> | <u>Inventory Paper</u> | <u>Discussant</u> |
|-------------|---------------------------|------------------------|-------------------|
| July 5 | Olmec Region and Oaxaca | I. Bernal | R. Heizer |
| July 6 | Highland Central Mexico | J. A. Bennyhoff | P. Tolstoy |

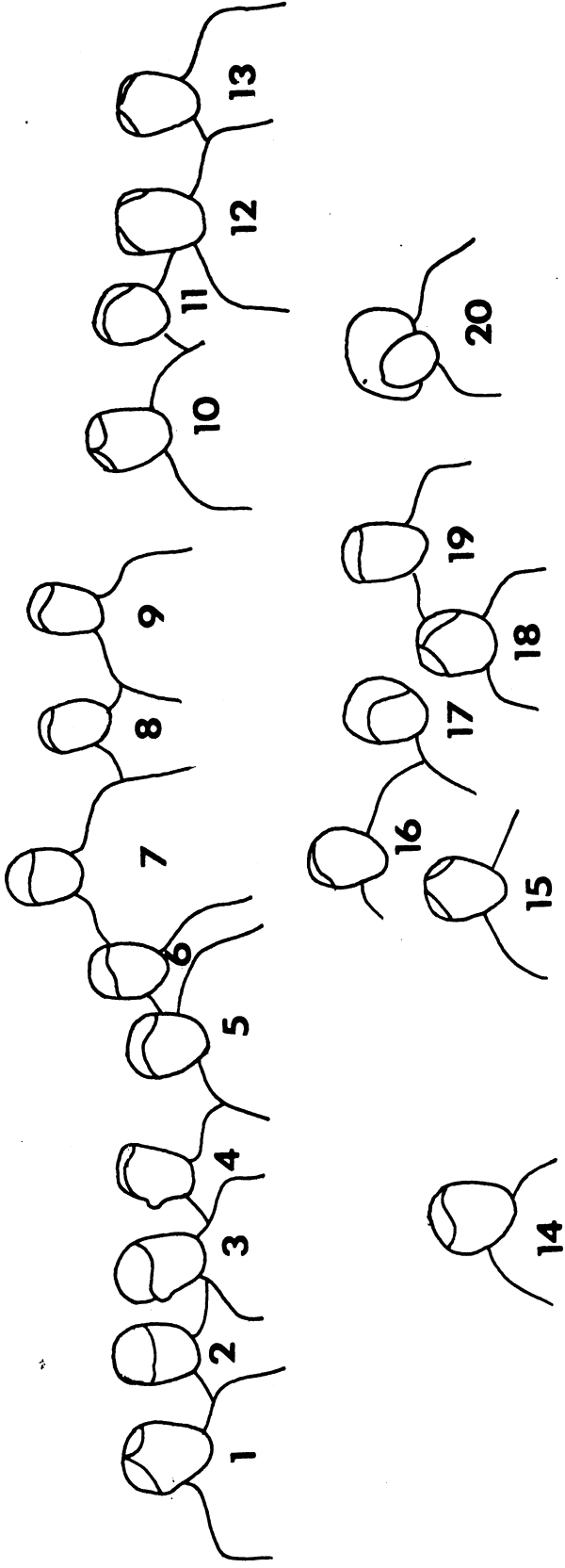
| <u>Date</u> | <u>Subject of Session</u> | <u>Inventory Paper</u> | <u>Discussant</u> |
|--------------|---|------------------------|-------------------|
| July 7, a.m. | Highland and Pacific Guatemala and Adjacent Areas | E. Shook | C. Baudez |
| July 7, p.m. | Maya Lowlands | E. W. Andrews | G. Willey |
| July 8 | Free Day, in Vienna | | |
| July 9, a.m. | Calendrics and Writing | H. J. Prem | J. A. Graham |
| July 9, p.m. | Slides of Archaeological Excavations | | |
| July 10 a.m. | Sculpture and Architecture | T. Proskouriakoff | G. Kubler |
| July 10 p.m. | Trade | L. Parsons | A. Chapman |
| July 11 a.m. | Ceramics and Agriculture | G. Lowe | G. Bushnell |
| July 11 p.m. | Slides of Archaeological Excavations | | |
| July 12 | Old World Comparisons | | R. Rodden |

In conclusion, we wish to express our very deep appreciation to the Wenner-Gren Foundation for making this symposium possible, and especially to Dr. Lita Osmundsen, Director of Research, whose valuable and perceptive suggestions aided enormously from initial planning to the very completion of the conference deliberations. The generous efforts of Dr. Osmundsen and the able and delightful Wenner-Gren staff at Burg Wartenstein made our stay there extremely pleasant and an experience that members of the conference will long remember. Mrs. Charlotte Frey, the Foundation's Symposium Secretary, did a superlative job of handling the organization of the Conference, and we cannot fail also to express our combined thanks to her and her husband, Carl Frey, who helped us all so much at Burg Wartenstein.

John A. Graham

Robert F. Heizer





- | | | | |
|----------------------------|-------------------|----------------------------|----------------------------|
| 1. Gareth W. Lowe | 6. Lee Parsons | 11. James A. Bennyhoff | 16. Edwin M. Shook |
| 2. C. William Clewlow, Jr. | 7. Hanns Prem | 12. Gordon E. Willey | 17. Tatiana Proskouriakoff |
| 3. John A. Graham | 8. Paul Tolstoy | 13. Ignacio Bernal | 18. Anne Chapman |
| 4. Robert F. Heizer | 9. Claude Baudez | 14. Robert J. Rodden | 19. E. Wyllys Andrews IV |
| 5. Rainer Berger | 10. George Kubler | 15. Geoffrey H.S. Bushnell | 20. Lita Osmundsen |

II. EARLY AND MIDDLE PRECLASSIC CULTURE IN THE BASIN OF MEXICO*

Paul Tolstoy and Louise I. Paradis

Between the 1st century of our era and the 16th, the Basin of Mexico saw the rise, one after the other, of what were probably the two largest cities of pre-Columbian America: Teotihuacán and México-Tenochtitlán. The preclassic settlements that precede these giants in the Basin are therefore of more than passing interest. Their study contributes inevitably to the perspective in which we view these two later centers of Mesoamerican civilization.

Much of our present understanding of Preclassic cultures in the Basin of Mexico comes to us from the work of George C. Vaillant at the sites of Zacatenco (1), Ticoman (2), and El Arbolillo (3). In the late 1920's and early 1930's, Vaillant brought to light the refuse deposits of these three small farming communities, situated on the lower slopes of the hills of Guadalupe, on what was once the north shore of a bay of Lake Texcoco, and what is today the rim of a flat plain covered by Mexico City.

Vaillant's sites, the first of their kind to be thoroughly tested and reported, represent the stage preceding the appearance of native civilizations in the Central Highlands of Mesoamerica. This position on the ladder of cultural evolution is reflected in the terms "Formative" and "Preclassic" generally applied today to these remains. Vaillant, not without wisdom, referred to them as the "Middle cultures" (4), recognizing in this way that they obviously did not represent the beginnings of settled life, farming, or most of the other practices and crafts known to these villagers. Earlier occupations of the Basin by peoples already possessed of similar habits and skills were therefore assumed, and concrete evidence was expected, sooner or later, to prove their existence.

Through an analysis of style changes in figurines and pottery, Vaillant was able to distinguish several periods within the time span of the Middle cultures. He recognized two gross temporal divisions, and these are still valid today. The earlier one, which he called Lower Middle or Copilco-Zacatenco, is exemplified by El Arbolillo, the deeper strata at Zacatenco (levels 10 through 4 of trench D), and evidence from under a lava flow at Copilco, a site in the southern part of the Basin investigated by Manuel Gamio in 1917. The later period, designated Upper Middle or Cuicuilco-Ticoman, is represented by Ticoman, by the upper layers at Zacatenco (3, 2, and 1, in ascending order), and by Cuicuilco, another site on the northern

* Underlined numbers in parentheses refer to "Reference and Notes" at end of article.

edge of the Basin, this one with several pyramids of modest size which are among the earliest in the region.

Each of these two major units of time and culture was subdivided further by Vaillant. The later, Cuicuilco-Ticomán phases (or subphases?) originally three in number but recently increased to six (5), are of no further concern here. In the earlier Copilco-Zacatenco culture, Vaillant perceived a twofold division. At El Arbolillo, it was formalized as phases I and II, and these were equated, respectively, with the strata called Early (10 through 7) and Middle (6 through 4) in trench D at Zacatenco. Like the Lower-Upper distinction, this partition appears essentially valid, and is widely accepted today. It is based on the presence of figurine styles A, B, and F in El Arbolillo II. These tend to supersede the C-1, C-2, and C-3 varieties of El Arbolillo I, though Vaillant's primary data, in fact, convey this rather imprecisely. Vaillant also points out the prevalence, in El Arbolillo II, of a new kind of incised pottery on which was "etched a running pattern that had the same relation to the previous stiff geometric design that script has to block lettering." Unfortunately, Vaillant found this stylistic change "almost impossible to express in a statistical summary," and he also failed to document it adequately with illustrations (1, plate 4; 4, plate 17; 6, figs. 22 (i, j, k, l), 25, 26 (b, c, g)). As a consequence, reliance on it by later investigators has been slight.

The finer divisions proposed by Vaillant for El Arbolillo have proved to be very difficult to use or to verify on the basis of his own data. Some of them appear to lack not only definition but substance as well. Thus, "Intermediate El Arbolillo I," the middle one of three subphases within phase I, and "Transitional El Arbolillo I," conceived as a bridge between phases I and II, are probably invalid and, in any case, unsupported by Vaillant's data. Early and late divisions do seem to be visible within his phase I (they may be, roughly, our El Arbolillo and La Pastora subphases, discussed below), but Vaillant does not define them satisfactorily.

To the problems inherited from Vaillant's original work, new ones have been added over the last 35 years. Some have been created by discoveries within the Basin itself; others have accrued as knowledge has come in from other regions of Mesoamerica, among them the Gulf coast, the southern highlands, and the area around the Isthmus of Tehuantepec.

For some time now the burial ground at Tlatilco west of modern Mexico City has been a prime source of perplexity (6-8). Since the early 1940's hundreds of graves have been excavated at that site. They contain pots, figurines, and other objects markedly different in style from those recovered in Vaillant's refuse dumps, and much more elaborate. The relative abundance, at Tlatilco, of flat-based dishes, long-necked bottles, and effigy jars, the presence of decoration by rocker-stamping and excision, and such unusual pottery forms as stirrup spouts, funnels, cornucopias, and spouted trays have all raised

the question of the relationship of this site to those studied by Vaillant. It has been claimed that Tlatilco was inhabited by a dominant group or elite, ruling over the villages of Zacatenco and El Arbolillo (7). The presence, at Tlatilco, of refuse resembling that of Vaillant's sites has been cited as support for that hypothesis, as well as for the rather different notion that, at Tlatilco, the elaborate burials are later, and were dug into earlier refuse of El Arbolillo-Zacatenco type (8). Another possibility, less often considered but worthy of serious attention, is that the graves, whatever their date, represent, to some degree at least, a mortuary complex of villagers whose day-to-day equipment may not have differed greatly from that of the inhabitants of Vaillant's sites (9). A meaningful choice among these and other alternatives requires data which published reports have, in the main, failed to provide.

Finds outside of the Basin of Mexico have had their own impact on our understanding of early cultures in the Basin, and this impact has been largely destructive. As new sequences have emerged elsewhere, it has become increasingly difficult to fit the Basin within the overall framework of the Preclassic in Mesoamerica, particularly if it is assumed, as it has been by many, that Vaillant's earliest finds are as old as, or older than, the earliest materials of other regions. A long chronology, based on this postulate, has been advocated by a number of authors. It would place the beginnings of Zacatenco and El Arbolillo well back in the 2nd millennium B.C., and would attribute the lack of cross-ties to other, equally ancient cultures elsewhere to the regionalism and isolation of the Central Plateau at that time. The fact is, however, that the few outside parallels that can be found for El Arbolillo (10) lie not with Ocos, Chiapa I, or Ajalpan but with Conchas, Chiapa II, and Santa Maria, all of them within the time range 1000 to 300 B.C. A shorter chronology has thus appeared, to some, increasingly probable. Until recently, radiocarbon dates from Vaillant's sites (C-196 and M-662) were inadequate to help with this problem. Tlatilco served merely to compound the existing confusion: while some of the grave goods have a clear relationship to Olmec finds from Morelos and Veracruz, neither the date of Tlatilco nor that of Olmec materials elsewhere could, until recently, be relied upon to support each other, or to tie the Basin sequence as a whole to the rest of Mesoamerica.

The alternatives made plausible or possible in view of all these uncertainties have been basic to the polemic between the so-called "Highland" and "Lowland" views of the emergence of civilization in Mesoamerica (11). Partisans of the first view have tended to push back in time as far as possible the beginnings of known Preclassic cultures in the Basin of Mexico, thereby securing a developmental lead for this area which is thought to have been maintained up through the time of the emergence of Teotihuacán civilization. Proponents of the "Lowland" thesis have been impressed by the Olmec phenomenon in Veracruz and Tabasco, and have emphasized what they feel to be a relative lag in highland development prior to the rise of the great city of Teotihuacán.

From this brief sketch of earlier research, certain urgent problems should have become apparent. They include (i) the proper phasing and absolute dating of the Vaillant sequence prior to Cuicuilco-Ticomán; (ii) the relative placement of Tlatilco within this sequence; and (iii) the nature of occupations preceding the initial settlement of El Arbolillo and Zacatenco.

It was primarily to solve these fundamental time-space problems that we recently carried out a series of stratigraphic and other investigations in the Basin of Mexico. Included were tests on the plain at Tlatilco, on the Loma de Atoto overlooking it, in two portions of the site of El Arbolillo, and at a locality near Tlapacoya which we call Ayotla. Surface collections were made at a number of other sites known, or presumed, to yield materials of pre-Ticomán date.

What follows is a summary of some of our fieldwork and of our present opinions (October 1969) concerning the relationships and meaning of our materials. The opinions are subject to revision in the future, for they are little more than impressions formed in the course of a long and continuing program of processing our data. Definitive tabulations were thus not available for most of the attributes which we recognize and which we plan ultimately to use as a basis for firmer conclusions.

The New Sequence at El Arbolillo

Two cuts were made in 1965 at Vaillant's site of El Arbolillo. These were designated El Arbolillo East and El Arbolillo West. They were located east and west, respectively, of the Ticomán-Cuauhtepéc road, which passes through the site.

Fortunately, the materials from these two cuts appear to span the full range of the occupation of the site as determined by Vaillant.

It is evident, moreover, that ceramic trends in our cuts can be described in greater number and in sharper focus than Vaillant found possible, and our final study is likely to improve the picture further. At this time, two subphases are clearly evident in the ceramic column at El Arbolillo East. The earlier subphase, which we are calling the El Arbolillo subphase, is characterized by a stiff geometric style of incision applied to burnished monochrome ware, often after hardening. It is also notable for the relative abundance of white ware decorated by incision on the interior floors of bowls (which were perhaps molcajetes or chile graters) and on the rim, where this incision often takes the form of the double-line-break motif, proposed by Coe (10) as a Middle Preclassic time marker for parts of Mesoamerica. Also characteristic are fine-paste "bird-face" figurines of Vaillant's C-1 and C-2 groups, small pottery masks, and a small amount of coarse pottery with sandy paste. The beginnings of the El Arbolillo subphase also seem to be marked by a scarcity or total lack of the yellow-white and white-on-red types typical of later levels,

and by the rare occurrence of white-rim black ware (differentially fired) and flat-based vessels. In the later, La Pastora subphase, two novel styles of plastic decoration appear: a deep broad-line incision, which predominates and generally is made before burnishing and used to create large-scale curvilinear designs (among them a series of concentric arcs which we call the "rainbow motif"), and a very shallow kind of engraving in which the burnished slip is scratched lightly when it is leather-hard, to form the cursive designs which Vaillant found so difficult to sort out in his material. This cursive style is, however, still quite scarce in the La Pastora levels. Other trends within this subphase include a perceptible decline in black burnished monochrome and in white incised ware, an increase in the abundance of light brown burnished monochrome, and certain changes in figurine types. In particular, "bird-face" varieties eventually disappear, to be replaced by the broad-faced C-3, the flat-eyed B-C, and the "sheep-face" C-5 forms of the Vaillant classification. The uppermost La Pastora levels contain a small but consistent amount of "textured" ware, bearing overall stamped designs which Tozzer (12) and Vaillant called "cuneiform" some of which may be impressions of basketry.

After what may be a short interruption, the sequence resumes at El Arbolillo West. The Cuauhtepac subphase represented at that location is notable for the overwhelming abundance of incision in the cursive style, and by the presence of flat figurines of the B variety, and of the very crude F type. The absence of the A type may be due to sampling error. Other characteristics include the virtual absence of incised white, the decline of the darker and lighter brown monochromes, the presence of textured ware, and the relative abundance of yellow-white, red, and red-on-buff. A number of these characteristics are those reported by Vaillant for his "El Arbolillo II" phase.

As to Vaillant's sequence in general, it appears that enough vertical mixture prevailed in most of Vaillant's cuts to prevent recognition of many of the changes which do in fact take place in the time span covered by his materials. For this reason, Vaillant's subdivision of "El Arbolillo I" does not match our own distinction between the El Arbolillo and La Pastora subphases, and the vertical distribution of a number of elements, including figurine types, appears in fact to be somewhat different from that claimed originally in the 1935 El Arbolillo report.

Tlatilco

In 1963, one of us (P.T.) made a cut 4.5 by 3 meters at San Luis Tlatilco on the plain formed by the rivers Hondo and Totolica, some 130 meters from Piña Chás "Iglesia" test pit. An outline of the stratigraphy and chronology of this excavation is given in an earlier paper (9). In it, Tolstoy and Guénette express the view that materials recovered by Piña Chán on the hill of Atoto less than half a kilometer away represent the final

portion of a sequence which runs through both Tolstoy's test of 1963 and Piña's two cuts at Tlatilco proper (his No. 2 and Iglesia pits) (9). This remains essentially our position, with certain qualifications and refinements which we set forth below.

A preliminary ordering of the material from our excavations suggests four main time segments or components marked by relatively minor changes in the popularity of certain types and attributes. These components should probably be considered no more than arbitrary and rather thin slices of a continuum.

Our two earlier Atoto components (1 and 2) probably overlap, in time, Piña's pit No. 2 at Tlatilco proper (levels 4 and 3), and certain units (F to C) of our own 1963 Tlatilco test pit. This overlap is indicated by the peaks and subsequent declines of light brown ware and fugitive white, which our earlier information failed to show clearly, as well as by the seeming absence of figurine types A and B in this early part of the occupation of Atoto.

Atoto components 1 and 2 should therefore be assigned, in all probability, to the Totolica subphase, defined (9) as a subphase showing a gradual decline of black and dark brown ware from an initial peak; an increasing importance of light brown, white, and white-on-red; and the presence of certain very minor wares such as the lacquer-like fugitive orange.

The two later components in our Atoto sequence (components 3 and 4) support and amplify our earlier definition of the Atoto subphase (originally founded on Piña's data) as one in which several trends visible in the cuts at Tlatilco proper continue or come to their predictable culmination. These include the decline of black ware and of fugitive white and white-on-red and the growth in importance of red, grayish-white, and red-on-buff. To these criteria, the presence of figurines of types A and B should probably be added.

Finally, if figurine types A and B are accepted as markers of the Atoto subphase, it must be granted that Piña Chán's latest level (level 2) in his pit No. 2 at Tlatilco contains Atoto subphase materials. A few clues, such as the frequency of textured body sherds in zone A and our radiocarbon date for our zone A at Tlatilco proper (Y-1626; 410 B.C. \pm 120), suggest that here too the latest Preclassic may represent the Atoto subphase, though unidentified as such on cultural grounds.

In summary, then, it may be said that our original threefold phasing of the refuse at Tlatilco into the Iglesia, Totolica, and Atoto subphases still stands. However, a review both of our own evidence and of that of Piña Chán now suggests that the initial occupation of Atoto dates back to Totolica times, whereas settlement on the Tlatilco plain continued into Atoto times.

The relationship of Tlatilco graves to Tlatilco refuse remains a vexing problem. Our recent work at Ayotla clearly shows that many Tlatilco graves

belong to a phase earlier than any represented so far by refuse at Tlatilco itself -- namely, the Ixtapaluca phase. Aside from the problem of recovering, at Tlatilco, the refuse dumped by the occupants of these early graves, there remains at that site the tertium quid long ago noted by Heizer (13) - namely, grave materials that cannot be matched with any other known assemblage. Thus, we still must ask whether some of this pottery reflects its funerary function, instead of being merely a sample of what the deceased used in their lifetimes, or whether perhaps we are dealing here with some third, unidentified ethnic or cultural entity.

The Relationship of Tlatilco and El Arbolillo

Tolstoy and Guénette (9) examined this problem at some length and concluded that the refuse deposits at Tlatilco and Atoto corresponded in time, respectively, to Vaillant's El Arbolillo II and to an unfilled gap thought to follow that phase in the Vaillant sequence. In searching for cross-ties between the two sites, Tolstoy and Guénette were compelled to depend on Vaillant's analysis of change at El Arbolillo. Now that we have on hand our own data from all of the sites concerned, we are in a position to revise these earlier conclusions.

Our new information, though still incompletely digested, strongly suggests that the Tlatilco-Atoto and El Arbolillo refuse sequences are, in fact, essentially parallel in time. More specifically, the Iglesia, Totolica, and Atoto subphases at Tlatilco emerge as rough equivalents of the El Arbolillo, La Pastora, and Cuauhtepac subphases at El Arbolillo. This opinion is based on a number of cross-ties, which include the predominance of cursive incision over other styles, the presence of B-type figurines, and a decrease, with time, in the importance of light brown and fugitive white pottery in the Atoto and Cuauhtepac subphases; parallel increases in the abundance of light brown ware, a concurrent decrease in black, and the presence of C figurines (among them, the C-5 variety) unaccompanied by type B figurines in the La Pastora and Totolica subphases; the appearance of cursive incision and of C-3 figurines at the beginning of the Totolica and La Pastora subphases; and an apparent lack or scarcity of yellow-white and white-on-red pottery in the earlier Iglesia and El Arbolillo subphases.

Whether or not these various points and segments in our refuse columns deserve to be matched precisely, the significant fact remains that the stylistic events we have mentioned follow one another in the same order at both sites. Since, in addition, the two sites have much the same chronologically "neutral" inventory and are located a scant 15 kilometers apart, the conclusion that they are roughly contemporary (within the limits of discrimination set by our data as a whole) would seem to be the best possible conclusion at this time.

If this is granted, we may raise some interesting questions about the

differences between the two localities. As yet, our analysis is not complete enough to show all of them, but a few are apparent. Thus, the greater abundance of dark monochrome at Tlatilco, already noted by Tolstoy and Guénette, is confirmed by our own analysis of El Arbolillo materials. It is particularly intriguing in view of the even greater abundance of dark ware at Atoto, contrary to what might be expected on purely chronological grounds. Whereas the trend, through time, of this ware is evidently useful in cross-tying the El Arbolillo and Tlatilco columns, the actual percentage of dark ware within any component thus would seem to reflect "activity" rather than time. More specifically, if we are able to follow up certain earlier leads (9), black ware may emerge as an index of prestige or wealth.

Other meanings must be sought for the abundance of D-1 and D-2 figurines, and for the seeming relative abundance of cursive incision in the Totolica subphase. Cursive incision may prove to be a cultural diagnostic, and its slow rise to dominance in Cuauhtepc times at El Arbolillo could reflect increasing communication between the two communities, over time, possibly in the form of intermarriage. The D figurines, on the other hand, pose a different problem. They remain exceedingly scarce at all times in the Basin of Mexico outside of Tlatilco (though they are well represented in Morelos). Rare examples occur in Zacatenco levels 9 and 7, and in level 3 of Vaillant's trench G at El Arbolillo (probably of La Pastora age). At Tlatilco itself, the definition of their time range is complicated by their presence in graves which could be earlier than the Totolica and Iglesia subphases. One may wonder, therefore, whether some D figurines did not find their way into refuse from earlier graves. Viewed in this light, the occurrence of D-2 and K specimens in our lowest levels at Ayotla and in some Tlatilco graves may be of considerably more significance than their continued presence in later Totolica refuse.

Excavations at Ayotla (Tlapacoya)

The three 4-meter-deep shafts that we sank at Ayotla in 1967 provided what is undoubtedly the most novel information to come out of our recent work in the Basin of Mexico. The location tested is the remnant of a larger site which has been bulldozed away, in large part to provide fill for the Mexico-Puebla highway, which passes to the east and south. Private collections contain pottery and figurines recovered from these fill-quarrying operations, and such specimens are usually identified as coming from "Tlapacoya" (14, 15). We substitute the designation Ayotla, not because it is more apt geographically, but to avoid confusion with the site of the Late Preclassic pyramid, already known in the literature as "Tlapacoya" (16).

The three Preclassic occupations at Ayotla are marked by assemblages significantly different from any hitherto reported from refuse deposits in the Basin. The two earlier assemblages, which we call Ayotla and Justo, though

separate, are closely related to each other and represent adjacent portions of a continuum. They have a host of features in common, many of them also found in the "Olmec" cultures of Chiapas, Oaxaca, Veracruz, Puebla, and Morelos. Such features include flat-bottomed cylindrical or flare-sided dishes (vasos) as the major open-vessel form; a gray-paste white ware decorated with exterior incision, excision, and resist designs; differentially fired ("white-rim-black") and red-on-buff plain rocker-stamping and zoned hatching; motifs such as the St. Andrew's cross; the use of a red pigment containing specular hematite; figurines of the D-C-9 (or Dx), D-2, K, and C-9 types; small pointed-stem projectile points; and legless metates with thick loaf-shaped manos. This material provides clear-cut evidence of "Olmec" presence in the Basin of Mexico in the form of occupational refuse, and suggests strongly that some, at least, of the individuals buried at Tlatilco belonged to a community culturally similar to Ayotla.

More startling yet is the evidence for the third subphase, which we have called Bomba. While it retains a substantial proportion of the attributes of the earlier occupations, it is also clearly in the process of losing some of them, and of acquiring characteristics that ally it to the earliest refuse at Tlatilco and El Arbolillo. In other words, it appears to represent an extension of the Ayotla-Justo continuum in its change toward an Iglesia- or an El Arbolillo-like assemblage. Indications to this effect include the appearance and growth in importance of brown-paste white ware decorated on the interior with "grater bowl" incisions and bearing the double-line-break motif incised on a flattened lip; the disappearance of rocker-stamping and earlier varieties of white ware; the decline of differentially fired ware; the decline of the flat-bottomed dish, and a corresponding increase in round-bottomed bowls, some of them of composite silhouette (though this shape is found earlier); and the disappearance of the earlier figurine styles and the appearance of new forms clearly within the C-1/C-2 tradition of the lower El Arbolillo levels.

On the face of it, we appear to have evidence that the earliest ceramic occupation in the Basin of Mexico is culturally "Olmec", and that it is followed by the appearance or emergence of Copilco-Zacatenco culture. This would seem to be the most economical interpretation of the evidence at this time. It should be recognized, however that the Covarrubias thesis, which would bring the Olmec into contact with a preexisting or equally old local tradition of Zacatenco type, still cannot be discounted completely. The main argument against it is inability to claim on either seriation or chronometric grounds, that suitably early sites in the Zacatenco tradition exist in the Basin of Mexico (see Fig. 1). Such reasoning will carry more weight when more early sites become known.

Chronology, Phasing, and Broader Relationships

Figure 1 sets forth the relationships in space and time of the materials

so far discussed.

Vertical sequencing within our El Arbolillo, Tlatilco, and Ayotla pits (Fig. 1, columns 4, 6, and 11) is based primarily on stratigraphy, though seriation was used to interdigitate lots from adjacent squares or shafts into single columns at each of these localities. At Atoto (column 9), the stratigraphy was more complex and less reliable, and seriation is responsible therefore to a greater degree for the definition of the four components shown. Numbered levels are shown for Piña's Atoto and Tlatilco excavations [columns 8 and 7; for a more detailed presentation, see (9)] and for Vaillant's trench D at Zacatenco (column 2). Vaillant's El Arbolillo and Ticoman sequences (columns 3 and 1) are given schematically in terms of his phase designations. Column 10 represents the Tlatilco graves, which evidently cover a fairly long time span, though most individual grave lots have not been published, and sequencing is not possible except on the basis of a few radiocarbon dates (hence the four entries in column 10).

Horizontal correlations between and within localities are based on matching a limited number of modes, types, and trends. As our analysis proceeds, many more cross-ties should become available, and our alignments will either be modified or achieve a higher level of proof.

Much the same thing can be said about our taxonomy, in which we attempt to express some of the relationships visible to us at this time within the material. The units we call subphases are so labeled because they are obviously finer than what most Mesoamerican archeologists have called phases - as might be expected, since they serve to contrast manifestations that are very close to each other in space, time, and content.

In the Tlatilco-El Arbolillo sequence, we propose three sequent phases; Iglesia-El Arbolillo; Totolica-La Pastora; and Atoto-Cuatepec. For those who would find the terms too cumbersome, we suggest the initials I-A, T-P, and A-C.

For the earlier subphases Ayotla and Justo, we are unable to predict, at this time, whether each will be linked laterally with contemporaneous but as yet unknown subphases in the Basin or even outside it, or whether the two should be joined vertically into a single phase. Some of the elements needed as a basis for this decision may be provided in the future by greater knowledge of the Tlatilco grave sequence.

What is evident, however, is that Ayotla, Justo, and whatever unit (or units) is formed by the "Olmec" graves at Tlatilco do constitute a higher-order group, easily contrasted with the rest of the material we are considering. The latter material corresponds to Vaillant's Copilco-Zacatenco culture or period, which we propose to designate more simply "Zacatenco." The former, more ancient group of cultures we shall label "Ixtapaluca." These two groupings parallel the broad phases of many Mesoamerican sequences, such as that of Flannery for Oaxaca (17) (San José, Guadalupe) and that of MacNeish for Tehuacán (18)

(Ajalpan, Santa Maria).

Traditions within the ceramic cultures of Mesoamerica have yet to be defined systematically. Here, we need only point out that both the Ixtapaluca and the Zacatenco cultures have relatives outside the Basin of Mexico. The Ixtapaluca subphases are part, of course, of the famed Olmec series of cultures which are now known to have existed in Morelos, southern Puebla, Veracruz, Oaxaca, and the Isthmian region and which may, in these areas, have come close enough to being contemporaneous to qualify as a genuine Mesoamerican horizon [Lowe's Early Olmec subhorizon (19, p. 68)]. The Zacatenco phases appear to have fairly close counterparts in Puebla and Morelos, with some features (such as the composite-silhouette bowl and the double-line-break motif) quite broadly distributed in Mesoamerica.

In the Basin of Mexico, there remain two major Preclassic assemblages whose exact taxonomic position still appears very uncertain. One of these is the Bomba subphase, which combines features of the earlier Olmec subphases with characteristics of later El Arbolillo and Tlatilco refuse. In its transitional nature, we can say unequivocally, lies the significance of the Bomba subphase. It is also this transitional nature that makes classification difficult until we can view our data more completely. We are inclined now to include Bomba within the Zacatenco group, perhaps as the sole representative of an initial phase within it, or else as a third subphase within the Iglesia-El Arbolillo phase. It is possible, however, that the quantitative study of vessel shapes and a point-by-point comparison with all of our other assemblages will place Bomba among the Ixtapaluca cultures.

The second unplaced phenomenon of the Early to Middle Preclassic in the Basin of Mexico is the tertium quid in the Tlatilco graves. Some Tlatilco burials fall clearly within the Ixtapaluca group. Others in all likelihood correspond to the later Zacatenco occupation of the site. Until complete grave lots are published, individual assignments of burials to one or the other category will be impossible. Yet, it is evident already that neither Ixtapaluca nor Zacatenco refuse have all the characteristics which are so obtrusively present in many Tlatilco graves and which Grove (20) takes as the basis of his "Tlatilco style." Over a dozen features of vessel shape, for example, are either entirely or largely confined to these graves. They include tubular necks and mid-body construction in bottles; stirrup spouts; whistling jars; and effigy forms (6, figs. 35y, 37q, 39a, 43m, 44q). Are these part of a burial assemblage, used by participants of one of the subphases already recognized, or do they indicate a cultural unit so far unrepresented by refuse? When do these features first appear in the Basin sequence, and what of their Andean relationships? Answers to these questions today are still guesses. Our own guess is that they do represent a culturally distinctive element of the Tlatilco community, that they appear first

at the time of the transition from Ixtapaluca to Zacatenco culture, and that their immediate source was Morelos, while their more remote affiliations are with the west coast of Mesoamerica and, ultimately, the Andean area [see Lowe (19, p. 71)].

Radiocarbon dates for Basin Preclassic are still scarce. Our 11 individual dates are discussed at length elsewhere (21). Together with four dates on Tlatilco burials, they constitute a corpus which renders suspect the two early dates obtained from solid carbon (C-196, and C-199) which form the basis of the "long" chronology of some investigators. As a consequence, both the Ixtapaluca and the Zacatenco phases fall well in line with their ceramic analogs in other parts of Mesoamerica. Ixtapaluca parallels Late Ajalpan in Tehuacán (18, p. 38), San José in the valley of Oaxaca (22), San Lorenzo in Veracruz (10), Cotorra in Chiapas, and Cuadros on the Pacific side of the Isthmus (23). Zacatenco, particularly with respect to its incised white ware, parallels Early Santa María in Tehuacán, Guadalupe in Oaxaca, perhaps part of La Venta in Veracruz, Dili in Chiapas, and Conchas 1 on the Isthmus.

While broadly consistent, the picture afforded by the radiocarbon assays is too imprecise to answer several questions. Thus, the amount of time between the latest Bomba and the earliest El Arbolillo levels could be stretched to 150 years or reduced to zero. How much time one allots this interval is crucial to visualizing the rate of "deculturation" of the Olmec communities in the Basin, the suddenness of the beginning of Zacatenco, and the extent of subregional differences between southern and northern portions of the Basin in the early centuries of the first millennium. It could also be important in estimating any possible gap in the sequence into which the appearance of the "Tlatilco style" might be fitted. Similarly, the degree of contemporaneity of the two members of the pair of subphases in the Tlatilco and El Arbolillo refuse sequences cannot be verified. Discrepancies could range as high as a century between boundaries of seemingly equivalent units. Convincing answers to some of the questions raised in the next section will be hard to provide until some of this chronological play is eliminated from our correlations.

Events, Activities, and the Olmec Problem

Our work has been aimed primarily at revising what had clearly become an inadequate time-space framework. This goal has determined our priorities both in the field and in this preliminary article. At this point we can offer some evidence and a few thoughts concerning the activities and events that involved the communities we have studied. As our study proceeds, these thoughts doubtless will be amplified and corrected.

The communities we have dealt with are, of course, those of farmers. All of them, as it happens, are so situated that both hillslope and lakeshore micro-environments are within close range. At El Arbolillo, Vaillant found casts of maize leaves in trench G, in what are probably La Pastora levels. At

Ayotla, the earliest deposit has yielded tiny maize cobs, which we have submitted to Paul C. Mangelsdorf for examination. In all the deposits there is abundant evidence of the hunting of large and small animals.

This latter evidence, in the form of bones, has been examined recently by Kent V. Flannery (24). The identifications he provides suggest that deer, rabbits (Sylvilagus and Lepus), gophers, domestic dogs, and people were among the land mammals most often eaten. In most phases, the lake was intensively exploited both for mud turtles (Kinosternon) and water birds (predominantly coot at Ayotla, and pintail, shoveler, coot, and others at El Arbolillo). Not a single fish bone was found in the refuse. Remarkable, also, is the almost total neglect of lake resources (turtle and birds) in the El Arbolillo subphase - - that is, by the first few generations to settle at the site. While there are several possible explanations, it is difficult not to speculate that we may be dealing here with recent settlers whose food habits had been formed elsewhere and who needed time to adopt techniques and schedules for procuring lakeside food and to acquire a taste for such food.

In trying to visualize economic and other relations within the Basin and between our sites and regions outside the Basin, we are led to consider the fact of Olmec presence from 1200 or 1150 B.C. to about 900 B.C. over a great part of Mesoamerica. This presence has been linked to trade by many (Coe, Flannery, Grove, and Jimenez Moreno), though the products exchanged between particular communities cannot always be specified with any confidence. In the case of our sites, we need to know the attraction that the Basin of Mexico held for traders from either the tropics or the highlands to the south.

As Coe has suggested (25), Ayotla (Tlapacoya) could have functioned as a port of entry into the Basin of Mexico from Morelos, while Tlatilco may have controlled the road leading westward out of the Basin to Toluca. The locations of these two sites of the Ixtapaluca phase are thus compatible with a possible role as gateways to several regions lying north and west of the Basin. Whether this was their role and, if it was, what product (or products) was handled is still not clear. Obsidian would seem a good possibility as a product, particularly since the prized green variety from Hidalgo, though exceedingly rare and not locally prevalent in the Preclassic of the Basin, is represented in one of our Ayotla subphase levels and at San Lorenzo in Veracruz (26). However, it is likely that many products traveled these routes, if any did, and that exchange occurred in both directions, even if one particular product may, in some cases, have been of primary importance, historically or functionally, in creating and maintaining particular routes.

We need, of course, to know many other things before we can elucidate the nature of Olmec presence. Do the Olmec of the Ixtapaluca phase represent a group of "Olmecoids" from another highland area, or "colonial" Olmec

from the lowlands (27)? And whom did they find and deal with in the Basin of Mexico? As long as we are completely in the dark on this latter point, a meaningful discussion of Olmec "trade" is very difficult. It is conceivable that the Basin of Mexico in 1200 B.C. was a virtual vacuum, in which the Olmec established self-sustaining settlements for the sole purpose of keeping open lines of supply to the lowlands, and that they had no need to deal in any but a defensive way with a scarce, possibly pre-ceramic, resident population. It is also possible, on the other hand, that the inhabitants of Ayotla and Tlatilco are the resident population, acculturated through ties to Olmec elsewhere, but also linked by ties of ethnic identity and mutual self-interest (kinship, trade, markets?) to a less acculturated local population of significant density and level of complexity. Gradations between these two extremes are also possible, as is a gradient in time leading from the first to the second. It is this last possibility that is, in fact, the most appealing, provided we bear in mind the fact that we have as yet no real basis for setting at the time of Olmec arrival the base line for this transformation of resident societies, which still are completely unknown archaeologically.

In gauging the impact of Olmec presence, we should ask not only what the Olmec came to get in this part of the highlands but also what, if anything, they brought in exchange. Here again the answer is not likely to be simple. As it is for "trade" in general, our basis of inference is mainly twofold: our theoretical understanding of the relationship of civilizations to the less complex societies around them, and data on regional specialization and trade in later times in Mesoamerica. Theoretically, we might predict that Olmec centers would export manufactures. Finds of Olmec portable art in such places as Michoacán might be cited as evidence of this kind of activity. On the basis of later conditions, we might, in addition, infer a flow of natural lowland products to the highlands. While perishable products (such as fruit) might not survive more than a few days of transport, items such as feathers or cacao can travel over great distances and did so in Aztec times.

In this connection, one wonders whether the Olmec may not have created for themselves a hold over much of Mesoamerica by introducing both cacao and the need for it among some of the "developing" societies of the highlands. The ultimate test of this idea is likely to be made in the dry caves of an area such as Guerrero, or possibly through the use of flotation techniques in areas less favorable for preservation of material. In the meantime, it is tempting to suggest that cacao was one more early contribution of the Olmec to Mesoamerican unity, particularly in view of its potential as a stimulus to economic and social differentiation (28) within lowland societies; its known range of cultivation, not unlike that of lowland Olmec remains; and its link with irrigation, which, in Coe's opinion, must have been known to the Olmec of Guerrero at least.

Olmec "presence" in Mesoamerica has been interpreted by some (29) as incorporation into an Olmec empire. It is difficult to see how this view

will be verified. At this time we can only say that resemblances between Veracruz, Oaxaca, and the Basin of Mexico do appear to be very close and to indicate that contact between these regions was continuous and intimate. Before we choose, in a particular instance, the imperial model of Caso (29), the economic- and social-dependence model of Flannery (17), or any other ethnographic representation of such similarities, a full-scale inventory of alternatives and of tests for them must be thought through.

On a more local scale, it is worth noting that our stratigraphic findings somewhat reduce the dimensions of the problem examined earlier by Tolstoy and Guénette (9) - that of the contrast and relations between Tlatilco and El Arbolillo. Whether or not an Olmec "elite" is responsible for the Ixtapaluca phase at Tlatilco, it would appear in any case that El Arbolillo was unoccupied at that time. That part of the occupation of Tlatilco which parallels the occupation of El Arbolillo, though marked by a larger settlement (about 50 hectares, as opposed to the 6 hectares occupied by El Arbolillo) can no longer be linked with all the opulent burial furniture which inspired the Olmec-dominance hypothesis of Covarrubias. In the Basin, at least, we are left, prior to 900 B.C., with all chiefs and no Indians. The "Tlatilco style" burials may yet revive the idea of Tlatilco dominance during the earlier part of the period of coexistence of the two sites. However, our burial chronology is still too imprecise to indicate how seriously this idea should be entertained. It is, in fact, the time interval between about 975 and 800 B.C. (that of the Bomba, Iglesia, and El Arbolillo subphases and possibly also of the Tlatilco-style graves) that is the least understood portion of our sequence.

That, and the nature of immediately pre-Olmec occupancy constitute two pressing problems for future Preclassic research in the Basin of Mexico.

Summary and Conclusions

To the three specific questions raised at the beginning of this article, we offer the following answers.

1) The Vaillant sequence at El Arbolillo is best viewed in terms of three sequential subphases--the El Arbolillo, La Pastora, and Cuauhtepic subphases--which appear to extend from about 850 to about 400 B.C. on the radio-carbon time scale.

2) At Tlatilco, the refuse (including the deposits on the Loma de Atoto) spans approximately the same interval, and can be fitted into three subphases roughly parallel to those of El Arbolillo; the Iglesia, Totolica, and Atoto subphases. However, the graves at Tlatilco include at least one component which is earlier, and which has no known equivalent in refuse - the Ixtapaluca or "Olmec" burials. For another component, consisting of the so-called "Tlatilco style" graves, the date and refuse equivalent are doubtful.

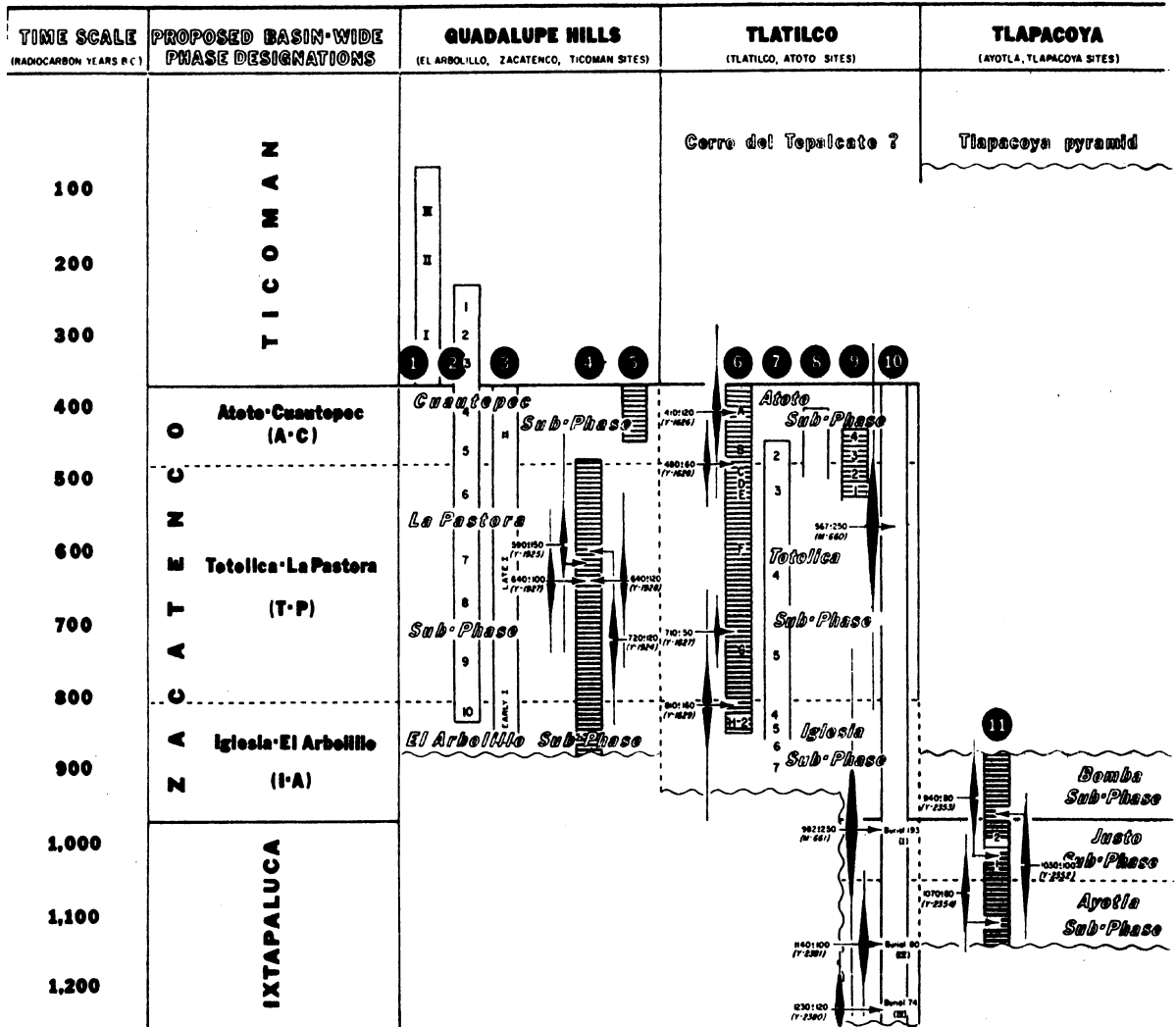


Fig. 1. Chronological alignment of Preclassic sites in the Basin of Mexico. For discussion of individual columns, see text. The shaded columns represent excavations by Tolstoy and Paradis.

3) The initial settlement of El Arbolillo (and doubtless of Zacatenco as well) in the Guadalupe hills appears to have been later, by at least 300 years, than the appearance of Olmec culture in the Basin. The appearance of that culture is manifest as the broad phase we call "Ixtapaluca," which we contrast with an equally broad phase or aspect that we call "Zacatenco." Ixtapaluca components in the Basin are now known only at Ayotla (Tlapacoya) and at Tlatilco. They represent the earliest reliably identified users of pottery in the Basin of Mexico (30).

These few points represent a mere beginning in the effort to put our data to use. Vast numbers of attributes and their combinations remain to be studied, from the standpoint both of chronology and of wider relationships. In addition, we need still to sift a broad range of evidence bearing on environment and its exploitation, on relationships within and between communities, and on other aspects of the cultures with which we are dealing. Ultimately, we hope for greater understanding of such central questions as the changing importance of the Central Highlands in Mesoamerican prehistory and the specific manner in which the Olmec phenomenon there affected the rise of civilization.

References and Notes

1. G. C. Vaillant, *Anthropol. Pap. Amer. Mus. Natur. Hist.* 32, pt. 1 (1930).
2. _____, *ibid.*, pt. 2 (1931).
3. _____, *ibid.* 35, pt. 2 (1935).
4. _____, *Aztecs of Mexico* (Doubleday, New York, 1944) pp. 28-49.
5. M. West, *Amer. Antiquity* 31, 199 (1965).
6. R. Piña Chán, *Tlatilco* (Instituto Nacional de Antropología e Historia, Mexico, 1958), vol. 1.
7. M. Covarrubias, *Cuad. Amer.* 9, 149 (1946).
8. M. N. Porter, "Tlatilco and the Preclassic Cultures of the New World," *Viking Fund Publ. Anthropol. No. 19* (1953).
9. P. Tolstoy and A. Guénette, *J. Soc. Americanistes* 54-1, 47 (1965).
10. M. D. Coe, "La Victoria, An Early Site on the Pacific Coast of Guatemala," *Pap. Peabody Mus. Archaeol. Ethnol. Harvard Univ. No. 53* (1961), p. 129.
11. W. T. Sanders, *Amer. Anthropol.* 65, 972 (1963).

12. A. M. Tozzer, *Bur. Amer. Ethnol. Bull. No. 74* (1921), p. 48.
13. R. F. Heizer, *Amer. Antiquity* 24, 202 (1958).
14. M. D. Coe, *The Jaguar's Children* (Museum of Primitive Art, New York, 1965).
15. M. Porter Weaver, "Tlapacoya Pottery in the Museum Collection," *Indian Notes and Monographs, Miscellaneous Series, No. 56* (Museum of the American Indian Heye Foundation, New York, 1967).
16. B. Barba de Piña Chán, *Acta Antropol.* 1-1, issue 2 (1956).
17. K. V. Flannery, A. V. T. Kirkby, M. J. Kirkby, A. W. Williams, Jr., *Science* 158, 445 (1967).
18. R. S. MacNeish, *Second Annual Report of the Tehuacán Archeological-Botanical Project* (Peabody Foundation, Andover, Mass., 1962).
19. G. W. Lowe, *Pap. New World Archeol. Found. No. 20* (1967).
20. D. C. Grove, in *Dumbarton Oaks Conference on the Olmec*, E. P. Benson, Ed. (Dumbarton Oaks Research Library and Collection, Washington, D.C., 1968), p. 183.
21. M. Stuiver and M. D. Coe, *Radiocarbon*, in press.
22. K. V. Flannery, in *Dumbarton Oaks Conference on the Olmec*, E. P. Benson, Ed. (Dumbarton Oaks Research Library and Collection, Washington, D.C., 1968), pp. 82-89.
23. M. D. Coe and K. V. Flannery, "Early Cultures and Human Ecology in South Coastal Guatemala," *Smithson. Contrib. Anthropol. No. 3* (1967).
24. K. V. Flannery, personal communication. Dr. Flannery has kindly agreed to present and discuss his findings in a separate report.
25. M. D. Coe, *America's First Civilization* (American Heritage, New York, 1968), p. 95.
26. _____, personal communication.
27. I. Bernal, in *Dumbarton Oaks Conference on the Olmec*, E. P. Benson, Ed. (Dumbarton Oaks Research Library and Collection, Washington, D.C., 1968), pp. 135-142.
28. R. F. Millon, *Amer. Anthropol.* 57, 698 (1955).

29. A. Caso, Mem. El Colegio Nacional No. 5 (1964).
30. An earlier date has been claimed for pottery recovered in deep deposits at Cuicuilco. Unfortunately, the materials of this proposed "Tlalpan phase" have not been published, and radiocarbon samples from Cuicuilco cannot be conclusively associated with it. [See R. F. Heizer and J. A. Bennyhoff, *Science* 127, 232 (1958); G. J. Fergusson and W. F. Libby, *Radiocarbon* 5, 12 (1963); ___ *ibid.* 6, 332 (1964); M. D. Coe (see 14, pp. 25-26).]
31. Work at Tlatilco was carried out in 1963 by one of us (P.T.), with a grant from Canada Council, while he was at the Université de Montréal. The investigation of other sites in the Basin of Mexico from 1965 through 1968 was made possible in part by concurrent grants from Canada Council and the National Science Foundation (grant GS-720). We thank these institutions for their support, as well as the Groupe Anthropologique et Sociologique pour l'Etude des Communautés and the Institute of Andean Research, which received and administered the grants.

Recent research into the Early Preclassic of the Central Highlands

Paul Tolstoy

Since the above was written, some further progress can be reported in our understanding of the Early Preclassic in the Basin of Mexico and adjacent regions.

Excavations by Christine Niederberger in 1969 at the site of Tlapacoya (which I call Ayotla in our earlier paper), under the direction of José-Luís Lorenzo of the INAH, have provided abundant material which should amplify immeasurably our picture of early ceramic phases at that site (Niederberger, 1969). In neighboring Puebla, the work of Joerg Aufdermauer at Moyotzingo (1970, pp. 15-16) evidently confirms the early position of Olmec-related materials in the sequence of the Central Highlands. In Morelos to the south, the work of Grove (n.d.) similarly indicates an early Olmec phase (La Juana) and a later Middle Preclassic occupation (Cerro Chacaltepec I), the latter paralleling Zacatenco in the Basin of Mexico. Perhaps intervening between the two is the San Pablo phase (Grove 1970), known principally from grave offerings near-identical to those of some burials at Tlatilco and exemplifying what Grove has called the "Tlatilco" or "Rio Cuautla" style of ceramics.

To clarify the position of "Tlatilco style" materials in the revised Basin of Mexico sequence, I have undertaken a seriation of the grave lots from Tlatilco, using unpublished data generously supplied by Muriel Porter

Weaver, Arturo Romano P., and José-Luis Lorenzo, and examining specimens at the Museo Nacional in Mexico City. This study, still in progress, has led to the recognition of 4 groups of burials. Group 1, perhaps the earliest, contains graves with goods of predominantly Olmec (Ixtapaluca) affinities. Group 4, probably the latest, consists of graves containing stirrup-spouted vessels and other markers of the "Tlatilco" style, as well as what appear to be occasional anticipations of Zacatenco ceramics. Groups 2 and 3 seem intermediate between polar groups 1 and 4. There are hints that the Ayotla and Justo subphases at Tlapacoya correspond in time to groups 2 through 4 at Tlatilco. Irreducible differences seem to exist nevertheless between materials from the two sites, regardless of their apparent age. For this reason, some, at least, of the attributes peculiar to the graves at Tlatilco are likely to be specifically funerary. Within the category of funerary materials, however, Tlatilco-style goods do seem to become particularly varied and numerous and to displace the earlier Olmec-style materials near the end of the Ixtapaluca phase (ca. 1000 B.C.). This trend evident in the grave seriation has not become visible so far in the Ayotla-Justo refuse sequence at Tlapacoya. A temporal equation of Justo and Group 4 materials is likely nevertheless in view of the radiocarbon dates and ceramic cross ties, including a possible stirrup-spout fragment in Justo refuse.

The apogee of the Tlatilco style in Group 4 graves at Tlatilco itself thus could be roughly interpreted as a short-lived, perhaps intrusive, fashion in burial furniture, ca. 1000-900 B.C., a conclusion also reached by Grove (n.d.) for Morelos. Yet it is evident that the situation is not so simple. Features alien to the San Lorenzo Olmec but allied to the Tlatilco style occur from the very beginning of the grave sequence postulated at Tlatilco (e.g. certain bottle forms, gadrooning) and, for that matter, from the very beginning of the Ayotla subphase at Tlatilco as well (e.g. an abundance of red-on-brown decoration). Such distributions can be interpreted in several ways. One of these is to postulate a non-Olmec tradition of respectable age in Central Mexico, one with which the Olmec would have interacted in some degree from the time of their earliest presence. Recent finds in Colima (Kelly, n.d.) and Michoacán (Beatriz Braniff, personal communication), as well as the striking prevalence of Tlatilco-like features in the later ceramics of the northern and western fringes of Mesoamerica (Ortices, Chupicuaro), suggest that such a tradition did exist and that it may go back quite far in time (perhaps beyond the San Lorenzo horizon of Mesoamerica proper). Therefore, within the broader framework of the culture history of Mesoamerica and of its northern frontier, the Tlatilco style should perhaps be situated within West Mexico, rather than within Mesoamerica proper. A shifting boundary is thus implied between two major traditions (the Mesoamerican and the West Mexican) in the Central Highlands between 1200-950 B.C.

With reference to the main theme of the Wenner Gren symposium - that of the emergence of civilization in Mesoamerica - the role of Central Highlands in Preclassic times remains somewhat enigmatic. It is difficult to avoid a first impression that the Ixtapaluca phase of 1200-950 B.C. represents an initial, and - in the short run - unsuccessful implantation of a way of life that had arisen elsewhere, perhaps on the southern Gulf coastal plain. If trade was responsible for this first impingement of civilization on groups living in the Basin of Mexico, then it is perhaps the decline of trade ca. 950 B.C. (Cobean and others, n.d.) that underlies the decline in craft standards and overall prosperity that seemingly takes place in Zacatenco times. 950 B. C. or thereabouts would then be the starting point of a slow uphill climb back to, and beyond, the level of relative material achievement and societal differentiation represented formerly by Tlapacoya and Tlatilco. As Sanders has indicated (1965), this climb must have been sustained, at least by Ticoman times, by the development of intensive valley-floor cultivation, transcending the constraints of seasonal frosts and deficient water supply that limit rainfall agriculture in much of the Basin.

Several major points, however, remain obscure. How real was the decline of productivity and social complexity in Zacatenco times? And, whatever the economic trajectory of Preclassic society in the Basin of Mexico, how much of the Olmec cultural legacy survived to the beginnings of Teotihuacán? The dating of major architecture at Cuicuilco is, in this respect, crucially important. For, if Cuicuilco was an active ceremonial center by 600 B.C. or earlier (Heizer and Bennyhoff, n.d.), then three centuries or less separate Olmec presence from tangible evidence of Mesoamerican ceremonialism in the Basin of Mexico. In developmental terms, if the smallish Zacatenco-phase sites now known in the Basin are to be considered satellites of a major center such as Cuicuilco, our view of Zacatenco society becomes very different from one that supposes that these communities were self-sufficient, undifferentiated and generally representative of all settlements then in existence. These, and other alternatives - that even older ceremonial structures remain to be discovered in the Central Highlands, or that the intangibles of Olmec civilization survived through the "dark ages" of the Middle Preclassic, to be revived in Ticoman times in tangible form - remain to be weighed in assessing the contribution of the Central Highlands (and of the Olmec) to later developments.

References Cited

- Aufdermauer, J. 1970. Excavaciones en dos sitios preclasicos de Moyotzingo, Puebla. Comunicaciones - Proyecto Puebla Tlaxcala, 1/1970, pp. 9-24. Fundacion Alemana para la Investigacion Cientifica, Puebla.
- Cobean, R. H., M. D. Coe, E. A. Perry Jr., K. K. Turekian and D. P. Kharkar. n.d. Obsidian trade at San Lorenzo Tenochtitlan, Mexico. Xerographed.
- Grove, D. C. 1970. The San Pablo Pantheon Mound: a middle Preclassic site in Morelos, Mexico. American Antiquity, vol. 35, no. 1, pp. 62-73.
- n.d. The Morelos Formative: cultural stratigraphy and implications. Paper presented at the 36th Annual Meeting of the Society for American Archaeology, Mexico City, 1970. Mimeographed.
- Heizer, R. F., and J. A. Bennyhoff. n.d. Excavations at Cuicuilco in 1957. Xerographed.
- Kelly, I. n.d. "Preclassic" material from Colima. Paper presented at the 36th Annual Meeting of the Society for American Archaeology, Mexico City, 1970.
- Niederberger, C. B. 1969. Paleoecología humana y playas lacustres post-pleistocénicas en Tlapacoya. Boletín INAH, vol. 37, pp. 19-24.
- Sanders, W. T. 1965. Cultural ecology of the Teotihuacan valley. Pennsylvania State University, Department of Sociology and Anthropology.

III. THE OLMEC REGION - OAXACA .

Ignacio Bernal

A few remarks seem pertinent before going into the subject itself; they bear on most of what follows and, if placed here, will clarify the background and avoid continuous repetition.

1. It is obvious that there is still much digging to be done and therefore much information to be gathered in Mesoamerica -- as everywhere. But even supposing that everything attainable had already been found and every possible theme of archaeology duly studied, a huge amount of past cultures would remain unknown and lost forever. Educated guesses will always be necessary. Furthermore a culture historian's point of view always changes as he himself changes and as the times change. We all clearly realize the fortunately continuous shifts in our conclusions derived from the continuously different world view of each generation and from new data made available for study. Thus history is always contemporaneous. Therefore what follows--except for factual data--is only what I hope may be considered serious hypothesis although I fear some of it may be wild surmises.
2. The archaeologist of necessity tends to place emphasis on material culture and so has generally based his definition of past civilizations on recovered objects and their direct implications. Social anthropologists and the philosophizing historian of our days see mainly social organization, values and invention. I am convinced that civilizations are a combination of many factors that range from ecology and economy to political or social organization, to art or religion, and to such even less comprehensible things as world view, attitudes, incentives, etc. Another basic factor is the interplay of various cultures with similar backgrounds but which have each evolved along slightly different routes without however losing contact and thus having a "parallel history." Civilization thus always has an international flavour.
3. The previous paragraph is truer yet when we deal with a remote culture, remote not so much in terms of years as differing from us in terms of culture and of development. It can be said that the very primitive periods are more remote from us in both aspects. Quite true. But when dealing with the Mesoamerican Preclassic we try to understand not primitive man but the beginnings of precisely that type of human society we call civilization; we pertain to the same family if in another genus. So there is more to absorb and study, the whole situation is of another complexity and degree of possible confusion as interpreted by us, and a much wider range of possibilities is present in

the Olmec world than would occur among primitive hunters.

4. The best possibility for understanding recovered archaeological fact is to see our data in the ethnographic light or to use historical sources. We have no ethnography of the Olmecs at 1000 B.C. and certainly no historical sources. But we do have a rich ethnography and a plentiful historical record for later times. Is this information applicable to the Olmec period? I think it is if we go about it in a cautious way. For this technique to be valid--and here is the first educated guess--we must accept that the Olmecs are the beginning of that same civilization that ended in the 16th Century, i.e. the Mesoamerican. If we accept this I believe we must also accept that later data are valid for interpreting Olmec archaeology, as long as our interpretation is based on known finds. This is the course I have chosen to follow. The pitfalls are obvious and need not be repeated here; some scholars object to this method but I can see no other if we want to go beyond a listing of material traits and the very scanty hypotheses we might extract out of them.

5. In order to accept Mesoamerica as one civilization and the Olmecs as the earlier manifestation of it, we must prove continuation of at least some basic traits all through Mesoamerican history, that is, even after the Olmecs had stopped being the central focus. Fortunately, even in our ignorance, we can do today what the Olmecs themselves could not have done, that is to know which of their ideas and their inventions survived and also which aspects of their culture came to a dead end. By survival of cultural traits I do not mean of course that they continued being identical but that in spite of changes produced in time and place the essential, basic ideas were still present in later times even if under new meanings and with great alterations of shape.

6. One of the great problems about Mesoamerica is that although it is a civilization, it is (a) a "first generation," independent one, thus harder to understand since its antecedents are on another level of development and, so far, relationships and hence comparisons with other civilizations have not been established; (b) it is one of the least developed civilizations we know of. It does stand above the "cultures" but below comparable counterparts such as Egypt or early China.

7. Our interest in civilization at this meeting is limited to the problem of how it emerges from the primitive matrix. Therefore only the pristine or first generation civilizations are now our concern. This excludes all the still living ones and I would stop even beyond this point, actually before the rise of Greece and the beginnings of the Classic World. From then on a large new set of factors intervenes and the situations, the modus operandi of societies, is on another scale. On the other hand civilizations, like all processes, cannot be separated from their antecedents and rigid limits cannot be established. As in any classification it is easy to distinguish be-

tween the extremes of the series but almost impossible to divide the line objectively in the center. So the difference between a pristine civilization and its predecessors is mainly a question of size and degree. It is more and larger but not all traits are new.

8. For the readers of this paper it is superfluous to describe and catalogue Olmec objects. They are much too well known and most of you are familiar with them. So I will not even attempt an inventory in the strict sense of the word but will stress those aspects basic to our symposium that show the Olmec world as a budding civilization and divide it from the lower cultures that precede it in time. Also I try to show the implications of those traits. In the case of Oaxaca the situation is slightly different since publication is more incomplete. A fuller coverage of the known data is useful only for specific points, however, and I will therefore concentrate only on these.

The Heartland Olmecs

It was in 1949 in New York during the XXXIX Congress of Americanists that we--at least I--heard for the first time, in Libby's paper, about his sensational new way of dating. Carbon 14, said a friend, is going to save us a lot of work and will do our stratigraphy for us. I never believed in such a thing because no matter how exciting a new technique may be or how immensely useful it may become, the archaeologist will never, thank God, be spared the chore and the pleasure of careful digging and of working and re-working over his data. His ability, his knowledge, and his wits are the main thing although this does not exclude some inventions from being a godsend.

The Carbon 14 readings for La Venta have become quite a problem. Still, after considerable deliberation, I have followed Berger, Graham and Heizer, 1967, with the more recent additions of 1968. I have introduced now very little change, actually suggested by Heizer himself, to what appears in Bernal, 1969. The rest is simply a re-use of all dates available except for the obviously impossible or unacceptable ones. The reasons for rejecting them have been expressed by the authors previously mentioned. These limitations leave us with twenty-two dates from various parts of La Venta Island. The oldest (M535) is 1255 B.C. and the most recent is 500 B.C. (UCLA 1283). In the Table I have placed all the dates in chronological order whether they come from Complex A or from the Stirling Group at La Venta.

They all seem to fall into three clusters:

- (1) Those that correspond to phase I at La Venta: ten dates ranging between 1255 and 900 B.C.
- (2) The dates of Phase II: seven dates between 865 and 655 B.C.
- (3) The dates of Phase IV: five dates between 580 and 500 B.C.

I never can believe that we have found the oldest or the most recent moment at any site even within a phase. Thus the oldest date should, I believe, be moved backwards to the next round number, and the most recent date moved forwards to the next round number. Not of course that periods end with our centuries or half centuries but they are easier to remember and a few years more or less cannot be ascertained. Thus we can propose the following limits for each phase:

Phase IV . . . 600 to 450 B.C.

Phase III . . .

Phase II . . . 900 to 600 B.C.

Phase I . . . 1300 to 900 B.C.

This does not correspond closely to the division of phases and their durations as given by the excavators. Period III seems to disappear. Late dates for Phase II (M 536, UCLA 1284 A and B, and UCLA 788B, all within the 7th Century B.C.) could correspond to phase III but this is not possible since most of these dates are precisely those that define phase II. Whatever the truth, what I called Olmec II in La Venta now should move from 1200-650 B.C. (Bernal 1969:107) to 1300-450 B.C.

The San Lorenzo dates (Coe, 1968:61) equate pretty well with the oldest cluster of dates at La Venta; thus the contemporaneity of the San Lorenzo phase with phase I at La Venta is clear, as it should be, since all other archaeological data agree. In effect ceramics and other minor traits are very similar in the two main Olmec sites excavated; they are also in the same general style and sometimes identical to objects found in other badly known Olmec sites and in many Olmecoid areas like the Valley of Mexico, Puebla and Morelos, Oaxaca and Chiapas, and Guatemala.

There is of course the problem of stone monuments. Most are obviously contemporaneous. By now, I believe, scholars in the field agree that the Colossal Heads at La Venta, San Lorenzo and Tres Zapotes must all have been carved within a relatively short period of time, probably less than a hundred years. This does not mean that all work necessarily came from one atelier; each site separately sculptured its own pieces. The contemporaneity of them all poses a considerable stratigraphic problem. The ones at San Lorenzo pertain to the San Lorenzo phase (1200-900 B.C.) whereas many at La Venta were found in strata corresponding to late phases dated between 850 and 500 B.C. Coe (1968:62) has suggested that they had been removed from their original positions by the makers of phases III and IV at La Venta and thus appear within these phases when actually they had been carved much earlier, during phase I. Here may lie the explanation of the difficulty. Similar moving of sculpture could also explain why so many of the monuments published by Medellin (1960) were found associated with ceramics of much later periods--

sometimes Late Classic. In these instances I have no doubt that the monuments do correspond to the Olmec period but in the La Venta-San Lorenzo problem it is to be hoped that further research in the field will bring a clearer answer.

There is another reason for worry. If the La Venta and San Lorenzo monuments are mainly from phases before 900 B.C., considerable changes in our views on the history of the Olmec world and on the possible causes of its downfall would ensue. In effect it might mean that the ascending road was very quickly traversed, a breakdown occurred towards 900 B.C., and then at the summit followed a long platform, with new heights at the end before the downward slope. It is most important in the future to determine precisely the phase during which those great sculptures were carved.

Anyway, whatever the truth, monuments were also being carved in the later phases and many of those found in other Olmec sites and even in neighboring Olmecoid places, but in typical Olmec style, correspond to the Olmec III period.

Besides the thirteen Colossal Heads (four from La Venta, two from Tres Zapotes, and seven from San Lorenzo), the monolithic rectangular blocks with a figure emerging from a niche that we call altars (two at San Lorenzo and seven at La Venta) are also contemporaneous and form part of the same culture. The atlantean altar at Laguna de los Cerros may be later. Much of the statuary depicting humans in a seated or crouched position and animals or combinations of animals and men, are also very similar in the sites of the Olmec heartland and also show that they are mainly contemporaneous between themselves and must pertain to the same phases as the Colossal Heads and altars.

I have dealt at some length with this point of dating and time relationships between Olmec sculpture because I believe it is essential to show from the start that we are concerned not with separate entities or sites, as the archaeologist calls them, but with a culture common to a certain area. We can study the Olmecs as a people within a geographical frame and not as isolated places. This is basic to understand what little we can of them and to think about them in historical terms. In other words I will refer in this paper mainly to the Olmec heartland in general, and not to specific sites, since I think that these cannot be understood when extracted from their context. It is the interplay of Olmec cities among themselves, their rural surroundings, the general ecology of the area, and even the relationships with neighboring peoples or more distant areas, that can help to explain the rise of this first civilized epoch, its history, the constitution of the larger cultural area we call Mesoamerica and suggest the future of this civilization.

The Olmec heartland has already been geographically defined (Bernal 1969:15-23). In it lie some sites that are large for the period, and many smaller ones. This heartland is the subject of our present enquiry concerning the efflorescence of civilization in Mesoamerica. In the same book I proposed tentative conclusions as to its demography, by suggesting 350,000 inhabitants in its 7000 square miles or some 50 inhabitants per square mile.

A very small number of people, it has been suggested, lived at La Venta and at San Lorenzo, to speak only of the two best known Olmec sites. Even if this were so the total number in the Olmec area is quite large and suggests not only an evolved situation and a secure economy, but also the need for expansion into less populated or less advanced areas.

In the best known sites digging has only uncovered ceremonial buildings or groups of them; the smaller sites, more rustic in all probability, still lie unexplored. Thus it seems very difficult to discuss with any certainty the problems concerning settlement patterns in the Olmec heartland. If we are, to a certain extent, at the beginning of the road that was to lead to Maya culture and to developments in Highland Mexico, then Olmec sites should contain the seeds of what was to become ceremonial centers in one area, and real cities in the other. I have already expressed my opinion as to the existence and meaning of ceremonial centers and cities (Bernal 1969:49-54). In resumé this states that notwithstanding contrary opinions, I fail to see how a civilization can exist without an urban core; an urban core is found only in cities; therefore if Mesoamerica is a civilization it must have cities. This bit of deduction seems very pleasing but let us not forget the joke that ethnography destroys logic.

Of course urbanism, like everything else, comes in varying degrees, and cities will take different forms. Perhaps the dispersed city is the criterion that best fits the Maya pattern and even the Olmec, whilst the compact city is the Teotihuacan type. This looks like a semantic game if ceremonial centers equal dispersed cities. But there are some basic differences. A city means specialized groups, habitation of the distinct social classes in separate sections, elaborate religion and ceremonial life, a state, concentration of population, monumental art, and other requisites of civilization. The ceremonial center is of course sometimes found in non-civilized groups.

The prevalent type of agriculture was slash and burn with the possibility of obtaining two crops a year. Riverine areas and annually flooded ones were used to considerable profit. Olmec economy was supplemented by hunting, fishing and gathering.

Still the production of foodstuffs would become insufficient for a growing population and thus trade was bound to develop more and more. We can observe both internal and external commerce even without considering the perishable goods that were irrecoverably lost. The great stone monuments

were carved from boulders carried over considerable distances, although within the Olmec heartland. This shows relations and communications of an interior nature. Other materials, such as jade and iron ores, came from the outside. Thus "international" commerce is also involved. Natural roads--the rivers--lent themselves admirably to such trade since they mainly run into the Olmec area, thus constituting a centripetal force in the Olmec world. Conversely, some small sculptures of undoubtedly Olmec origin have been found in remote places showing the enormous extension of Olmec influence. There is thus little question as to the existence of relations with other areas. Trade might have been the basic means, although the Olmecs may have obtained many products through another source; that of tribute. But tribute--and I believe trade--are so intimately linked with the socio-political system that I will briefly discuss them all together.

We know nothing of Olmec organization except from inferences or by later modes of life. An urban situation has been mentioned above with some kind of cities. Were people organized, like the Aztecs, in a sort of split society divided into a ruling elite quite free from tribal rights and obligations, and the people living within the framework of the calpulli? It would not be surprising if the whole social system that prevailed in later Mesoamerica originated with the Olmecs, and that precisely in the rise of such an elite lies the main reason for the rise to civilized levels.

On the political side, are we already dealing with a state in the fashion of later times? Certain things tend to show the existence of one state, with perhaps La Venta as a capital, at least from 900 B.C. onwards, others suggest a group of city states, an amphictyony. If later situations are of Olmec origin, then both possibilities should be valid. Trade in Mesoamerica is linked to war and thereby to tribute. In other words armies are to be supposed, and a power to command them. Faint traces of this can be detected in some of the stone monuments, particularly in the stelae at La Venta and Tres Zapotes. It is quite possible that stelae came later than monuments in the round. They would thus reflect phases III and IV of La Venta or the second part of Period II. During these times war and armies are more to be expected. Of course I am not suggesting an organization as complex and complete as the one we know for the Aztec empire, but the seed of such an organization, on a simpler level, might already have existed with the Olmecs, containing an incipient state, war, tribute, and a ruling elite above the common tribal man. This elite and these rulers of Olmec society, were they priests, as seems most probable? Perhaps the answer lies in the interpretation of the colossal heads, and again in our general view of Mesoamerican civilization, where religion and therefore priesthood recalls the many headed monster with the multiple arms of an octopus encompassing everything.

At the moment, our knowledge of religious organization is hazy. I think, however, that we can already speak of religion, as different from

tribal magic, as a more advanced step in the history of belief. The typical pattern of Mesoamerican polytheism with a large number of anthropomorphic deities frequently combined with animal forms is not yet present amongst the Olmecs. Gods must be recognizable, with fixed attributes represented in such a manner that the devout will know which deity he is beholding. I have stated (Bernal 1969) that the Olmecs had not reached this point and had no specific gods. I now believe however that one deity had probably already arisen, the were-jaguar. He was to survive through many transformations until the 16th century. Other gods were not born yet or at least remain undetected by us.

In any case the Olmec jaguar combined with human features, or a human being associated with jaguar features, inaugurates the long story of such Mesoamerican combinations. Quetzalcoatl in time will become the most famous. So on this point as on so many others the Olmecs are the initiators of this manner of thinking, and more specifically of the future rain god who seems to have evolved from the original were-jaguar. Was he a nahual of the Olmecs, still in a rather tribal fashion? Or has the man-animal ascended to the rank of a god? Perhaps in the Olmec world--that is including the Olmecoids--he was a vehicle of Olmec diffusion and the source for other deities invented by the Olmecoids, mainly the pre-Zapotecs of the central Oaxaca valleys.

Other religious or rather other ceremonial aspects are already clearly present: the building of cities along central lines with an approximate north-south axis, possibly the association of cardinal points with colors, special rites to celebrate the end of each century, sacrifices--perhaps human, an emphasis on death, and necrophilic practices with the divinization of certain dead.

Clearly related to religious practices but mainly a great intellectual achievement is of course the calendar and all the astronomical and mathematical knowledge it implies. A written calendar obviously requires the knowledge of writing, an advance that occurs late in Olmec II times. The Long Count only appears towards the very end of Olmec III times, when the great centers were dead. It means, apart from other knowledge, the discovery of the concept of zero and therefore the possibility of numbering by position. We can be certain that this extraordinary intellectual feat occurred in the Olmec world but there is no certainty that it occurred in the Olmec heartland. Stela C at Tres Zapotes is the most remarkable but not the only monument depicting Long Count Preclassic calendrical inscriptions. As interpreted, and it seems we are correct, it marks the second oldest date recorded in the Americas. The three other stelae of Baktun 7 pertain to the Olmecoids. But more of this later.

Another remarkable Olmec achievement are the stone mirrors of La Venta. As Gullberg (1959) has said, "They stand out as the most unique pieces of precision stoneworking."

In the beginnings of pristine civilizations, some aspects of culture are notably advanced while others lag behind. Thus architecture, which was to become Mesoamerica's main esthetic feat, can hardly be said to have existed amongst the Olmecs. Constructions were made of earth or of colored clays and the basic element--stone--was hardly used. There is of course an ecological reason for this. We therefore find stone used only in drains, palisades, minor veneers, and the La Venta tomb. The use of natural basalt columns is an immensely costly technique probably inspired by buildings made of wooden logs. It had no future. Nevertheless planned centers, massiveness and extravagant use of labor, and a clear sense of space and proportion are already present--all traits characteristic of Mesoamerican architecture. With richer materials and new ideas, future peoples would continue the trends initiated by the Olmecs in this field. Whether to escape from floods or for religious reasons, the idea was now conceived of building temples and houses on a higher level, above solid mounds. On a relatively modest scale we find also low platforms surrounding courtyards in a symmetrical pattern.

Their bid for greatness, sculpture, is outstanding. The Olmecs had a real sense for sculpture in the round, as rarely found amongst the Maya, the Zapotecs, or the Teotihuacanos and which will only reappear in similar greatness with the rise of the Aztec empire two thousand years later. Theirs is definitely an art of sculptors and not of painters on stone, as often happens in Classic Maya times. Some of the most naturalistic pieces of Mesoamerican sculpture, such as the wrestler of Santa Maria Uxpanapa, go hand in hand with the entirely conceptual were-jaguars. Size was a concern of theirs as we see not only in the Colossal Heads and altars; even small objects are given a concept of monumentality. Olmec statuary is uncluttered and only becomes confusing in the great stelae of La Venta or of Tres Zapotes, or in the stone boxes, where a mass of figures and decorative elements suggests the beginning of that horror vacui so typical of many pieces of Maya art. Perhaps this is another reason for considering these Olmec objects as rather late.

Work in jade again shows not only profound artistic sensitivity and refinement but considerable technical skill. Besides figures and other sundry objects, the axes and celts are outstanding. Olmec ceramics are generally uninteresting and the great pieces produced by the potters of those times are mainly to be found among the Olmecoids.

Mural painting is absent. The lonely exception of two Guerrero caves of unknown age but certainly in Olmecoid style has no reflexion on the heartland. I would place those paintings in the late formative when mural decoration is also present at Monte Albán and early Teotihuacan as well as in other sites and some inheritance from Olmec art is still to be observed.

Can we seriate these great or small aesthetic achievements and thus gain some idea about development of art in the Olmec area? In general we

cannot and whatever seriation could be done--as for the Colossal Heads, the altars or the axes--falls within a short span of time and gives little idea of the whole process between 1200 and 500 B.C. I can see no clear trend yet in what we know of ceramic periods.

There may be an important truth in Coe's suggestion that there are two periods of florescence, an older one corresponding to large monuments in the round and a later one corresponding mainly to stelae and sculpture in low relief. This would link the coastal Guatemala sculptures with the first period and Izapa, and then the Maya world with the second. This second efflorescence may also have been influenced by the Olmecoids of Oaxaca, Chiapas, and Guatemala, reaching as far as Salvador.

Preclassic art has in Mesoamerica a freedom, a sense of individuality, a lack of the socio-esthetic rules that enhance and fetter Classic production. Each Preclassic work is unique, in contrast to the production in "series" of later times. Thus the appearance of "official" art, of ordained works, may be linked to a higher general level of political organization. This seems another reason for considering the Olmecs as already within civilization since only in the Olmec heartland and the Olmecoid regions do we find objects that suggest the mass production of an atelier and compliance with commands of a hierarchy. In this sense the Colossal Heads and the altars seem made by Classic period artists.

Nobody any more believes in civilizations starting by a "miracle" or in the sudden appearance of a civilized situation in full bloom materializing from a near vacuum. Digging shows more clearly every day that the Olmec efflorescence we call Olmec II is based on local antecedents. Both at La Venta and San Lorenzo earlier constructions have been found and materials from these were used to construct later buildings. Pottery figurines and other ceramic forms of the Olmec II period stem directly from earlier types and wares. Even the stone monuments have local ancestors, small and coarse as they may be. The stone objects found under La Venta floors and some very simple carvings that Coe suggests may pertain to the pre-San Lorenzo phase at that site, may indicate this. They are all of Olmec type, thus providing at least an inkling of local antecedents of the tradition that was to bloom in Olmec II times.

If we date Olmec I as prior to 1300 or 1200 B.C., then Olmec influence outside the Olmec heartland during this epoch is small or nonexistent. It only begins later, according to sequences in other areas like the valley of Oaxaca; therefore it seems to correspond to the first phases of period Olmec II which again corresponds to the first stirrings of civilization.

So the "miracle" can be bracketed within reasonable limits. But the vital core of the question--why did those simple antecedents lead in the Olmec heartland to such great developments?--is still in the realm of

hypothesis. Was it an effectively organized social pattern based on a proselytizing outthrusting religion that produced the Olmec state and thence civilization?

The Oaxaca Formative

I have already mentioned the interaction of cultures that I consider essential for reaching civilized levels. Cross fertilization between different peoples and languages seems to be mainly productive when it occurs amongst groups having similar origins in the sense that the basic traits of their cultures are alike. This of course is the case between the Olmecs and the Olmecoids. Their mutual advances were to submerge the primitive world and start Mesoamerica.

During Olmec times a number of Mesoamerican areas were linked more or less directly with the heartland. Only those regions sufficiently sophisticated on their own could understand and use the advances of the Olmecs, collaborate with them by an exchange of cultural traits, and on occasion even improve upon the successes of the heartland. Of these Olmecoid areas, the only one I am asked to discuss is Oaxaca.

Period Olmec II, as I have already suggested, might be divided at least into two main parts: 1300 to 900, and 900 to 500 B.C. With similar dating this is true for the valley of Oaxaca. A first period containing the San José and Guadalupe phases would go from 1300 to 700 and a second period, Monte Albán, from 800 to 400 B.C. There is a short but noticeable overlapping between the two.

Unless we go into minor details, stray finds and unrelated ceramic wares or objects impossible to interpret--and that is not the spirit of this meeting--we can deal usefully at this point only with one region of Oaxaca: the central valleys. The Mixtecas will be mentioned occasionally when they might help to clarify the picture.

The Central Oaxaca Valley is formed by the union of three large valleys that meet at the point where the city of Oaxaca is today. It has an average altitude of 1550 meters above sea level and is entirely surrounded by rather high mountains. These form an enclosed area that has a common history from at least Formative times until the present. It has been proven that no lake ever existed in the lower parts; the Atoyac River is the main drainage system. Flat valley floors with thick alluvial deposits offer obvious advantages to an early type of agriculture, except for the considerable aridity of the land. This was partially remedied, at least since mid-Formative times, by small scale irrigation along canals and by shallow well irrigation that can be traced back, in Mitla, to sometime during the Guadalupe phase. The system is still prevalent in some areas. Early villages were concentrated in the high alluvium lands and the tips of piedmont spurs.

Ceramically the San José phase is clearly related to the Olmec heartland and to some Olmecoid areas and contains designs and figurines of types C and D with obvious Olmec or Olmecoid influence. Its eponym site, San José Mogote, was a village that already at that time covered an area of some 20 hectares. Flannery (1968) from whom all my data are taken, considers that three areas of distinct manner of habitation can already be noticed at San José Mogote. In the first two, the objects found suggest the living quarters of potters in one case, and cutters of ordinary stone in the other. Wattle and daub rectangular houses with partial stone foundations and walls plastered and white-washed, contained hearths and bell-shaped sub-floor cooking pits.

The third area is littered with fancy pottery and a high proportion of valuable iron ores and imported shells. In one house a recessed circular area plastered and painted red contained a number of figurines and fragments of magnetite mirrors. We can surmise some social and barrio differentiation in which this third group controlled the sources of the magnetite, ilmenite and hematite exported to the Olmec heartland; it may constitute proof of early long distance trade. It all suggests difference in status amongst this early society and formal contacts with other groups both on the Pacific and the Gulf coasts.

In this "barrio" of the site a rectangular stepped platform of low height and north-south orientation is faced with stone. No matter how miserable looking it may be, it is, to our knowledge, the oldest stone monument in the area and ancestor to the great architecture that evolved later. Another structure at Barrio del Rosario, of the same phase, is built in much the same way and has similar orientation.

The second phase, Guadalupe, has pottery also related to the Guatemala-Chiapas sites, to Tehuacan and to La Venta, and figurines mainly in the A tradition. Interestingly enough they are both male and female. Houses are similar to the ones of the previous phase. Platforms, mainly made with the curious bun shaped adobe of the period, were covered with white plaster, again what seems like a "first" use of this all pervading material in later Mesoamerican sites.

Two types of settlement patterns begin to occur. In the low areas habitation villages would grow continuously. San José exceeds 45 hectares in extension. Ceremonial centers begin their life on the hill tops. Many of them were to expand to huge proportions in later periods. The best known and most important is Monte Albán almost on the confluence of three valleys. Already by the beginning of the phase some of the larger early formative sites in Mesoamerica rose above the valleys.

The bun shaped adobes were being substituted by the rectangular ones still in use today and stone was becoming the main building material, at

least for the large monuments.

From what has been said it is obvious that the basic economic problems had been adequately solved by then in the Valley of Oaxaca, and solved along different lines than those also successfully followed in the Olmec heartland. Thus one culture is not the result of another but both stem from much earlier initial steps that were intelligently continued along diverging lines. This is due mainly to the different local situations.

One clear result of these two successful groups, due perhaps to land division among village farmers, was the tendency to concentrate in larger and larger villages instead of scattering the houses in wider areas and in smaller communities. Thus the large nucleated village took form both amongst the Olmec and among people in the Valley of Oaxaca and became the origin of future cities that, in this latter area, were to become so extended in later times. Concentration of the population in fewer but larger towns led to hereditary social differentiation, specialization, and a greater possibility of developing the major arts and sciences. This situation maintained an hereditary elite in both areas that probably held not only political power but in whose hands were kept the secrets of knowledge and religion. This of course is clear in later times but it was already an appreciable trend from the middle Formative onwards, if not earlier. Status and rank are the outward manifestations of the situation frequently sustained by sumptuary laws. Flannery presents a good hypothesis suggesting that all luxury trade was connected with the necessities of status linking high ranking lineages of both areas, and thus the Oaxaca nobility would tend to imitate a number of upper class traits from their more evolved Olmec relatives "whilst patterns of settlement and subsistence remained unchanged."

The Olmecs reached their peak earlier than their Oaxaca counterparts but in the long run these, either through being more solidly constituted or through having more permanent possibilities of developing, reached a more complete urban life. The end result was that whilst the Olmec heartland disappeared as a main focus of culture long before the beginning of the Christian era, the Oaxaca Valley continued--with the Zapotecs--a brilliant career, and in the sixteenth century A.D. was one of the leading nations of Mesoamerica.

In all we have for the two regions not only a set of fundamental relationships but also a set of fundamental differences that seem to explain the little we know about what occurred at that time, and our slightly lesser ignorance as to what occurred later. The earlier success of the Olmecs is perhaps best shown by their earlier greater art, their clearer caste differentiation and in the fact that, particularly in the San José phase, it is Olmec iconography and symbolism that prevails in the then far more modest production of the Oaxaca Valley. This is also reflected in the failure of the valley people--they were not yet ready for it--to imitate major sculpture

in the round such as the Olmecs had already achieved or to try their hand at their own style. Even if artistically they never succeeded in reaching the sculptural levels of the Olmecs, they did, as we shall see, reach far greater success precisely in the iconographic areas, when a complete writing system was inscribed on the stelae of Monte Albán I.

All these differences and all these connections are what I have meant by the perhaps ill chosen term of "Olmecoid." I don't mean subjugated or culturally inferior peoples even if they were so in the beginning--these to me are the Colonial Olmecs--but human groups already possessing a degree of advancement precisely due to which they were capable of absorbing with success the Olmec culture although without becoming imitators or following the chariot of the victor. Thus they not only received a stimulus from the more evolved Olmecs, but they sent luxury products into the heartland. We only know about the imperishable materials but many more--not necessarily luxuries--may have been involved. This established, through peaceful or warlike means--and I rather believe in the unfortunate second possibility--a permanent flow of products, men, and ideas that cross fertilized and sustained both the Olmecs and the Olmecoids. I shall later refer briefly to another Olmecoid group, of the Guatemalan-Chiapas coast. Certainly one of the main vehicles of Olmec cultural expansion--if not of its imperialism--was the jaguar cult. The jaguar was not only established in Oaxaca as a permanent deity of first importance but there exists the possibility that Monte Albán may even have been called the Hill of the Jaguar, as we might discover if we knew its Zapotec name.

Whatever the reasons and processes were, at least from 1000 onwards to 800 B.C. a great symbiotic area had undoubtedly been formed in which through different channels and in different degrees most people of nuclear Mesoamerica were already sharing. This is how I understand the constitution of the super-area, and the role of the Olmecs and the Olmecoids in its creation.

Thus when we reach the epoch marking the dawn of Monte Albán I, a syncretism has already occurred in the valley merging Olmec traits with local ones and hastening the advancement towards greater levels.

In the attached chronological chart are given the few formative dates we know for Oaxaca. I have backdated Flannery's estimate for the San José and Guadalupe phases for two reasons: (1) the two dates for Guadalupe are 900 and 975 B.C.; corrected to the 5570 half life they would be approximately 930 and 1000 B.C. Thus it seems better to place this phase between 1050 and 750 instead of 900-600 B.C. Therefore we must push back proportionately the San José phase. (2) The Monte Albán IA phase clearly corresponds to Monte Negro in the Mixteca which has been dated as ending towards 670 B.C. So it appears more probable that Monte Albán I, and therefore the contemporaneous Monte Negro, started towards 800. The end of Guadalupe is certainly contemporaneous with the beginnings of Monte Albán I.

The end of Monte Albán I in phase C can be dated by a Yagul reading of 400 B.C. and so the whole period would stretch from 800 to 400 B.C. It cannot be later since two dates of the Monte Albán II period indicate 380 (C-425) and 350 (O-1300) B.C. Thus Monte Albán II should start around 400 B.C. Its end is difficult to establish at present but 100 B.C. seems appropriate. This new dating throws some light on certain obscure relationships and allows for a better understanding of the later Teotihuacán influence over the Oaxaca Valley. According to all the above this Monte Albán I corresponds in time to the later phase of period Olmec II whilst Monte Albán II is coeval with Olmec III.

Except for some ceramic wares that are distinctive, in other aspects of the culture it is so far impossible to distinguish the three postulated phases of period Monte Albán I. We can be certain that Monte Albán IA is a continuation of the Guadalupe phase.

A still incomplete survey of the Oaxaca Valley indicates that there were no less than 50 sites in existence during Monte Albán times. A number of others developed in the Mixtecas and the coastal region, including the Isthmus of Tehuantepec. We know of a few, with great Olmec influence, in the mountainous area south of Tuxtepec. And so this culture--at least ceramically speaking--is not limited to the valley but it is only here that we know a little more about it.

The sites known are very different in size and appearance. Some are obviously residential--mainly in the valley bottom or in the lower piedmont--whilst others on hill tops seem of a more ceremonial nature. No fortified places correspond to this period. To attempt an estimate of population is hopeless at the moment.

Most of our information must come from the only site that has been more amply dug, Monte Albán itself, which shows a long span of time for period I. At the climax of the period its influence extended over a large area that included most of the modern state of Oaxaca and parts of southern Puebla and western Guerrero. But this influence seems exerted more by the whole valley, not only by a single site. Indeed so extensive a culture was apparently the only one at the time. I have therefore suggested that the period should be termed Oaxaca I instead of Monte Albán I, but names are not important if we understand their meaning and it is easier to move heaven than to change a label.

There is no certainty about the first buildings erected in Monte Albán. These may have followed the Guadalupe pattern of using adobe and uncut stone. However, the known constructions of period I--unfortunately very few and possibly corresponding to phases B or C--are made of faced stone. From that time onwards this would be the basic material with stucco abundantly covering walls and floors. It is clear that a real architecture had been born, far

more advanced than that of any Olmec building. The great central plaza of Monte Albán was at least already envisaged since both the substructure of the Danzantes and the North Platform limit the main plaza with the same orientation and following the same layout that the plaza would later have when completely paved in period II.

The old Temple of the Danzantes (a later one was erected over it) is a pyramidal platform with vertical retaining walls dressed with large stone slabs of more or less rectangular shape. They were placed in alternating rows and held together with clay. Another platform was attached to the front and to the central one and was reached by way of a staircase formed with large stone blocks lying in horizontal position. The stairway, without balustrades, protrudes from the main body of the platform. Another stairway of the same type leads from the lower platform to the upper part of the main structure. It all rests on deep, strong foundations. Nothing remains of the temple that stood on top, though we know the floor was stuccoed. The roof may have been of straw. Masonry columns dividing entrances were frequent in this period, especially in Monte Negro, a contemporaneous site in the Mixteca.

These architectural features were to be characteristic of all formative Oaxaca buildings even into the end of period II, when Teotihuacan architecture would introduce considerable change.

The most remarkable feature of the Danzantes temple consists in the figures engraved on the large rectangular slabs mentioned. On each stone there is only one figure, always male, in rather violent posture. Most are naked though the male sex is only once indicated realistically. On the others it was replaced by what might be tattooing or body paint, although in at least one case the design is separate from the figure. It has been suggested that these decorations may represent blood as a result of mutilation. All the figures wear ornaments and occasionally hats. A few slightly different elongated danzantes have been found in reused contexts. They seem to be later, probably from the very end of period I.

Recently another set of some 40 low reliefs has been uncovered at Dainzú, a site also in the valley of Oaxaca, near Tlacolula. Here, in similar fashion, the figures are inscribed on separate slabs, are all male, refer to one idea, and are placed in the lower vertical wall of a monument with characteristics rather similar to those of the temple of the Danzantes. But in Dainzú the figures represent ball players in the varied and violent positions required by the game. Each one carries a ball in his right hand, and most have a sort of mask to protect the face. Arm bands and leg shields would also protect those parts of the body from dangerous strikes from what appears to be a stone ball. It is certainly not the same game that we know was played in the courts of later times, but an ancestor to this favored Mesoamerican sport.

There is little doubt that the Monte Albán danzantes and the later Dainzú ball players are related to, if different from, the Olmec art. We may consider them parallel products of separate but intercommunicated histories.

Perhaps the most important feature of the danzantes is the fact that numerous hieroglyphs are engraved on the slabs, and these also appear with the Dainzú figures. Some of the glyphs are associated with numerals thus indicating a calendar in the Mesoamerican fashion. They represent the days Jaguar, Turquoise, Ehecatl, Water, Monkey, Xipe. Other probable day signs but without numerals also appear: glyphs I, J, S, arrow and death. Some are to be found in the stelae of this period, like numbers 12 and 13 at Monte Albán, where rows of glyphs are placed vertically giving the oldest "texts" so far found in Mesoamerica, even if we cannot read them. Many other glyphs, unrelated to numerals, also occur. Some apparently stand for place names and others might be verbs, thus indicating action.

The system of the Long Count, however, does not appear to have been born in Oaxaca, but amongst other Olmecoids, in the Chiapas-Guatemala Pacific area. As already mentioned it is there that three of the four known cycle 7 inscriptions have been found. The fourth one is of course Stela C at Tres Zapotes. In the vagaries of research and hypothesis, for many years the classic Maya were considered as the inventors of this extraordinary system; later it was attributed to the people of the heartland Olmec area, even in their decline. Now the wheels of fortune turn partly back and the coastal Maya are suggested as the possible inventors. But this theme lies outside the scope of my paper.

The writing system of Monte Albán I is not the only great contribution the Oaxaca valley gave to Mesoamerica. We have already mentioned the considerable progress in architecture; and let us now turn to yet another aspect. In the Olmec heartland we can think of at most, one god, the jaguar. By the end of the Monte Albán I period, at least ten deities are sufficiently well characterized as to be easily recognized. They are all masculine and include such well known later gods as the Jaguar, Tlaloc, Quetzalcoatl, Xipe, and the Old God. I give the Nahuatl names since they are better known. The existence of temples over large mounds and the well built if still simple tombs of the period suggest, together with the pantheon, a far more elaborate and important religious organization that must include a professional priesthood. Its members would retain as a basis of their prestige most calendrical and astronomical knowledge, and the art of writing, and would foster the progressively more evolved necrophiliac complex. Would they also be the ruling elite?

The very sophisticated and technically perfect pottery of Monte Albán I period has certain Olmec traits and frequently an Olmec flavor, but is quite distinct and hardly ever suggests anything resembling Olmec

iconography. Jade figurines or objects of some importance made in semiprecious stones are unknown; only beads or small jade mosaics and earplugs have been found in the site. From other areas of Oaxaca come excellent jade pieces; they are entirely Olmec and I think were exported from the heartland.

Even if later periods were to bring further advances I believe that civilization had emerged by the end of Monte Albán I, as it had in period Olmec II. There is thus no point, for the purposes of this paper, of going further along in time and describing the Monte Albán II period. It is still a pre-Teotihuacan epoch but the real formative has ended in Oaxaca and civilization is already a going if modest concern.

Postscript

After this paper was finished Mr. Gareth Lowe of the New World Archaeological Foundation very kindly lent me his manuscript on San Isidro Mound 20. This site is located in Chiapas, outside--although near--the Olmec heartland. Mr. Lowe finds two main phases, an early one he equates with San Lorenzo, and a later one apparently contemporaneous with La Venta.

In the first phase the ceramics are almost identical to those of San Lorenzo and there is hardly anything to suggest a different local culture or an influence from some other place. He found some low platforms made of sandy clay with no stucco but a sort of whitish volcanic ash.

The second phase has a pyramid made of earth with numerous offerings of celts (in one instance as many as 65). The celts are crude, certainly non-functional, and placed in groups just as in La Venta. Another cache contained jade earplug flares and some burials were surrounded with other celts. The bodies were placed in a sitting position. The ceramics were also mainly Olmec.

The discoverer of this important site believes it to be a minor ceremonial center. To my mind the implications are very important because for the first time we have a totally Olmec site outside of the Olmec heartland with no stone sculpture of any importance. In other words it suggests a less developed Olmec site of which we had no previous example. It also suggests that Olmecs at one time lived outside of that area without mingling with other peoples. Thus it is not Olmecoid.

| Years B.C. | <u>LA VENTA</u> * | <u>SAN LORENZO</u> all Yale | <u>OLMEC</u> Periods and Phases | <u>OAXACA</u> Periods and Phases | <u>OAXACA</u> |
|---------------|-------------------|--------------------------------|--|---|---------------|
| 0 | | | | | |
| 50 | | | | | |
| 100 | | | | | |
| 150 | | | | | |
| 200 | | | | | |
| 250 | | | | | |
| 300 | | | | | |
| 350 | | | | | |
| 400 | | | | | |
| 450 | | | | | |
| 500 | • 1283 | | | | |
| 550 | • 1351 | | | | |
| 600 | • 1287 | | | | |
| 650 | • 903 • Y-2378 | | | | |
| 700 | • 1284A • M-536 | | | | |
| 750 | • 1284B | | | | |
| 800 | • 788B | | | | |
| 850 | | | | | |
| 900 | • 1350 | | | | |
| 950 | • 1280 B | | | | |
| 1000 | • 1281 B | | | | |
| 1050 | • 1276 A | | | | |
| 1100 | • 1280 A | • 1802 | | | |
| 1150 | • 1355 | | | | |
| 1200 | • 1285 | | | | |
| 1250 | • M 529 | | | | |
| 1300 | • 1276 B | • 1908 | | | |
| 1350 | • 902 | • 1930 • 1934 | | | |
| 1400 | • 1286 | • 1937 | | | |
| | • 1288 | • 1797 | | | |
| | • 1800 • 1801 | | | | |
| | • 1939 • 1911 | | | | |
| | • 1288 | • 1798 | | | |
| | • M 535 | • 2379 | | | |
| | | • 1933 | | | |

* All UCLA except when otherwise specified.

Bibliography

Only the main works used in this paper are mentioned here. In them can be found an extensive bibliography of the subjects here briefly condensed.

Benson, Elizabeth P.

1968 (ed.) Dumbarton Oaks Conference on the Olmec, Washington.

Bernal, Ignacio

1969 The Olmec World, University of California Press.

Paddock, John

1966 (ed.) Ancient Oaxaca, Stanford University Press.

Willey, Gordon R.

1965 (ed.) Handbook of Mesoamerican Indians, Vol. 3, University of Texas Press.

ADDED REMARKS by I. Bernal

It has become apparent during the Conference sessions that on occasions we discuss the same facts without understanding one another too well. This occurs, I believe, because the basic postulates of the core of our subject are seen in quite a different light by various participants. Since the symposium deals with the general problem of the emergence of civilizations and specifically with the emergence of Mesoamerican civilization, contributions by the participants have shown--either directly or by inference--the differing ways in which the speakers understand civilization as a stage of societies, and Mesoamerican civilization in particular. Although only incidentally stated, it is clear that we cannot discuss with profit the problem of the emergence of something if we are not quite clear in our minds what this is. Not of course that uniformity of criteria is to be sought or even desired, but each one must construct his image of how civilization emerged on the basis of what it is that is emerging. With no apostolic zeal let me give my own opinion, on the narrower issue, or in other words, how I envisage Mesoamerican civilization.

It is an original one, that is not derived from a parent civilization but emerging from lower cultures. This point needs no comment, being obvious, but obliges us to understand as much as possible that remote and less evolved matrix. I do not refer to the problem of origins of man on the continent, or the long stages of hunting and gathering peoples, but mainly to the second millennium before our era when the fundamental steps that would lead to civilization had already been taken.

Like all civilizations, the Mesoamerican is formed by a number of different peoples with sufficient individuality to cross-fertilize one another but close enough to have a common basis for all. Thus a large number of traits--mentioning now only some of the pre-civilized ones corresponding to that second millennium--were common to all. Similar agriculture, plants, domesticated animals, magic, tribal systems, sedentariness, pottery, weaving...From this basic culture the civilized one would emerge, having a common origin but differing somewhat in later developments.

Among all the different nations of Mesoamerica they managed to build a number of typical traits that taken together separate the area from any other culture. Many aspects of their social and political organizations, of their commerce or warfare, of their religious beliefs and practices, of their art or their philosophy, or their ceremonial concept, are not shared by their northern or southern neighbors nor indeed by any other people.

Evidently not all Mesoamericans possess all the traits nor are some common ones equally shared by the different areas. I believe this is typical of any civilization. Some areas went further along one path whilst others followed a diverging course.

Besides, we must consider civilization as encompassing at least four main human groups:

- (1) The urban elite, without which I can't see how we may speak of a civilized level. This elite lives mainly in cities--of whatever type they may be--and is formed by the leaders of various fields: intellectual, priestly, political, merchant or military.
- (2) The rural population, the feeders of the society, usually oppressed by the elite. I think that this is today the only surviving group, no matter how much changed by Western culture. By themselves they are incapable of forming a civilization but were indispensable to the ancient one.
- (3) The marginal groups within the frontiers of the civilization. Apart from internal islands of this type, I would think that Western Mexico fits this category. If Mesoamerica had been fashioned on the Western Mexico type, we could hardly consider it a civilization.
- (4) The outside neighbors, the barbaroi, on various levels of development. Although they did not pertain to the civilization, they influenced it at different moments and were an important factor in some of the breakdowns.

A different but related aspect is the apparent tendency of civilizations to be formed of two cores or two main groups. In Mesoamerica it would be Maya and non-Maya, as in the Hellenic society there were Greek and Roman, and in our own world Latin and Anglo-German.

It is clear by now that in my view we can only speak adequately of one Mesoamerican civilization. Such expressions as Maya civilization or Aztec civilization I consider misleading, since both the Maya and the Aztecs and many others are only part of a larger whole, even if particularly distinctive in different ways and moments; both have been to a considerable degree fashioned by this larger whole.

This leads to another important point of whether it is one civilization from its emergence in Olmec times until its final downfall in Aztec times, thus making a continuum, or whether along those three millennia a break of such intensity occurred as to make it more probable that we should consider two civilizations, one succeeding the other. I do not hold this view for many reasons too long to enumerate here, but I quite agree that a good case could be made for the opposite position.

All these matters would have to be considered and many more--demography, ideology, intercommunication are basic--if we are to understand not only the emergence but the very nature of Mesoamerica. How much can be done depends of course on archaeology for the more remote periods, and on archaeology helped by the written sources and other sciences for the more recent ones, but even if we gather an immense amount of factual information it will not be fully useful without a theoretical approach to the problem of civilization. Only this will allow for a real understanding of that information.

IV. COMMENTARY ON: THE OLMEC REGION - OAXACA

Robert F. Heizer

My assignment at this Conference is to serve as a discussant for Dr. Bernal's contribution on the Olmec culture. This I find not a difficult task because he has done such an excellent synthesis here and in his recent major work The Olmec World (1969) that only brief comments on substance need be made.

My remarks will follow Bernal's order of presentation in his Conference paper. First is the important matter of dating. We now have available 25 acceptable radiocarbon dates from the La Venta site and 14 from San Lorenzo. There are an additional dozen or so La Venta dates, but some are suspected to be, and others are known to be, inconsistent with their stratigraphic source and cannot be accepted. In addition to those dates listed at the end of Bernal's paper, we can add the following:

(1) UCLA-1350, 1150 ± 80 B. P. and Y-2378, 1370 ± 80 (800 and 580 A.D.) for a post-La Venta firepit occurring within the surface drift sand mantle. These dates mean nothing in terms of Olmec occupation, and merely indicate early Postclassic utilization of the main site area about 1000 years after its abandonment.

(2) UCLA-1630, 2630 ± 60 B.P. (680 B.C.). Based on charcoal from uppermost artificial clay fill forming the floor of what earlier we tentatively interpreted as a possible ballcourt at the south end of the Stirling Group at La Venta. Nothing found in the brief explorations carried out in March and June, 1970, can be interpreted as specific ballcourt features.

Bernal's assessment and rounding off of the La Venta radiocarbon dates leads him to assign the age of construction Phase I to 1300-900 B.C.; Phase II, 900-600 B.C. and Phase IV, 600-450 B.C. Phase III has only one secure date, 600 B.C. (UCLA-1332). Bernal may be right, but my impression is that the succession of rebuilding events (which Drucker and I, perhaps inaptly, called phases) were probably more formally or regularly spaced through time than suggested by his analysis of the radiocarbon dates. Phase III was a major one at La Venta and I would guess that it was of the same approximate duration as Phases I and II which preceded it. However, it is possible that its duration was very brief. As an aside I note that Bennyhoff in his paper prepared for this Conference believes that the La Venta pyramid was erected in Phase IV - that is, toward the end of the site's history about 600-500 B.C. While this might be true, and there is no evidence to affirm or deny the opinion, I believe that a major construction existed

here from the beginning, though it may have been increased in diameter and height from time to time and achieved its final form only at the end. Since we cannot really hope to answer such questions of the internal chronology of the site without further excavation and collection of charcoal for dating, we can generally agree that La Venta began about 1000 to 1200 B.C. and lasted until 400-500 B.C., which is almost precisely the time period which Ford in his Comparison of Formative Cultures of the Americas assigns to what he terms the "Theocratic Formative."

The San Lorenzo site Olmec occupation begins ca. 1150 B.C. and terminates ca. 900 B.C., its floruit thus being somewhat briefer than La Venta. There is older occupation evidenced at San Lorenzo than presently proved for La Venta, but this imbalance may in time prove to be more apparent than real since there are clear signs of pre-LaVenta period (i.e. pre-Phase I) refuse at La Venta which have not yet been sampled adequately. There are at La Venta no structures or stone sculptures antedating the major Olmec occupation, the latter appearing according to present evidence to be something established there from outside rather than developing gradually on the spot.

Bernal correctly sees a main problem about Olmec stone monuments, and this is the question of where they date within the occupation spans at San Lorenzo and La Venta. Coe believes that the Chicharras Phase (dated at 1150 to 1250 B.C.) occupants of San Lorenzo were producing Olmec style basalt sculptures of the same genre as occur so abundantly in the San Lorenzo Phase which follows immediately. The evidence for this is basalt waste and a single fragment of sculptured basalt. The La Venta monumental stone sculpture is not dated or dateable with reference to stratigraphy or radiocarbon. This is due in part to a failure of the earlier excavators to examine the stratigraphy and ceramic associations of the large altars, stelae and colossal heads, and in part to the final positioning of many of these sculptures on the latest (i.e. Phase IV) construction surfaces. Thus, while all of this wealth of sculpture at La Venta can be said with assurance only to date from the time of or before the abandonment of the site, i.e. 400-500 B.C., some of it may go back to the beginning of the site around 1000 to 1100 or even 1200 B.C. Coe believes that all of the La Venta stone sculpture dates from the earliest phase of the site, but it should be remembered that this is stylistic and not stratigraphic dating. At La Venta in 1955 we found beneath Monument 13 a pit and offering which dates from Phase IV. If the same monument stood at this spot in Phase III, as we suspect it did (BAE-B 170:Fig 10) this would be evidence for the repositioning of monuments at times when this was made necessary by new construction activities. This single hint is important in suggesting that monuments were either re-set or changed while the site was occupied, and further, that the La Venta sculpture may be viewed as a local collection formed over a period of time which might be as long as that of the six or seven centuries of site occupation. Since both the San Lorenzo and La Venta people were capable of moving very large stones, the shipping of finished sculptures from one site to another is a possibility that cannot be ignored. The close

similarity of Monuments 20 and 14 from San Lorenzo, to Altars 4 and 2 at La Venta would surely encourage the hypothesis that both pairs were made at one place and dispatched to separate sites. Clewlow's demonstration of the practical identity of two Olmec sculptures found about 55 airline miles from each other is the clearest evidence we have of such transport (Contribs., Arch. Res. Fac., Berkeley, No. 8, 1970). The quite variable style and condition of the colossal heads from La Venta may indicate separate histories and different ages of some heads before they were brought to La Venta. But whether sculptures were moved from La Venta to San Lorenzo, or vice versa, or whether finished monuments were brought to each site from older sites in the Tuxtla Mountains we do not know. There are hints, and only that, of sculpture workshop areas at La Venta, but the information is too scanty to support speculation. I agree that a better understanding of the source and age of these stone sculptures is important, but think also that these problems will be difficult to solve.

Bernal reminds us that we should think of Olmecs as a people occupying a geographical area rather than a series of populations attached to individual sites. I agree, but at the same time note that our reliable information on lowland Olmec archaeology comes from a very small number of sites about which we have often limited or contradictory information. For this reason a discussion of settlement patterns is impossible. Bernal (The Olmec World, pp. 49-50) prefers to call La Venta a "dispersed city" rather than a "ceremonial center", the distinction being important to him because the dispersed city is defined as the urban core in which the palpable and visible as well as the socio-religious activity manifestations of the civilization were concentrated. I have used the term "ceremonial center" and "religious capital" to describe the La Venta site, but with the same meaning that Bernal used "dispersed city." Some general agreement on terminology would be useful, and perhaps we can discuss this at the present conference.

As to Olmec population numbers and details on modes of economic support, we again know very little. Bernal's estimate of an Olmec population of 350,000 living in a territory of about 7,000 square miles seems to me rather too large on both counts; perhaps half or two-thirds of that area and population would be an equally good guess, but our difference here depends upon how one draws the territorial boundary of a people we know so little about, and even more importantly, how efficiently they were utilizing the area they occupied for economic production. Bernal's suggestion that the "Metropolitan" Olmec territory may have been divided into a series of "city states" whose capitals numbered Tres Zapotes, Laguna de los Cerros, San Lorenzo and La Venta has been made before, but until we have better chronological control and can devise some way of testing this theory it can remain only that. These large sites are situated on an arc surrounding the northern edge of the Tuxtla Mountains. The mountain area itself is a very attractive one for farmers, but thus far no sites of equal age or size to the lowland ones

mentioned have been discovered here. It has hard to believe that the hot and humid lowland zone surrounding the Tuxtlas was occupied and the cooler mountain area with its rich volcanic soil was vacant. Until this central upland zone has been adequately surveyed we will be hampered in trying to account for the big sites in its penumbra. Whether there existed an Olmec state in lowland Mexico we do not know, but the common sharing of the monumental style of art suggests some political unity. Warfare, a common feature of states, is not clearly evidenced either in pictorial art, military artifacts or defense locations of sites. The size of the major sites, of which San Lorenzo and La Venta are the best known, and nature of many of the features at these sites, clearly indicate that a large labor force was available to carry out the large scale construction works. At La Venta the two largest structures are the conical "pyramid" and the Stirling Group acropolis. The pyramid is 420 feet in diameter, over 100 feet high, and has a mass of about 3.5 million cubic feet. The Stirling Group acropolis measures 650 by 700 feet on the sides and rises 37 feet above the original ground level. Its mass is slightly in excess of 16.5 million cubic feet. Coe has intimated that the whole San Lorenzo site plateau is an artificial construction; a rough calculation of its mass is 140 million cubic feet! Such public works projects are unique to lowland Olmec sites in Middle Preclassic times, and by their mere existence they prove that society was organized in such a way as to control the labor of a considerable population.

There is evidence of long-distance trade at San Lorenzo and La Venta in the form of obsidian drawn from ultimate sources in the states of Hidalgo and Puebla to the north and Guatemala to the south (Contribs. Arch. Res. Facil., Berkeley, No. 5, 1968). What is of interest here is not so much the fact that obsidian was serving as a trade item, but that the "sphere" of procurement running from Hidalgo in the north to southern Guatemala in the south covers the areas of both Bernal's Colonial Olmec and Olmecoid settlements. What other goods, presumably of a perishable nature such as food, cacao, copal or feathers, may have been traded we do not know. Most important, perhaps, were the ideas which were transmitted along the routes by which the obsidian was passed. And along these routes also could have passed sculptors trained in the canons of Olmec art who left the evidence of their presence at such places as Pijijiapan, Las Victorias, Batehatón, San Isidro Piedra Parada and Chalcatzingo. Some theorizing has been formulated around the presumed and probable, but not proven, trade between highland Oaxaca and the Gulf lowland in magnetite and ilmenite from which mirrors and beads were made. Such trade in obsidian and magnetite and perhaps jade also, may have been carried out on an informal exchange basis. Flannery suggests that the Oaxaca-San Lorenzo magnetite trade served as a status reinforcing mechanism where surplus food was exchange for luxury items. Flashy and rare imported items usually become the property of the wealthy who can afford them, but this does not tell us very much beyond the fact that some hierarchical system of status existed. It would be interesting to know if there were Isthmian markets at such spots as the modern market towns of Juchitan and

Acayucan which lie at the points on the Pacific and Atlantic sides of the Isthmus at the valley and elevation "hinge points," in which lowland and highland goods, as well as people, came together with resulting exchange of goods and ideas. Such trading spots, whether they may have been small informal village markets where individual merchants appeared with their goods, or whether they might have been large organized markets to which numbers of traders went with large amounts of goods, would account for the various highland-lowland shared items of ceramics and material goods. I agree with Bernal and Flannery (Dumbarton Oaks Olmec Conference, 1968) that the peoples of the Oaxacan region around 1000 B.C. may have quite independently achieved a sufficient degree of socioeconomic development so that they were interested in the somewhat more sophisticated and exotic forms displayed by the lowland Olmec, and that they were receptive to these. The large scale procurement of schist and serpentine by the builders of the La Venta site from the metamorphic zone of the Pacific half of the Isthmus of Tehuantepec (for area see *Contribs. Arch. Res. Facil., Berkeley, No. 1, Map 3, 1965*) proves either that large numbers of people who lived in the area producing serpentine and schist were engaged in quarrying and transporting these materials northward to the lowland Olmecan centers, or that the Olmecs themselves were engaged in this work which we may call a large scale "lithic industry". We do not know which system was employed, but if it was the latter it would imply territorial ownership or political control of a larger part of the Isthmian area by the lowland Olmecs than is often assumed was the case. Green and Lowe in their *Altamira and Piedra Parada report (NWA Papers No. 20, p. 71, 1967)* consider the Olmec heartland to extend across the Isthmus to the Pacific. There are allegations that the distinctive blue-tinted Nicoya jade was used by the Olmecs but I have never seen any of this particular and distinctive jade from Mexico, and can say categorically that none of it occurred at La Venta which is the one site from which we have a substantial collection of jade whose site origin we are certain of. We should be careful, I think, about talking about long-distance trade of the La Venta-San Lorenzo people and inferring from this a "trade network" because thus far the amount of material present at these sites secured from distant sources is very small - - so slight, in fact, as to be almost insignificant in terms of the totality of hard goods in these sites. What we know nothing about, of course, is what kinds of perishable objects may have been changing hands.

The Veracruz lowland-Oaxaca highland region might be termed the "Pre-classic Isthmian Oikoumene," a geographical-historical unit within which a related set of happenings and forms developed - a rich and variable web of culture growth achieving the qualitative level of civilization. Bernal's felicitous term "symbiotic area" intends to say the same as my adoption of the word Oikoumene though symbiosis implies to me a somewhat greater emphasis on necessity and even biological survival than Oikoumene which bears the connotation of operating on the suprabiological or cultural level.

La Venta and San Lorenzo are at present the oldest radiocarbon dated large Olmec sites with abundant sculpture, formalized plans and major architecture. The scale or degree of organization of society, esthetic development, and technology exhibited at these two sites is not duplicated elsewhere on the same time level in Mesoamerica. Everything tells us, regardless of their Early to Middle Preclassic time placement, that the recognizable Olmec manifestations at these sites is not a beginning, but rather a climax. Where, and in what form, the undoubted earlier and developmental stages of lowland Olmec culture occurred we do not know, but there is no doubt that we will learn about this with more work and new discoveries. My own inclination is to expect that pre-La Venta, pre-San Lorenzo period Olmec sites will be found in the eastern Tuxtla Mountains and that these will be smaller and somewhat simpler in form but still recognizably Olmec through their layout patterns and style of stone sculpture. Such sites may have to date escaped notice both because no field work has been done here, as well as because of the probable obscuring of sites beneath volcanic ash deposits. An alternative area is the higher country of the Isthmus lying directly to the south and from whence we assume came a substantial amount of the serpentine and related metamorphic minerals (schist, jade, ilmenite-hematite) used by the Olmecs. The ritual-oriented aspects of the big Olmec centers in the Southwestern lowland region of Mexico must have antecedents, and many features are so distinctive that they should be easily recognizable. Among them are the round fluted conical pyramid whose model may be a naturally eroded cinder cone in the Tuxtla Mountains (Antiquity 42, Pl. XII, 1968); the particular art style as evidenced in small or large stone carvings; large and thin rectangular unfired adobe bricks for platform or wall construction; use in architecture of well-shaped rectangular blocks of basalt and serpentine; and the placing of large so-called offerings in the form of flat pavements or mosaic masks of serpentine blocks in deep dug pits. Since we do not know where Olmec culture in the form in which it is manifested at sites such as San Lorenzo and La Venta as early as 1100 to 1200 B.C. originated, we can only speculate on the time, place, and manner of the formation of this particular event.

There have been, over the past century, a number of suggestions made arguing for Old World germinating contracts, either by way of the Pacific or from Africa by way of the Atlantic. None of these opinions in my judgment, are to be seriously considered. This leaves us with a local i.e. American, origin of the particular cultural syncretism which we call Olmec. In 1970 it seems unlikely that there remains still to be discovered any hitherto unknown culture in Mesoamerica which will be the equal in age and in degree and sophistication of development to the Olmec culture as seen in the major Vera Cruz-Tabasco sites. At the same time it is possible that archaeologists have thus far not found some Early Preclassic development which will change all of our current ideas. But, assuming that a main flowering of Mesoamerican high culture occurred in the southern Veracruz-northern Tabasco region some time before 1200 B.C., what several factors may have been combined, and in what manner, to produce this particular pattern?

In the first place, no single element or factor can be assumed to have been principally causative. A sounder approach would be to consider the several factors involved to be individually pre-requisite but processually significant only when they came into combination in such a way as to produce the Olmec pattern. The Olmec food-production system, about which we know nothing in fact, must have been efficient enough to provide a surplus which allowed free time for large-scale public-works construction activities. That proposition is, I think, undeniably true, but in stating it I do not mean to say that economic sufficiency was the causative factor but rather that it is one of the preconditions of Bernal's "dispersed city" and large-scale architectural construction. Parsons and Price in their Conference paper dealing with trade argue that the Gulf lowland in Middle Preclassic times was especially favorable for agricultural production, that this led to greater population density, and thus the stage was set for the precocious emergence of Olmec culture. I do not know of any evidence for or against this view, but even though we accept it as some kind of ecologic-demographic explanation, it still fails to explain what went on in all those Olmec heads (not stone ones). A surplus of corn may mean a full belly, but it will not by itself explain the Olmec culture pattern. Let us assume a maize farming economy in full operation by or before 1200 B.C. practiced by a substantial population of people we call the Olmecs. This assumption seems safe because over most of Mesoamerica effective agriculture as the primary subsistence basis appears to have been established by 2000-1500 B.C. The Olmec farming system was surely the swidden or slash-and-burn type which still obtains throughout the forested areas of Mesoamerica and about which we have a great deal of ethnographic information (for La Venta see SWJA 16, No. 1, 1960). Of high importance in this farming system is the time at the end of the dry season when the cut vegetation is burned and the fields are planted just before the rainy season begins. To do this with any assurance one must know something about the weather pattern and have a calendar. While the seasonal weather pattern is not absolutely fixed, it does observe a time protocol. If there should come early rains followed by some weeks of dry hot weather and the farmer burns the milpa and plants too early by error, he may fail to get a crop. Perhaps Preclassic agriculturists were more knowledgeable than I assume them to be, but I like to think that not all of them were, and further that if a newly emerged priesthood said "Don't call us about whether a particular rain marks the time to burn and plant - - we'll call you", the idea would have been attractive since it was a mitigation of one of the greatest uncertainties of living as a village farmer. But beyond this, suppose that the priests also said, "And what is more, we will at the La Venta dispersed city-ceremonial center, engage in a lot of mumbo-jumbo with the astral, agricultural, solar and pluvial deities whom we are well acquainted with, and through our influence we can get them to behave in a rational and benevolent way which will benefit you."

Today in rural Mexico there is a sufficient degree of literacy so that the time for burning and planting is determined by consulting a printed

calendar. In preconquest times the calendar was a responsibility of specialists, and it was from them that the word came about the proper day to clear, burn, plant or harvest. Regardless of how involved the Maya had become in the intricacies of calculating dates, we must remember that their calendar was still a practical time reckoning method which was closely associated with Maya agriculture. There are a lot of opinions about whether the Olmecs had a complex calendar of the Maya type. It does not seem very probable to me that they did. Parsons' suggestion in his Bilbao report that the Cycle 7 monuments belong with the Izapan horizon style which is Protoclassic (100 B.C.-100 A.D.) fits better with the archaeology than other interpretations which try to associate them with an earlier time level. But, this is not to say that the Olmecs did not have any calendar. We tend to associate the Maya calendar with writing, but there are many calendars which are much simpler and whose development into accurate chronometric systems would merely need more refined observation and the keeping of long-term records. Leslie Spier's study of southwestern Indian calendars (Mus. No. Ariz. Bull. 28, 1955) and Leona Cope's earlier and more general study of North American Indian calendar types (Univ. Calif. Publs. Amer. Arch. and Ethnol., Vol. 16, No. 4, 1919) attest the existence of a number of calendars whose basis is termed "astronomical" for the reason that the year is begun or divided by determination of the solstices, or from the time of the rising at dawn of constellations such as the Pleiades or stars such as Orion. Calendars of this type also occur in South America, and there seems little doubt that they were known in Mesoamerica before more complex systems were developed. What I am saying is merely that simple astronomical type calendars must have existed in Mesoamerica in Preclassic times.

Control of weather by specialists who possess supernatural power to influence wind or rain and can either bring or terminate these weather conditions occurs so widely among North and South America tribes as to allow the conclusion that the practice is almost universal among American Indians. In Mesoamerica weather control was either in the hands of priests who had no other duties, or lay in the domain of non-priestly specialists in village societies such as the backwoods Populucá of the Tuxtla Mountains whose "rain-makers" claim to be able to bring on damaging rains and extort money or goods from people whom they threaten to injure by applying this special power (G. Foster in Inst. Panam. Geogr. e Hist., Publ. 51, 1940; Univ. Calif. Publs. Amer. Arch. and Ethnol., Vol. 42, No. 2, 1945; Amer. Ethnol. Soc. Monogr. V, 1942).

We do not know whether any of the large stone monuments at La Venta were present there as early as 1000 or 1100 B.C. but since closely similar ones are reported to occur at the San Lorenzo site on this time level (i.e. San Lorenzo Phase) we can believe that some of the La Venta monuments also existed at the same time. There can be no doubt that important individuals are depicted on some monuments. I think it very probable that these persons are the La Venta leaders. It would help us considerably, as Dr. Bernal

points out, if we could identify the nature or role of these persons since this would give us a direct lead to understanding the hierarchical structure of La Venta society. I believe that these important persons were specialists in ritual and the calendar, and were an important element in the successful agricultural system which was practiced through that part of the Olmec area which the La Venta center controlled. This is a pretty large claim to make for a culture in 1000 B.C. in southeastern Mexico, and I will try to cite some supporting arguments:

There cannot be much doubt that La Venta was a great center of ritual. The abundance of stone monuments which were precisely and formally positioned relative to the centerline; the nature of the architectural constructions in the form of mounds, plazas and platforms; the peculiar deeply buried deposits in the form of one to 28 layers of green serpentine; the numerous caches, interpreted as ritual offerings, of jade objects; the absence of living refuse in the central site zone lying north of the pyramid; and the unusual pyramid itself are among a longer list that could be cited to support the proposition that the site was built to serve some special purpose. Since the site apparently did not function as a market or defense citadel or manufacturing center or as a place to house a large population, it must have served non-material or intellectual ends. The most impressive items of all at the site are the colossal stone sculptures which include a 34-ton altar, the four colossal heads ranging from 12 to 24 tons, and two so-called stelae weighing 6 and 26 tons. There can be little doubt, it seems to me, that few events in the lives of the San Lorenzo and La Venta populations can have been more memorable than the witnessing or participating in the transporting of these really huge blocks of stone for nearly 70 miles. Many hundreds of persons were necessarily involved in each of these long-range moving jobs, and there were enough of them carried out at both sites during their history for us to suppose that each generation of Olmecs had either seen or participated, or knew from direct report, of a particular stone-moving occurrence. Each of these great stone monuments can be interpreted as the means of memorializing a person who is portrayed in a simple straightforward human form and not with jaguar facial elements. Those persons shown in the colossal heads, standing in front of niches, or as the central person (in one case two persons) on the stelae are, in my opinion, direct representations of members of the authority group at La Venta and therefore leaders of the society of people who built the mounds and transported the multi-ton stones from their distant sources. The La Venta leaders happened, I think, to have chosen to allow us, some twenty-five to thirty centuries later, to see what they looked like. Granted the ritual or religious or ceremonial nature of the site, it is difficult to see the persons portrayed on the colossal stone sculptures as anything but priests. While it is only my impression, I do not see the figures on the La Venta and Tres Zapotes stelae as warriors. They may be, and in this case Bernal is correct in what he interprets as to who the persons are, but I shall prefer to see these persons as religious functionaries. If

there were richly-endowed tombs at La Venta we would have some good data to work with. The probable tombs (see discussion in Kroeber Anthropol. Soc. Pap. No. 33, 1965) are few in number and late in time. Perhaps there is an undiscovered "royal cemetery" at La Venta. Such a place may be the pyramid itself which contains several as yet unexplored stone constructions (Contrib. Arch. Res. Facil., Berkeley, No. 8, 1970). Architecture in the form of palaces or special living precincts at La Venta seems also lacking. If, as appears to be the case, the La Venta site as a unit represents the most substantial evidence of integrated activity of the whole society, then the religion must have been closely attuned to political or secular authority. From this I infer that church and state were one, that priest-kings residing at La Venta were the holders of power in the society, and further, that sites such as La Venta, San Lorenzo and others of their class were the socio-religious-political integrating centers for the rural populations which supported them. In brief, the La Venta site can be seen as the communication center of an interdependent set or series of Olmec socioeconomic population elements ranging from the high priests and their retainers at the center to the dispersed village farmers in the countryside.

I have recently consulted an astronomer who is interested in the matter of Mesoamerican site orientations and put to him the question of the significance of the 8 degrees west of true north alignment of the La Venta site. He has determined a number of possibilities for different times in the first and second millennia B.C. A star 19 1/2 degrees from the pole would set at 18 degrees latitude at 8 degrees west and rise at 8 degrees east on the horizon. Alpha Ursae Majoris (the pointer star in the Big Dipper) would fit here at about 2000 B.C. and Alpha Ursae Minoris, our own Pole star, did so perform about 1200 B.C. Either of these points could have served as the orientation line for the La Venta site, but there is no hint whether any were in fact so used. Another possibility is that some star rising in the east may have been important and the site centerline was laid out at right angles to the east-west line. Now all of this is something less than satisfactory in terms of providing a firm proposal for the astronomical orientation of La Venta, but because so many Mesoamerican sites are aligned mainly north-south, and because there is evidence that the centerline of La Venta was deliberate rather than a matter of topographical convenience, I would argue that there is a probability that La Venta was astronomically oriented. Accepting this proposition, I would argue for the additional probability that the La Venta Olmecs employed an astronomical calendar. Shook in his Conference paper refers to fairly simple kinds of astronomical observatories dating from Middle Preclassic times at Naranjo, Monte Alto and other Guatemalan sites. Shook's opinion is that such astronomy as was practiced was primarily to keep count of days for the purpose of noting appropriate points in time for agricultural processes such as clearing fields, burning and planting. It is this kind of calendar which I am supposing was employed by the Olmecs. Whether one could call La Venta an astronomical observatory is quite another matter. The great conical fluted mound which rises over 100 feet at the southern end of Complex A at

La Venta would have served admirably as a vantage point to view the horizon to the north. A true horizon sighting would at present require an elevated position such as the pyramid because of the height of the surrounding forest growth. There could, of course, exist an astronomically oriented Mesoamerican site which was, in addition, a true astronomical observatory, without the people who built and used the site having a calendar. Such a site alignment and observatory might in this case merely be essential adjuncts of a solar, lunar, stellar, or planetary cult. But, since we are accustomed to linking Mesoamerican astronomy with a calendar, it is tempting to construe this concurrence as obtaining by 1000 B.C. among the La Venta Olmecs. The San Lorenzo and La Venta sites are, despite many unusual features, still basically Mesoamerican, for here is the pyramid - mound - plaza arrangement, figurines of stone and clay, jade celts, beads and composite earspools, obsidian blades produced with the punch technique, unfired adobe bricks, the jaguar deity and the plumed serpent.

The Mesoamerican calendars served not only to keep track of time, and thus provided a means of determining when seasonal weather changes were approximately due, but more importantly the calendar was the means of fixing the precise time for the observance of specific rituals whose performance was vitally important to the welfare of men. The priesthood with its special knowledge was, therefore worthy of popular support. We can, I think, see this kind of relationship at La Venta. It is possible that Olmec religion was involved with prophecy, eclipse prediction, astrology, divination, and other features which can be readily linked with the calendar, but if so this remains to be demonstrated.

At 1000 B.C. or perhaps several centuries earlier, according to this argument, we have major religious centers at La Venta and San Lorenzo; perhaps also at Laguna de los Cerros and Tres Zapotes. But even at 1000 B.C. we are not dealing with a beginning, but with something already patterned and highly developed. Perhaps the most important ingredient of this pattern is in the priesthood who can be assumed to have been the managers of the religious centers, or the rulers of Dr. Bernal's dispersed cities.

Are the lowland Olmecs of 1000 B.C. proximate to the point in time when a body of men versed in occult matters (perhaps like the weather controllers of the recent Popoluca of the Tuxtla Mountains as described by George Foster) organized themselves into a formal society and entered into a contract, so to speak, with the dispersed villager Olmec population? The priesthood in return for providing religious guidance and the benefits of performing the cycle of rituals could call on the farmers for labor to build the ceremonial center and provide economic support for the religious leaders and their specialist retainers who lived at the center. Whether this happened first in the lowland Olmec country we do not know. Nor do we have any hint about whether the organizing impulse came spontaneously out of such a local population or was due to the successful efforts of outside proselytizers.

But once such a system became operative, and if it was sufficiently productive for the supporting as well as the supported groups, a condition highly conducive of rapid cultural elaboration would have existed. Given the existence of naturalistic stone sculpture, however unelaborate it was; given an existing system of rituals in the form of a ceremonial cycle associated with farming, regardless of how simple or complex this cycle may have been; given a calendar based on readily observable regular movements of the planets or stars of the type known so widely among North and South American Indians, add to this a few other assumed preconditions which would not be unusual among Preclassic farmers, then apply to this set of features the energies of an intelligent and progressive priesthood, and something like La Venta or San Lorenzo might result in a fairly short time. The model for such a process would be a deviation-amplifying system in which the "kick" or impulse was the motivation of the priesthood. Once the feedbacks were placed in operation the calendar could be systematized and refined, sculpture could aspire to megalithic proportions as well as improve in quality because full-time specialists were at work, the ceremonial cycle could expand both in elaborateness and importance in response to the needs of all, and so on. In this fanciful reconstruction of what might have gone on sometime in the second millennium B.C., somewhere in Mesoamerica, a seeding bed for writing could have come to be established. I propose all of this as something which might have happened in this way among the lowland Olmecs. The one thing which does seem to me most probable is that the originators of Mesoamerican civilization were priests rather than military generals or businessmen. Why, if such a sequence of events did take place, it happened first among the lowland Olmecs is the most interesting question of all. We have no information from which we can argue that the lowland Olmecs were better off as farmers and through some economic means got the jump on other Mesoamerican peoples. Nor can one think of any provincial natural resources which they could have purveyed and thus become wealthy and prestigious through the dependence of outsiders on some supposed necessity which only the Olmecs could supply. Nor is there any evidence that the Olmecs possessed a wide-ranging military force, like the Roman legions, which effectively subdued and extorted from subject peoples either ideas or valuable goods. So much of Olmec culture is unique that it looks like a home-grown product. The best proposal I can suggest, at the same time admitting there is no solid evidence to support it, is that there became effective in application some kind of organizational virtuosity covertly expressed in religion among the Olmecs around or just before 1000 B.C. and that this was maintained in good working condition for from five to seven centuries at which time the system broke down. During the half-millennium of lowland Olmec culture climax other Mesoamerican people were developing their own local styles of civilization, but whether these last were taking place through primary or secondary stimulation from the lowland Olmec area we do not know. In part, we lack understanding about this because we are unable to define Olmec influence, both as regards time and directions in which influences travelled. We cannot date the clearly Olmec-inspired rock reliefs in Morelos, Chiapas, Guatemala and El Salvador, not only because they lack clearcut ceramic associations, but

also because these are stylistically rather different from the reliefs occurring on Stela 2 and Stela 3 at La Venta, the only lowland Olmec site to thus far evidence this form of sculpture.

The idea of a New World Oikoumene was specifically proposed in 1948 by A. L. Kroeber and later elaborated on by Gordon Willey (*Amer. Anthropol.*, Vol. 57, No. 3, 1955). We can now begin to see in these terms, and as a result of recent work, something of what was going on in the Middle American nucleus. Prominent participants in the first half of the first millennium B.C. were the Olmecs whose climax development seems to have been reached in south-eastern Mexico, and whose impress or influence extended into the Valley of Mexico, Morelos, Puebla, Guerrero, Oaxaca and Chiapas to the west and south, and to Guatemala and Salvador to the southeast. Parsons and Price in their paper written for this Conference have referred to this distribution as evidence for an Olmec "horizon style".

A real problem of interpretation exists in trying to explain the occurrence of Olmec features such as several types of distinctive ceramics, carved jades, and low-relief rock sculptures which are present either singly or in different combinations, over such a wide area. In part we cannot put the Olmec jigsaw puzzle together because the chronological control is imprecise, and we must therefore fall back on stylistic or ceramic comparisons which are, in effect, seriations whose direction or trend can be read alternatively. Bernal has interpreted the available data in terms of seeing sites such as Chalcatzingo, Las Bocas and Tlatilco as settlements of "Colonial" Olmecs, and sites where the "Olmec presence" is less strong as "Olmecoid", meaning that Olmec influence was registered through some as yet not understood means, among which have been proposed missionaries or proselytizers who were exporting the Jaguar Cult, pochteca-like traders, or military expeditions. Parsons has proposed an Early Olmec horizon which was the registration of a rapid diffusion of the Olmec art style, and a Late Olmec horizon which involved local specializations developed from the base of the already diffused and accepted Olmec art style. Parsons' Early Olmec horizon may be what Bernal means by Colonial Olmec, and Parsons' Late Olmec horizon may be what Bernal means by "Olmecoid". I hope that each will comment on this later in the discussion. The question is an important one, because the Metropolitan-heartland-lowland Olmecs at present carry a heavy burden of responsibility as the people who, in Mesoamerica, first synthesized or distilled Preclassic culture into the essence which we call civilization.

The southeastern Mexican Olmec area, at times referred to as the Olmec "heartland", may not be the center of origin and source for the diffusion of Olmec objects, people and ideas, but rather a localized elaboration built upon a base which was very widespread--a base which in other areas provided part of the raw material for such diverse developments as took place in the Valley of Mexico, Oaxaca, and the Maya area. The lowland Olmec zone which we see at present only from the peculiar perspective of the great "dispersed cities" or

"ceremonial centers" was probably not, it seems to me, the nerve center from which were dispatched colonists, traders, or religious proselytizers. If this were so we should expect to find more kinds and larger amounts of outland objects which came back to the administrative centers to be added to the treasures buried as ritual offerings. There is a wealth of valuable materials in the La Venta offerings, but taken as a whole it does not impress me as being formed from the tribute or gleanings of other cultures secured and brought back by Olmec emissaries or troops or far-ranging trade with distant and different cultures. Rather, the La Venta jades look like local products for the most part. A careful comparative analysis of the La Venta celts, beads, earspool flares and other forms, together with an examination (by X-ray fluorescence or neutron activation methods) of the jade mineral itself might produce leads as to the source(s) of the jade as well as indicate the probability of local manufacture as against importation in finished form. Nothing along this line has yet been done. The sequestering of such a great wealth of jade objects in the form of ritual offerings at La Venta once led me to suggest that the site itself may have been equivalent to the "national treasury", or, perhaps better, like the Schatzkammer of a great European cathedral. The burial of the valuable jade objects, on the other hand, may have been a means of stimulating the flow of sumptuary goods by taking them out of circulation and depositing them in a place so sacred and inviolable that they would be safely stored.

There is no way known to me to test the several possibilities of the means by which the La Venta jade was secured. The great site must have been known from afar, and it may have been a pilgrimage place to which travellers came and brought gifts of jade. Or, external trade may have been controlled by the ruling class which was interested in jade because of its rarity.

The excavators of La Venta and San Lorenzo have suggested that the Olmec occupation of these sites ended rather abruptly. Some momentous event, affecting both people and what they did, may have happened in the traditional Olmec heartland area to cause a drastic deculturation about 500 B.C., and this may have been due not to some mysterious disaster or invasion which wiped out the population, but rather to internal disjunctions which might, for all we know, have involved a revolution aimed at relieving the undue pressure of hierarchic power on an oppressed peasantry, provincial rivalries between regional "capitals" or "city states", or a series of calamitous years in terms of crop yield, or a pandemic, or whatnot. Or, some external trigger could have upset the delicate balance of an internally-adjusted power structure which brought the system of Olmec culture to an end. Possibly, having stood as exemplars of how to practice civilization, the Olmecs may have, through the web of the Mesoamerican Oikoumene, communicated the concept of the centralization of power which, in the course of time, was turned against them by other people who had been, so to speak, their students. Given the physical survival of the Olmecs in their lowland home area after their decline from greatness, they may have retained for several centuries enough of their

now-disrupted pattern to still be able to accept new ideas which were feeding back from other peoples in other areas. By invoking this explanation we could account for the Olmec-connected but not Olmec-inspired Tuxtla Statuette and Tres Zapotes Stela C. According to this proposal the Olmec calendrical "correlation problem" may be in part explained. If this was the case, we shall have to revise some earlier conclusions that Olmec culture came to a sudden and full end about the middle of the first millennium B.C. and consider the alternative that when La Venta and perhaps other main ceremonial precincts were abandoned the bearers of the esoteric content of Olmec culture survived and maintained some of the older body of special knowledge. I would not be surprised in the least to hear of the discovery of epi-Olmec sites in the Olmec heartland dating from 500 B.C. - 100 A.D.

SUPPLEMENTARY REMARKS

There are uncounted definitions of civilization. We did not discuss in our Conference which definition we could all agree upon, but preferred to leave such specifications up to each person who contributed a paper or commented on one. Perhaps our group should have tried to pinpoint in each area which was considered the instant at which the society moved from pre- or proto-civilization to the level of true civilization. But if we had attempted to do this, we might have had as many answers as participants. Willey alone made the effort to fit the Maya into a general definition, and we call the reader's particular attention to his thoughtful comments on pp. 101-104.

Nearly all definitions of "civilization" are agreed on the point that this development can be characterized by a specific roster of cultural practices and social-political-economic-demographic-technological situations or conditions which, though varied in their enumeration, all manifest a level or degree of sophistication and which do not occur in combination among simpler-cultured societies, whether these be hunter-gatherers, farmers or fishermen.

Many, perhaps most, definitions of civilization coined by historians or anthropologists list some specific qualitative features whose presence is difficult or impossible to prove in ancient times. Let us illustrate this by quoting a definition of civilization which happens to appear in print as this volume is being readied for publication. Bohannan (1971) writes, "There comes a point in [the] continuous growth of culture when those traits emerge that characterize 'civilization': a large enough population to have something resembling an urban agglomeration, a highly developed division of labor with concomitant specialization in a stratified society, food production rather than hunting and gathering, the form of government known as the 'state', a calendar and basic mathematical knowledge, [and] written records.

[Bohannan then adds the comment about this list]: They always go together-- and the absence of any of them makes classification as a civilization doubtful."

Bohannan probably would not agree with the majority of the Conference participants that Olmec culture by shortly after the beginning of the first millennium B.C. had achieved a condition of civilization. Population size sufficient to amount to "something resembling an urban agglomeration" can be argued on the basis of the very considerable size of the La Venta, San Lorenzo Tenochtitlan and Laguna de los Cerros sites (cf. Bernal 1969:24, 49-54). The "highly developed division of labor with concomitant specialization in a stratified society" can also be assumed for the Olmecs (Bernal 1969; Heizer 1961, 1963 "Food production rather than hunting and gathering" as the basis of Olmec subsistence seems highly probable since maize agriculture had been known in Mesoamerica for a long time prior to the establishment of the big Olmec ceremonial centers. Existence of the "state" cannot be demonstrated beyond question, but the pronounced centralization of ritual activities which is apparent at the La Venta site does seem to point to the operation of authority of the kind which the State might possess. But here again we are in difficulty, for Olmec society has been interpreted variably as having had the political structure of a "chiefdom" (Sanders and Price 1968:122, 132), a state (Coe 1968:123), or even an "empire" (Caso 1965). An Olmec calendar, body of "basic mathematical knowledge" and "written records" are still more difficult to prove. An astronomical calendar seems to have been in existence at the time La Venta was built and occupied (Hatch n.d.) but bar-and-dot numeration appears too late in the Olmec sequence as presently known (e.g. The Tuxtla Statuette and Stela C at Tres Zapotes) to prove any mathematical knowledge possessed by the Olmecs of La Venta or San Lorenzo Tenochtitlan between 1100-600 B.C. Written records in the usual sense are unknown, but Hatch (op. cit.) has proposed that astronomical "sky maps" in the form of symbols or glyphs inscribed on jade celts were in use, and if this is accepted we have something which is so close to written records as to make the question a semantic one. Of temple accounts, records of rulers in a dynastic line, mythological texts, or the like, we have no hint, so we probably cannot argue that the Olmecs were literate in Bohannan's terms of possessing a true "storage and retrieval" system, unless we accept the "sky charts" as true records. My own feeling is that the Olmecs of La Venta were very close to having writing. The precisely planned layout of the La Venta mounds, and the site centerline with offerings placed directly on or equidistant from either side of it all surely prove a knowledge of mensuration existing by 1000 B.C., and from this one may suspect that the Olmecs at least practiced addition--but of other mathematical practices which would constitute a "body of mathematical knowledge", we have no information. On the whole the Olmec culture as we know it from controlled excavations at San Lorenzo Tenochtitlan and La Venta comes pretty close to fitting Bohannan's list of specifications of a civilization--sufficiently near, at any rate, that the Olmecs should have the privilege of applying for admission to this exclusive club.

Gordon Willey in his commentary on Andrews' Conference paper suggests that civilization has three essential dimensions: 1), large population size and density; 2), marked social complexity, and; 3), a complex network of intercommunication among its social components (see also Willey, 1966). Civilization in Willey's view can obtain only with 5000 or more persons as participants. Societal integration may involve either a concentrated or urban settlement, or a dispersed, non-urban settlement. The crucial factor is that the energies and abilities of a population of 5000 or more are drawn upon and integrated to a common purpose. Civilization is further marked by division of labor, a complex ranking system or social classes, by a hierarchial governmental structure, monumentality in architecture, a codified symbolic system such as writing or a pervasive art style, and inter-regional trade.

In terms of the peak expression of Olmec culture dating from 1100 to around 600 B.C. in the southeastern Gulf lowland, these people stack up pretty well with Willey's criteria. Some of the features listed by Willey have been discussed earlier in testing Bohannan's list of civilizational features. The matter of inter-communication among its social components can probably be demonstrated through long-distance procurement of raw materials used in construction and sculpture, as well as by the proven existence of wide-ranging trade through which means obsidian, and luxury goods such as ilmenite and jade were secured in appreciable quantities. The hierarchical governmental structure is inferable rather than demonstrable, and the argument for priest-kings holding the highest authority has been made elsewhere (Heizer 1961, 1963, 1967:39)-an interpretation objected to by M. Coe (1965: 122; 1967:128) who believes the leaders of Olmec society were "secular lords who drew their power from lineage and conquest". The societal organization of that portion of Olmec society which looked to La Venta as its center (whether manned by religious leaders or secular lords) appears to have been organized along the lines of Willey's "dispersed, non-urban settlement" type, provided the reader agrees with propositions earlier made in this connection (Drucker and Heizer 1960; Heizer 1960; Drucker 1961). The concerted harnessing of the energies and abilities of the population is surely attested by the mere presence of the La Venta site itself, the largest structures being the truncated conical "pyramid" whose cubic mass runs to about 3,500,000 cubic feet, and the Stirling Acropolis whose mass amounts to about 16,500,00 cubic feet of earth. Constructions such as these, while admittedly miniscule when compared to the Pyramid of the Sun at Teotihuacan as Sanders and Parsons (1968:127) have pointed out, need not be denigrated by reason of their magnitude when we remember their early date. Without providing details here, I would now argue that my figure of 1,100,000 man-days of labor needed to construct the La Venta site which was proposed in an earlier paper (Heizer 1960:219) should now be raised to a figure of about 2,500,000 man-days of work, the revised figure being based on new facts about the site which have been learned in the last decade. Finally, as regards the symbolic system such as writing or a pervasive art style, I have

commented above on the possibility that a germinal writing is present in La Venta times, and as far as the art style is concerned, we know it reached in some manner as yet not at all understood, the Valley of Mexico in the north to Salvador in the south--surely a wide enough distribution to be termed pervasive.

This discussion could go on to greater lengths, and might also consider the specifications which other Mesoamericanists have laid down for civilization. If we accept the proposition that the Olmecs of lower Veracruz and northern Tabasco about the beginning of the first millennium B.C. had arrived at a level of social-material-artistic-economic virtuosity sufficient to allow them to be labelled for all practical purposes as "civilized", we can admit them as having fashioned what Bernal calls America's first civilization, the institutors of a special kind of culture which shifted its centers and bearers through time and space and endured up to the time of the Aztecs when American civilization was truncated by the Spanish conquest. The general agreement that Olmec civilization came into focus before that of the Mayas and Teotihuacanos therefore seems to be, in our present state of knowledge, a supportable hypothesis.

References

- Bohannon, P.
1971 Beyond Civilization. *Natural History* 80:50-67. (Special supplement of unnumbered pages).
- Caso, A.
1965 Existió un imperio olmeca? *Memorias del Colegio Nacional*, Vol. 5, No. 3:1-52. Mexico.
- Coe, M.
1965 *The Jaguar's Children*. New York Graphic Society. Greenwich, Conn.
1967 Review of film, Excavations at La Venta. *American Anthropologist* 69:127-128.
- Coe, M.D.
1968 *America's First Civilization*. American Heritage Publ. Co., N.Y.
- Drucker, P.
1961 The La Venta Olmec Support Area. *Kroeber Anthropological Society Papers* No. 25:59-72.
- Drucker, P. and R. F. Heizer
1960 A Study of the Milpa System of La Venta Island and its Archaeological Implications. *Southwestern Journal of Anthropology* 16:36-45
- Hatch, M.
n.d. An Hypothesis on Olmec Astronomy, with Special Reference to the La Venta Site. Manuscript to be published.
- Heizer, R. F.
1960 Agriculture and the Theocratic State in Lowland Southeastern Mexico. *American Antiquity* 25:215-222.

Heizer, R. F.

- 1961 Inferences On The Nature of Olmec Society Based Upon Data From The La Venta Site. Kroeber Anthropological Society Papers No. 31:43-57.
- 1963 The Possible Socio-political Structure of the La Venta Olmecs. Aktendes 34 Internationalen Amerikanisten Kongress, pp. 310-317. Wien.
- 1967 Analysis Of Two Low Relief Sculptures From La Venta. Contributions of the University of California Archaeological Research Facility, No. 3:25-55. Berkeley.

Sanders, W. T. and B. Price

- 1968 Mesoamerica: The Evolution of a Civilization. Random House, New York.

Willey, G. R.

- 1966 Postlude to Village Agriculture: The Rise of Towns and Temples and the Beginnings of the Great Traditions. Proc. XXXVI Internat. Congr. Americanists, Spain, 1964, pp. 267-277.

V. INVENTORY OF SOME PRE-CLASSIC TRAITS IN THE HIGHLANDS AND PACIFIC GUATEMALA AND ADJACENT AREAS

Edwin M. Shook

Fundamental to any concept of what constitutes "civilization" are those physical manifestations readily available for study, critical analysis and assessment. When research is focused upon physical manifestations found in one particular area, in this instance Mesoamerica, and during a specific time range, the Pre-Classic, one is impressed by the wealth of data at hand and the incredible imbalance of that data. This condition is especially apparent in the limited region of Mesoamerica dealt with in this report - - the Southern Highlands and Pacific Coast of Guatemala and adjacent areas.

Most of the data presented in this report has been extracted from my field records compiled over the past thirty years. I shall summarize some of the physical manifestations of human activity within this limited region covered by maps published in the Handbook of Middle American Indians, Vol. 2, p. 184 and 239 and also include information derived from well-known published sources listed at the end of Vol. 2 of the Handbook.

Obviously, when referring to the Pre-Classic, an extremely long range of time is involved, so long, in fact, that students have already found it expedient to divide it into Early, Middle, and Late Pre-Classic. As knowledge expands one will undoubtedly be faced with such nomenclature as Early Early, Middle Early, Late Early Pre-Classic, etc. In this paper, because of my ignorance as to when and where a certain cultural feature or trait may have started, I shall often refer to the Pre-Classic as a whole, roughly the period of time from 1500 B.C. to 200 A.D. However, if the evidence permits an assignment with greater accuracy, I shall then provisionally employ the terms Early (1500 to 800 B.C.), Middle (800 to 300 B.C.) and Late Pre-Classic (300 B.C. to 200 A.D.).

Throughout the Pacific Coastal Plain of Guatemala and of adjacent Chiapas in Mexico there is an astounding number of Pre-Classic archaeological sites. Here the topography and ecology is generally more uniform than in the Highland area just north of the volcanic rampart which separates the two zones. In the Highlands, Pre-Classic sites are less dense and less uniformly distributed, and although they are found sporadically as far north as the southern base of the Cuchumatanes mountains in Huehuetenango and eastward to Livingston on the Caribbean sea, nowhere, other than in the Guatemala Valley and adjacent plateaus to the east and west, does the density of Pre-Classic sites equal or surpass that of the South Coast.

As a convenience for distinguishing Pre-Classic sites according to size, I have classified them as villages, towns and cities; the smallest, villages, simple surface concentrations of cultural debris without observable mounds or with one or several low artificial mounds; larger sites, towns, containing about a dozen or so mounds; and, finally, cities, large population centers of from twenty to hundreds of man-made structures. In large centers, individual pyramidal mounds twenty meters or more in height, still exist after almost twenty centuries since their abandonment despite the ravages caused by vegetation, tropical rains, and man. Kaminaljuyu in the Highlands and Izapa in the Pacific coastal plain are examples of major Pre-Classic sites in their respective areas. Although there was considerable occupation in both of these sites following the Pre-Classic, their greatest building activity seems to have occurred during the Pre-Classic.

Characteristically, Pre-Classic archaeological sites of all sizes are situated in open terrain without artificial or natural defenses. The primary concern of their agricultural and sedentary founders seems to have been availability of an adequate supply of food and water. In settlements located close to the Pacific shoreline, the food supply may have been derived partly from marine sources and partly from agriculture, while sites further inland depended basically on agricultural products. Only a few small Early Pre-Classic settlements have so far been discovered and excavated. Three of these, Altimira, La Victoria and Salinas La Blanca are located in close proximity on the lower coastal plain of Soconusco. Middle and Late Pre-Classic sites, however, are far more common, no doubt because their physical size makes field recognition easier for the archaeologist. In both the Coastal Plain and the Highlands, Middle and Late Pre-Classic sites, when not modified by later constructions, are often identified by a formal plan of mounds arranged around a narrow, elongated north-south plaza. Generally, a single prominent structure closes the extreme ends, and both of the long sides are marked by opposing east-west units facing each other. Occasionally, the principal plaza is paralleled by others on one or both sides. Another variant of this site plan is found, for example, at El Jardin and Izapa, where the elongated plaza is somewhat obscured by a series of single structural units within the narrow plaza, aligned at intervals on its central axis thus forming a continuous series of four-sided courts. At El Jardin on the Guatemala coast 25 kms. S.S.E. of Izapa, the principal plaza exceeds 500 meters in length and is broken into six contiguous courts by the addition of these individual mounds on its central axis.

Pre-Classic mound construction is basically similar in both the Highlands and the Pacific coast. Substructures are predominantly of earth fill, although where readily available from nearby stream beds, unworked water-rolled cobbles may be included in the earth fill and occasionally in retaining walls built over earthen core structures. Throughout the area, substructures were most commonly modelled into the form desired and then surfaced with thin clay or adobe plaster. Traces of painted decoration in red, orange-red, yellow, blue-green, or black encountered sporadically suggest that the

use of color for embellishment of architectural units was quite widespread. Nowhere, in either the Highlands or South Coast of Guatemala, has the use of cut and dressed building stones, lime plaster or mortar, and the modelling of adobe for architectural ornamentation during the Pre-Classic been reported. There is evidence that temples and houses built of pole and thatch were erected upon the earthen substructures, sometimes with walls of wattle and daub, particularly in the Highlands where lower temperatures prevailed.

By Middle Pre-Classic times, a trait had become established in the Highlands and South Coast of Guatemala and in Chiapas which apparently continued in certain parts of Mesoamerica through Late Pre-Classic and Classic times - - that of erecting plain stelae in towns and cities. These stelae may be exceedingly rough unworked shafts of stone, unworked sections of columnar basalt, or partly well-shaped and dressed stones in the typical stela form. They were erected in formal positions in courts or plazas, at the base, on the frontal slope, or on top of the earthen substructures. From my sporadic surveys and often inadequate field notes, I have recorded plain stelae in 28 out of the 114 sites with Pre-Classic remains in the Guatemala Highlands and South Coast. These range from sites with a single stela, to 11 stelae at El Jardin, 15 at Monte Alto, 35 at Naranjo and a still larger uncounted number of stelae at Kaminaljuyu. The least disturbed sites with numerous plain stelae are Monte Alto and Naranjo. One alignment at Monte Alto forms an astronomical observatory and at Naranjo the stela placement also strongly suggests an observatory. Still other sites with probable astronomical observatories are Kaminaljuyu, Virginia on the Canchon plateau southeast of Kaminaljuyu, and El Balsamo on the Pacific coastal plain south of Santa Lucia Cotzumalhuapa. The example at Monte Alto consists of three large plain stelae erected in a north-south line along the west base of a low platform opposite and east of a pyramidal substructure. Early astronomers probably observed sunrise from this substructure, presumably from a point on top of the pyramid. On field recognition of the astronomical observatory, I arbitrarily selected the center of the top east edge of the mound and observed the azimuths of sunrise from the north star, Polaris, at various intervals from December 9, 1969 to April 9, 1970. I had assumed that the three stelae marked the solstices and equinoxes, but this assumption proved incorrect. The south stela did, in fact, mark the winter solstice on December 21st, but, contrary to expectations, the sun rose over the central stela on February 19th, sixty days later, and over the north monument on March 15th or 84 days after December 21st. Thus it appears that the Monte Alto observatory and possibly those at other Pre-Classic sites served primarily as a means for recording days and the position of the sun for agricultural purposes. The observatory may have therefore provided such vital knowledge as the appropriate time for clearing milpa land, burning, the expected arrival of the rainy season, and the first planting of the maize. At Naranjo, just north of Kaminaljuyu, the astronomical observatory, if it proves to be one, may pertain to the Las Charcas Phase and thus predate the observatory recently discovered at Monte Alto.

It is important to bear in mind that the erection of stelae, sometimes in position for astronomical observations, was a well established practice in the Southern Highlands and South Coast of Guatemala during Middle Pre-Classic times, long before this trait became so prominent in the Lowland Maya area during the Classic period.

Sculpturing of stone begins in the Las Charcas Phase at Kaminaljuyu with a few minor crude sculptures and vigorously executed effigy mushroom stones, all carved in full round. The fashioning of mushroom stones evidently continued through the Pre-Classic and into the Classic and possibly later times. The distinctive features which early examples have in common are a grooved or incised line encircling the mushroom head, effigy stems depicting either anthropomorphic figures, jaguars, toads, or birds and a solid base either rounded or square. From the Late Pre-Classic Verbena Phase through the remainder of the Pre-Classic, mushroom stones have tripod supports but retain the other features. In Classic and later periods they are often plain, and occasionally, especially in El Salvador, the typical form is modelled in pottery.

The variety of stone sculpture produced during the Pre-Classic possibly exceeds that produced in Classic and Post-Classic periods. To demonstrate the range I will list a number of types and in parenthesis the ceramic phase or time period known at present for the earliest occurrence of the type.

1. Carved stela or monument without recognizable hieroglyphs (Stela 9, Kaminaljuyu, Majadas phase).
2. Carved stela, altar or monument with recognizable hieroglyphs (Stela 10, Kaminaljuyu, Verbena phase - actually a large rectangular altar).
3. Pedestal sculptures: anthropomorphic, jaguars, monkeys, pisotes, armadillos, birds (Kaminaljuyu, Majadas phase).
4. Monte Alto style, pot-bellied sculptures (Monte Alto, Late Pre-Classic; Kaminaljuyu, Arenal phase).
5. Toad or "sapo" sculptures (Kaminaljuyu, Verbena phase).
6. Silhouette sculptures (Kaminaljuyu, Arenal phase).
7. Small bench figures (Kaminaljuyu, Verbena phase).
8. Individual miscellaneous unclassified stone sculpture, minor to monumental in size (Kaminaljuyu, Las Charcas phase).
9. Doughnut stones or digging stick weights, carved and plain (Kaminaljuyu, Santa Clara phase).
10. Carved stone vessels (Kaminaljuyu, Verbena phase).
11. Stone and jade ornaments (Kaminaljuyu, Las Charcas phase).
12. Pictographs, carved or painted (Olmec style rock carvings at Santa Margarita, Chalchuapa, etc. --stylistically Pre-Classic).

Many of the sculptured types listed are limited in distribution not only to the general area under discussion but quite a number are found only within a very restricted zone within that area. For example, silhouette sculptures have been surely documented only at the Kaminaljuyu site and immediate surroundings. The small bench figures, some showing Olmecoid features, are reportedly found exclusively in a restricted Highland plateau region centered around Tecpan, Patzun and Patzicia, although fragments of such figures have been recovered from mound fill under controlled excavations at Kaminaljuyu. Other types, such as pedestal sculptures, are more widely distributed throughout the Highland and South Coast of Chiapas and Guatemala and into El Salvador. Also, pedestal sculptures persist with stylistic changes beyond the Pre-Classic and through the Classic and conceivably into the Post-Classic. They may relate to the well-known "alter-ego" pedestal sculptures of Nicaragua and comparable sculptures in Costa Rica and Panama.

The Monte Alto style, pot-bellied sculptures and colossal heads, has a known geographic distribution extending from Monte Alto northwest along the coastal plain and volcanic foothills to Tonalá in Chiapas, east as far as Copan in Honduras, and southeast to Apaneca in El Salvador. In the Guatemala Highlands these sculptures may be limited exclusively to the area in and around Kaminaljuyu. Numerically there are more of the Monte Alto style sculptures at Kaminaljuyu than at the type site. At Kaminaljuyu, the sizes of individual specimens range from miniature seated human figurines about 25 cm. in height to others approximately 1 m. in height. Their smaller size alone distinguishes them from the Monte Alto sculptures. Another striking feature which segregates all known pot-bellied sculptures from the eleven huge ones at Monte Alto is that the latter are true boulder sculptures carved only on a portion of a rough natural boulder, while outside the type site the sculptures are carved completely in the round and often show more elements of dress and ornament.

S. W. Miles, in her excellent paper on the stone sculpture of the same area, (Vol. 2 of the Handbook), places Monte Alto style sculpture in Division 1, the oldest division of stone sculpture. She implies (p. 252) as have other students of Pre-Columbian art, that Monte Alto style sculptures are Pre-/or Proto-Olmec. Miles equates the style with the Arevalo and Las Charcas ceramic phases at Kaminaljuyu and this placement may ultimately prove correct. However, the two long and intensive field seasons of excavation at Monte Alto have not produced archaeological evidence to prove that chronological placement; we were unable to assuredly place the sculptures in the sequence of the site. The vast quantity of sherd material from the excavations is now under laboratory analysis, but the analysis is far from complete. Nevertheless, it may be stated tentatively that the occupation of Monte Alto extends from Middle Pre-Classic, roughly around 800 B.C., into the earlier part of the Late Classic, approximately 700 A.D. Occupation of the site does not appear to have been continuous for the estimated span of

1500 years. The ceramics suggest a sparse occupation in the Middle Pre-Classic with the peak of population density and architectural activity during Late Pre-Classic times, a moderate Early Classic habitation and perhaps no more than an agricultural village among the ruins in Late Classic times.

At Monte Alto we recorded 11 sculptured and 68 plain boulders, 15 uncarved stelae and 3 altars. The estimated weight of these stones ranged from 300 kilos to 16 metric tons, some of the plain stelae and carved boulders being particularly heavy. If one assumes that the physical transportation of these huge stones and the carving of eleven of them, even in a primitive fashion, indicate the time of maximum population and societal organization, then the Monte Alto style sculptures should date approximately 300 B.C. to 0 A.D. Undoubtedly many students of Pre-Columbian art will object to this dating on stylistic grounds. Therefore, for future studies it may be well to state the meager archaeological evidence presently available for dating the Monte Alto style sculptures. Practically all known examples, including those from the type site, have been moved in ancient and modern times from their original positions and context. Possible exceptions of such displacement may be three sculptures excavated and recorded by Stanley H. Boggs on Finca Leticia, near Apaneca, Department of Ahuachapan in El Salvador. Fortunately, Boggs recovered a sherd sample together with a small amount of charcoal (as yet undated) from beneath one of these sculptures prior to its removal by the property owner to his finca house. The more than a dozen examples from Kaminaljuyu were discovered mostly in unrecorded diggings at the site, the majority of them being heavily eroded, broken or mutilated. Our Carnegie excavations at this site recovered two examples of Monte Alto style sculpture -- one, a concave disc from the chest portion of a figure from the fill of a Pre-Classic Arenal Phase mound and the other, a human head from within an Early Classic Esperanza Phase structure. This head had apparently been broken from a full figure in ancient times and the neck portion had later been re-worked so as to form a complete sculpture. At Bilbao, on the outskirts of Santa Lucia Cotzumalhuapa, the Milwaukee Public Museum's excavations recovered a severely worn or weathered complete human figure with Late Classic sculptures. At Copan, a pot-bellied figure, worn, broken and lacking the head, was found in the foundation fill of a Late Classic stela.

Evidence for dating the Monte Alto style, as previously indicated, is woefully meager and unsatisfactory. The finding of the Kaminaljuyu fragment in an Arenal Phase context proves that the style is definitely Pre-Classic, but from the results at the Monte Alto excavation, the style's Late Pre-Classic placement in time is no more than suggestive.

One of the perplexing aspects of the Pre-Classic in the area under discussion is the general scarcity throughout of worked and unworked shell, despite proximity to the Pacific Ocean and easy access to marine fauna. No

shell was recovered in the two seasons at Monte Alto, none at Finca Arizona, a site very near the coast, and none at other Pre-Classic sites excavated by me near the Guatemala-Mexico border. The earliest recorded occurrence (approximately 400 B.C.) of worked shell comes from Chiapa de Corzo (Lowe, Handbook article p. 215). At Kaminaljuyu, shell was absent in all Pre-Classic phases except for one find in the Verbena phase. Here, a very richly stocked tomb - - Tomb 1 in Mound E-III-3 -- contained about 45 small disc beads and a single plain pendant of shell. To my knowledge the Chiapa de Corzo and Kaminaljuyu examples, both from burials, represent the only worked shell found in the entire area during the Pre-Classic. The high esteem and popularity of shell for personal ornaments and its obvious ceremonial significance evidently came into vogue during the later Classic Period.

The Pre-Classic has an abundance of pottery, both fine and coarse wares, much of it technically excellent. Vessels in an extraordinary variety of shapes comprise the largest category of pottery, while in certain phases other artifacts -- human, animal and bird figurines, figurine whistles, "napkin ring" ear spools, etc. are present.

The most ancient ceramics at present identified come from Altamira, a village site 2 kms. inland from the Pacific on the lower coastal plain of Chiapas. Green and Lowe (1967) date this oldest pottery, the Barra Phase, as beginning about 1600 B.C., slightly earlier than the date postulated for the Ocos phase of the similarly situated village site of La Victoria near the Guatemala port of Ocos. The Barra Phase included several excellent ceramic types in forms of tecomates, jars, and flat-based vertical and flaring walled bowls and vases. The inventory of stone artifacts is small but, as Lowe clearly states, these stone artifacts and the pottery indicate that the Barra Phase represents the refuse of a sedentary agricultural community. Undiscovered as yet on the Pacific coastal plain are the remains of still older sedentary, agricultural and ceramic producing cultures. These and many more Early Pre-Classic sites quite certainly will be found when archaeologists take advantage of the extensive land clearing of the lower plain which has taken place in recent years for cotton planting, cattle grazing and agricultural colonization.

The Ocos and Cuadros Phases at La Victoria and the equivalent Chiapas I or Cotorra Phase in the Upper Grijalva Basin of Chiapas apparently succeed the Altamira Barra Phase. These coastal and highland phases, though seemingly spanning the same Early Pre-Classic time level in sites not too widely separated geographically, already demonstrate cultural distinctions and regionalization. The differences in cultural traits between the Pacific Coastal plain and the Guatemala-Chiapas Highlands are manifest from these early times throughout their Pre-Columbian cultural history and exist even to the present day. To point out one seemingly insignificant trait as an example of the many differences, the Ocos Phase tecomates bear long tripod supports while Chiapa I tecomates lack supports. The presence in one and the absence in

another Pre-Classic Phase of hand-modeled human, animal and bird figurines and whistles in both the Lowlands and Highlands may prove to be an indicator of cultural continuity or discontinuity of a site or particular region and may even serve to indicate population shift.

The Middle Pre-Classic appears to be the period of rapid increase of population, a formalization of ceremonialism, societal organization, city planning and utilization of the agricultural and ritual calendar. However, the cultural apogee of the Pre-Classic was reached in Late Pre-Classic times somewhere between 300 B.C. and 0 A.D. with the widest inter-regional cultural affiliation and trade relations, a proliferation of stone sculpture and styles and the development of Maya hieroglyphic writing. The final phase of the Pre-Classic from 0 to 200 A.D., often termed Proto-Classic, suggests from the evidence at Kaminaljuyu a decline in cultural attributes and achievements when the area under discussion was apparently segmented into localities of relative isolationism. An exception to the general pattern may be the great site of Izapa where the high intellectual plane of the Late Pre-Classic Period was evidently maintained into the Proto-Classic.

VI. COMMENTARY ON: INVENTORY OF SOME PRE-CLASSIC TRAITS IN
THE HIGHLANDS AND PACIFIC GUATEMALA AND ADJACENT AREAS

Claude-F. Baudez

In his Inventory Paper, Mr. Shook has given an inventory of some pre-Classic traits in the area under consideration, focusing his study on the archaeology of the regions he knows better than anyone: the Guatemala Highlands and Pacific Coast. I think that we may get a broader understanding of the Pre-Classic of Southeastern Mesoamerica if the area under discussion encompasses the following adjacent regions: to the west, central and southern Chiapas, eastward, El Salvador and northern Honduras.

The archaeology of central and southern Chiapas has become one of the best known in Mesoamerica: many detailed monographs as well as articles of synthesis have been published and if new data are available - particularly from Izapa - I am confident that Mr. Lowe will supply them in the course of the ensuing general discussion.

On the other hand, very recent work in El Salvador and north-central Honduras has produced information on the Pre-Classic which for the major part has not been published yet. Therefore it may be pertinent to present here a short account of these new results which we feel are relevant to the discussion.

Archaeological work was resumed in 1966 in the very promising Chalchuapa zone in western El Salvador. Chalchuapa is located at an approximately equal distance of 120 km from Copán and Kaminaljuyu. At 700 meters in altitude it is in a transitional zone between the Pacific Coast and the central Maya Highlands. Robert Sharer claims to have found a very long ceramic sequence running from the Early Preclassic to the Late Classic. From the information at my disposal I shall mention a few points which I consider as particularly significant:

Sharer's earliest ceramic complex (called Tok and dated approximately by comparative analysis from 1200 to 1000 B.C.) discloses in the author's terms "direct ties" with the San Lorenzo phase ceramics.

The famous Las Victorias boulder with Olmec reliefs is located a few kilometers east of the mound groups. The Chalchuapa archaeological zone

covers approximately 6 square kilometers and includes the mound groups previously designated in the literature under the names of Tazumal, El Trapiche and Casa Blanca. The map shows the mound groups disposed along an axis slightly east of the north, as in many Pre-Classic sites in the area.

If the majority of the tested or excavated mounds seem to have been built during Early Classic times, at least one of the highest structures (Structure) E3-1 or El Trapiche Mound 1 is 23 meters high) has a Late Pre-Classic association for its terminal stage of construction (Sharer 1969).

Farther east in El Salvador, the site of Quelepa which was recently excavated by Wyllys Andrews V, seems to have had most of its architectural activity in Early Classic times. Nevertheless an earlier Late Pre-Classic platform or terrace with rockfill and a series of superimposed floors was found in the East Group of the site.

In north-central Honduras, on the northern shore of Lake Yojoa, a cultural sequence divided into four phases has been constructed on the basis of excavations undertaken in '68-'69 at Los Naranjos by Pierre Becquelin and myself. Our earliest phase, Jaral, dated approximately 6 or 500 to 200 B.C., is characterized by early spectacular cultural achievements and "Olmecoid" manifestations. Although we have undisputable evidence of only two buried structures pertaining to this phase (one 6 meters, the other 2.50 meters high), we have good reasons to think that most of the higher structures which make up the Main Group overlay an inner Jaral building. The site was limited on two sides by a defensive ditch (1300 meters long, 15 to 20 meters wide and 7 meters deep) enclosing a flat area of some 85 hectares. Differential treatment of the dead has been evidenced in Str.IV (the highest referred to above). Buried in the top of this platform an extended burial was found without pottery offerings but with an abundance of jade ornaments. At the western foot of the same structure, four burials, mostly secondary, have been unearthed. They had no other offerings except one jade axe rubbed with cinnabar and stratigraphically associated with the group of burials. Although the pottery is only rarely decorated and generally crude (the Yojoa monochrome of Strong, Kidder and Paul) the jade ornaments (beads of several kinds, ear-plug flares 12 cm. in diameter) are the products of excellent workmanship. A few sculptures in the round from Los Naranjos were published in the thirties. Another excellent although mutilated example was found a few years ago while digging a canal for an hydro-electric project. This sculpture depicts a free-standing individual of almost natural size. Although we did not find any piece of sculpture in our excavations we may safely and on pure stylistic grounds label, as Michael Coe previously has done, these sculptures as Olmec-inspired.

The succeeding phase, Eden, assuming there is no gap in our sequence, covers the 200 B.C. - 4 or 500 A.D. span (we have two C14 dates: 100 ± 100 and 250 ± 100 A.D.). The pottery, which has a number of types in common with other

contemporary complexes in Honduras (precisely in the Ulua and Comayagua valleys) cannot, in answer to Gareth Lowe's assertions (Green and Lowe 1967, pp. 61-62) be compared to the Valdivia material. Most of its forms and decoration are shared with many Late Pre-Classic and Proto-Classic complexes in southern Mesoamerica. Eden is a phase of major building activity: two of the biggest structures in the Main Group (Structure 1 is 20 meters high) are mainly Eden, having been only slightly modified in Yojoa - Late Classic times. Another defensive ditch (3 kilometers long, 8 to 15 meters wide, 4 meters deep and with a 2 meter high bank on the inner side) enclosed an area of around 290 hectares, probably protecting settlements as well as milpas. Although there is no formal arrangement of the structures composing the Main Group seen as a whole, an Acropolis-like construction should be mentioned: Structure IV includes a stepped platform on the top of which is a plaza limited on three sides by 3 meters high substructures and on the fourth by a small altar platform. Access to the plaza is made possible through a ramp. Stepped platforms and pyramids are made up of clay with retaining walls of unworked blocks of limestone. No evidence of lime plaster has been found in the structures of the Eden phase.

Thus, as early as Middle Pre-Classic times, Los Naranjos is a ceremonial center with temple platforms, sculpture in the round, and jade working (or trading?) worthy of note. A stratified society thus is inferred. The construction of the structures as well as the digging of the ditch represent a notable amount of collective work. Furthermore the presence of the ditch, unusual in Pre-Classic Mesoamerica, shows that the "Jaraleños" had to fear hostile attacks from potentially strong foes. The Jaral culture does not appear as marginal or belated when compared to most of the contemporary known cultures of Mesoamerica. The same can be said of the Eden phase which represents a climax in Los Naranjos history. A corresponding cultural peak had been observed before in the Comayagua valley (Yarumela III and Lo de Vaca II).

The following discussion will be centered on the major problem of evaluating the role played by the Gulf Coast cultures in the emergence of civilization in southeastern Mesoamerica.

Considering the long time span (around eight centuries, according to the C14 dates published in Dr. Bernal's inventory paper) covered by the Olmec sequence at La Venta, it has become increasingly more confusing and dangerous to use the concept of an "Olmec horizon". "Olmec tradition" corresponds better to our present knowledge, particularly when it refers to the Olmec art-style. At La Venta as well as at San Lorenzo, the cultural sequence is still mostly a ceramic and architectural sequence. The most conspicuous Olmec trait, sculpture (non portable as well as portable pieces) has not been yet chronologically divided into types or sub-styles. Therefore we are presently unable, when finding an Olmec or Olmecoid sculpture, to ascribe it by itself alone to a definite period. Michael Coe's interesting hypothesis (cited by Dr. Bernal) that Olmec sculpture in the round preceded low-reliefs and carved

stelae has still to be proven even in the heartland. As for the pieces in our area, their unknown or doubtful chronological placement makes them of little help in the solution of this problem.

We are on firmer grounds when comparable ceramic complexes with corresponding absolute datations can be equated and set up a ceramic horizon. A Cuadros-San Lorenzo ceramic horizon has been recognized these last years, the recognition of such an Horizon allows us to consider as roughly coeval - in the last part of the Early Pre-Classic 1100 to 900 B.C. - a number of sites spread over a vast area: Gulf Coast (San Lorenzo, La Venta), Central Chiapas (Chiapa de Corzo, Santa Marta rockshelter, the first phase at San Isidro, (Mal Paso), Padre Piedra, Vistahermosa, etc.) and the Pacific Coast (Izapa: Mound 30a fill, Pijijiapan, Salinas la Blanca, Chalchuapa: Tok complex). At present no ceramic complex of comparable antiquity has been found in the Highlands. At most of the sites mentioned above - with of course the exception of the Gulf Coast - we have very little information besides ceramics. They seem to have been hamlets or small villages with a similar way of life to the one led in the first part of the Early Pre-Classic. Outside the Olmec heartland, no monumental architecture has been reported with the exception of a few low clay platforms (as at San Isidro). The Cuadros-San Lorenzo ceramic horizon (or may we call it a sphere?) shows that the Gulf Coast and the Pacific Coast peoples were sharing the same or very similar ceramics. This obviously indicates the existence of relationships from Coast to Coast, but it seems to me a little hasty to infer with Lowe (op. cit.) "an Olmec population block astride the Isthmus". Other evidences of active relationships between the civilized centers of the Gulf Coast and southeastern Mesoamerica are meager: the life-size reliefs carved on huge boulders and discovered by Navarrete at Pijijiapan (Navarrete 1969) may belong to this period. The possibility remains that other Olmec sculptures are associated with Cuadros ceramics: the free-standing sculpture found near Colonia Obregon, west of Tapachula, and the Las Victorias boulders. But these associations remain to be demonstrated.

For the Middle Pre-Classic period, we have more evidences of cultural manifestations which attest to, in Miss Proskouriakoff's terms, a concern with permanence. Clay or adobe platforms, sometimes faced with stones and sometimes of complex plan, are reported in Central Chiapas (Mirador, Vista-hermosa, Chiapa de Corzo, San Isidro, etc.), on the Pacific Coast (Mound 30a at Izapa, pyramidal mounds of the Conchas phase), at Kaminaljuyu and Los Naranjos. There is no doubt that around 400 B.C. important ceremonial centers were to be found all over the area, from San Isidro to Los Naranjos. Among the sculptures which can be assigned to this period, some of them clearly belong to the Olmec art-style tradition, such as the monument at Padre Piedra and the Los Naranjos free-standing figures. Other realizations in stone such as the plain stelae and the pedestal sculptures appear to be original productions. Between the two groups, I would place some of the contents of the Majadas cache in Structure C-III-6 at Kaminaljuyu, which seem to reveal an indirect Olmec influence through: (1) the use of columnar basalt,

(2) stela 9 which appears to me a copy, although in a very different technique and style, of the Olmec figures holding up a torch (reproduced in M. Coe, 1965, Fig. 51-52). The excavations at San Isidro have made us aware of the fact that we may have Olmec presence without Olmec sculpture. But other Olmec traits are often hard to pinpoint: I can only refer to the axe offerings at San Isidro and at a lesser degree at Los Naranjos, and the occasional presence of Olmec-style clay figurines.

The cultural history of the area, taken as a whole, presents two climaxes or peaks in terms of population density, exploitation of natural resources, monumental architecture, artistic creativity, intellectual achievements...These two periods of maximum cultural intensity are the Late Pre-Classic and the Late Classic. In this discussion our concern is naturally with the first of these periods.

Late Pre-Classic sites are to be found almost everywhere in the area under discussion: more than 50 have been numbered in Central Chiapas alone and there are undoubtedly comparable figures for settlement density on the Pacific Coast, including western El Salvador as well as in the Guatemala central Highlands and in central Honduras. On the other hand, many highland regions such as the Sierra Madre de Chiapas, the Chiapas plateau, the western and northern Highlands of Guatemala seem to have been sparsely peopled during this period. The most important ceremonial centers reported in the area (Izapa, Monte Alto, Kaminaljuyu, etc.) conform, with the exception of Los Naranjos, to the general axial disposition of the structures. These are higher and more elaborate than those of the preceding period, and temple-platforms as well as residential substructures are reported. At Kaminaljuyu as elsewhere, social stratification with concentration of wealth and power in the hands of an elite are clearly inferred from the burials excavated in Mound E-III-3. Sophistication in ceremonialism is indicated by evidences of animal and human sacrifice, huge incense burners in stone and other features. The concern with permanence is evidenced not only by architecture, but also by the carving of representations and the recording of calendrical dates in a durable material (Cycle 7 monuments). Once again, we are faced with one of the most exciting and at the same time frustrating problems of the archaeology of this area: sculpture. The Izapa and the Monte Alto styles have both a very broad geographical distribution and are said to be of Late Pre-Classic age. If this is actually the case, I wonder what meaning is to be given to the coexistence of two such distinctive styles. Do we have here superposition of an imported, sophisticated sculpture over a local, cruder one? The Izapan sculpture has the widest distribution of both, from Tres Zapotes through the Chiapas Coast to Kaminaljuyu and perhaps beyond. Assuming that the Izapan style is Olmec derived - and we have many good reasons to think it is - we must reckon a time span of several centuries between the end of La Venta and the appearance of Izapan sculptures. It is hoped that transitional forms between the two styles will be someday found. I would favor the hypothesis that the Izapan style

developed out of Olmec low-reliefs in the Gulf Coast region (at or near Tres Zapotes) and from there spread to the south and southwest, where probably local developments did occur. Very few sculptures from Kaminaljuyu have been reliably dated. The two most famous stelae (10 and 11) found in a Miraflores context are strikingly distinctive: stela 11 is clearly Izapan whilst the style of stela 10 is much closer to the Maya and has a hieroglyphic inscription in Maya fashion. As Miss Proskouriakoff points out: "Apparently sculptors from many localities resided and worked in this cosmopolitan center."

Now that we have weighed the available archeological evidence, I wonder if we possess sufficient data to answer the main questions: Was civilization genuine or imported in southeastern Mesoamerica? What has been the role of the Gulf Coast cultures in the process?

As far as the Olmecs are concerned, we have not yet found a site in our area which would be to La Venta or San Lorenzo, what Chichen Itza is to Tula or what Kaminaljuyu is to Teotihuacan. Axial planning of ceremonial centers may have a Gulf Coast origin, but this has to be proven. Ceramic ties are very strong in the Early Pre-Classic but seem to get loose in the following periods. Olmec portable objects are rather rare - - very few have been found in controlled excavations - east and south of the Isthmus of Tehuantepec, in contrast to the Mixteca-Puebla-Guerrero regions. The Olmec presence or influence is unmistakably only attested through sculptures which, unfortunately, are for the most part, not well dated.

The same may be said of the Izapan style. Assuming that its birthplace was the Gulf Coast region, it would have represented a second wave of influences to Chiapas and the Pacific Coast. Disappointing as it may seem, I think we are presently on too shaky grounds to determine whether the contacts between the Gulf Coast and southeastern Mesoamerica have been direct or indirect (stimulus diffusion).

The Chiapas and Guatemala Highlands offer a problem of their own. No Early and Middle Pre-Classic sites have been reported from the Highlands, with the exception of the Guatemala central zone. Late Pre-Classic settlements are rare in the Chiapas plateau (two sites reported) and in the Guatemala western Highland (Salcajá, Chukumuk). During his survey of the northern Highlands Richard N. Adams did not find any Pre-Classic occupation either in the Cotzal valley or at Chajcar (Alta Verapaz). Pre-Classic remains are also conspicuously absent in the Nebaj region. Adams' conclusions are that this lack of Pre-Classic material indicates an absence of Highland-Lowland contacts through these regions in Pre-Classic times. Be that as it may, these conclusions may appear too hastily drawn, since several Late Pre-Classic sites from the northern Highland ceramic zone have been reported: Cambote (in the Huehuetenango region), Rio Blanco (near Sacapulas), and in Alta Verapaz: Chama, Chichen, Chipoc and San Pedro Carcha (Becquelin, 1969, p. 118). These

sites need to be thoroughly investigated before a definite answer to this problem may be given. It appears nevertheless that the Chiapas and Guatemala Highlands - the central zone excepted - were peopled well after the southern Lowlands and that even in Late Pre-Classic times, the population was sparse with no centers as important as Izapa or Kaminaljuyu. Actually the major part of the Highlands seem to have played a minor role in the emergence and development of civilization.

If there was ever a path of civilization, it would have been primarily a Lowland path or a "peripheral coastal lowlands" path, as Parsons would call it. Starting from the Gulf Coast, the flow would have spread through the Isthmus of Tehuantepec, and from there, avoiding the mountains, extend into the Grijalva depression on one hand, and along the Pacific Coast to El Salvador and perhaps beyond, on the other. As for the route through which Los Naranjos was reached, there is presently no answer: one relay might have been the Copan valley.

The central Highlands and particularly the valley of Las Vacas may have achieved their peculiar destiny due to their geographical situation: they are within easy reach of the Coast through Escuintla and Amatitlán, and have access northward to the Motagua valley. According to our present knowledge, civilization in the Highlands has its most immediate origins in the adjacent Pacific Coast. Nothing on hand indicates that the Maya Lowlands have contributed in any way to the emergence of civilization in the Highlands. Did the latter then have any influences on the early developments of the former? This is a question we had better keep for the next session.

Bibliography

- Becquelin, Pierre
 1969 Archéologie de la region de Nebaj, Guatemala. Institut d' Ethnologie. Paris.
- Coe, Michael D.
 1965 The Olmec Style and its Distributions. Handbook of Middle American Indians, Vol. 3: 739-775.
- Green, D. F. and Gareth W. Lowe
 1967 Altamira and Padre Piedra, Early Pre-Classic sites in Chiapas, Mexico. New World Archaeological Foundation, Publ. No. 15.
- Navarrete, Carlos
 1969 Los relieves olmecas de Pijijiapan Chiapas. Anales de Antropologia. Universidad Nacional Autonomia de Mexico, Vol. VI:183-196.
- Sharer, Robert
 1969 A Preliminary report of the 1969 archaeological research program at Chalchuapa, El Salvador. Katunob, Vol. 7, No. 1.

VII. THE EMERGENCE OF CIVILIZATION IN THE MAYA LOWLANDS

E. Wyllys Andrews IV

Prefatory Note: This paper of necessity was written on a field expedition during stray moments of freedom. It does not pretend to be a factual inventory, which could never be condensed to this size. It is hoped it will serve as an inventory of current problems which might profitably be discussed during the Burg Wartenstein conference.

E.W.A.

Xpuhil, Campeche
10 April 1970

Introduction

This preliminary paper should survey "The Emergence of Civilization in the Maya Lowlands." My approach will be based on the semantics of Korzybsky, rather than the multifarious, rigid definitions of "civilization" by a number of authors. As I see it, man has gone through a varying and almost always disparate development in the course of identification with and adjustment to the ecological context in which he lived. As culture became more complex and as human population grew, man frequently and drastically (sometimes fatally) altered the total ecology of which he was a part. In the northern Maya lowlands, for example, there is considerable reason to postulate that an early population converted a once humid rain forest area into what is now a semi-arid scrub plain. First the forest was cleared, leaving the deep age-old accumulation of humus with no source of renewal and no root protection. Unprotected, the soil soon vanished into the porous limestone below. Without this source of moisture, cumulus clouds borne on the northeast trade winds found no sustenance in their passage over the area and the rainfall dropped sharply. The same syndrome may have been duplicated in the southern Maya lowlands twelve to fourteen centuries ago. Abandoned by most of its human population, the forest there is again achieving climax phase.

Similar phenomena are not unfamiliar in the Old World where, for example, removal of high forest in great zones north of the Niger River has allowed the southward spread of the Sahara and the virtual elimination of the once heavy rainfall.

Diffusion, sometimes in the form of commercial or aesthetic trade, sometimes more accentuated by domination or conquest, can properly be regarded as an integral part of human ecology. Its impact on some cultures is minimal. In others, it has been overwhelming, completely eliminating major developmental phases which would otherwise have occurred and changing, for better or for worse, the basic patterns preceding the impact.

Spenglerian and neo-Spenglerian theorists have tended to oversimplify culture study by defining a series of "inevitable" developmental phases. Such chronocultural typologies, often of considerable direct interest, are rarely valid in more than limited geographical context. "Civilization" knows no rules of its own and develops in varying ways from area to area, partly in terms of man's response to the stimuli offered, and partly in terms of his own viability. The results of these totally unpredictable responses to environmental factors are haphazard and definitely not subject to broad taxonomic analysis.

Numberless definitions of "civilization" have been offered in past decades of academic analysis. These, to my mind, only have validity as symbols to spheres of reference created by writers dedicated to some specific theme. Too many indispensable factors have been postulated: these have varied from cultural specialization allowing leisure time to artisans, through hierarchy, to industrialization and urbanism -- all vague terms except in the particular frame of reference used by the author. Such appraisals, although perhaps useful when clearly defined in any given thesis, are of necessity subjective. Words, such as "civilization", may well be applied to the process as a whole, but should only be used with great care when describing segments of the whole.

Sixteenth century man in Polynesia was never industrialized, urbanized, and never met most of the criteria required by so many modern scholars - - he was apparently uncivilized. On the other hand, he did produce a complex hierarchical and social organization and a successful adaptation to his own environment which persists until today and which perhaps has not been matched.

Middle Americans in Formative times produced some of the most aesthetically and technically effective ceramics and artifacts known from the Continent. Later they surpassed the world in mathematics, calendrics, astronomy, some aspects of art and architecture. Their final cultural outburst at Tenochtitlan certainly decadent in most of the aspects just mentioned, made enormous advances in military and governmental organization, exercising varying degrees of control over the entire area from Mexico to Panama. Yet this socio-political structure fell easy prey to a few hundred avaricious Spaniards in the early sixteenth century.

Various phases of culture growth were characterized by quite different facets of development -- occasionally globally pre-eminent at their time. This

article will not attempt to define when "civilization" began (or ended) in the Maya lowlands. Rather, it will attempt to outline briefly what now seem the critical developmental stages of human culture in the area and how they have or may be dated.

TECHNIQUES OF RESEARCH

Stratigraphy

Stratigraphy, since early studies, has been called the handmaid of the archaeologist. Actually the study of superposition, it provided us with our first sequential framework of events in geological time, including the tiny segment occupied by human prehistory. Its obvious flaw is that it orders data in relative time, but it cannot establish specific points of reference in absolute time. This weakness is compounded by our frequent ignorance of continuity in sequences, so that geological or cultural events, which are momentarily side by side in the stratigraphic scale, may be eons apart.

Until recent developments, stratigraphic columns could be anchored in time only by written dates or by association through modalities with material of known age. Traditions (even chronicles) are a poor crutch in this dilemma, almost invariably subject to suspicion because of the Orwellian tendency of scribes and editors to reshape the past to better glorify the dynastic, ethnic or social groups of the moment. Attempts to order early archaeological data in the Maya lowlands in terms of chronicles, certainly written or heavily edited shortly before the Conquest, are a good case in question.

In view of these factors, our framework, perhaps sequentially correct, had to remain flexible in absolute time.

Radioactive Isotopes

Our breakthrough in this dilemma came in the discovery of Dr. Libby and collaborators in the early atomic age that various radioactive isotopes ingested by living organisms measurably broke down when ingestion ceased. Thus the death date of vegetable or animal material could be rather precisely determined.

Although various isotopes have been successfully used in dating geological and historical artifacts, Carbon ¹⁴ has offered much the most precise ordering of events within the relatively short period when man's culture evolved to the extent that it could, by any definition, be called "civilization". Given proper samples and collection technique, virtually any organic material, including bone and shell, can be assigned a surprisingly accurate date when it ceased to be living matter. These dates, correct to a century or two, have

been invaluable in providing us the first reliable rigid framework for the reconstruction of man's past. Our interpretations of cultural developments must now be fitted to much more rigorous temporal specifications.

Welcome as it was to the handicapped archaeologist, the technique has thus far fallen short of perfection in dating short-term events. As the methodology became more defined, determinations became more ambitiously accurate, the 1-sigma "mechanical" error being reduced from figures in approximate hundreds of years to definitions, such as " \pm 37 years." But as the potential counting error became increasingly precise; it became obvious that there must be other still uncontrolled variables not yet separated for analysis. For example, impressive groups of C^{14} determinations in the northern and southern Maya lowlands have yielded puzzlingly different allocations in time to cultural events which we have much reason to believe were contemporaneous. Such discrepancies have become increasingly clear in datings in the southern and central highlands of Mexico - - to the point that a number of scholars are now most reticent to accept isotopic evidence as gospel. This holdback is almost certainly temporary - - until further research has smoothed out the wrinkles. Until then some reservations must be made in relying on very exact dates over the last two or three millennia. Dr. Suess at La Jolla laboratory has recently added a 200-year span in his 1-sigma errors to account for as yet unidentified technical inaccuracies, other than counting error.

Geomagnetism

Under certain conditions of heat, some iron bearing clays adjust their crystalline structure with crystals oriented towards the magnetic poles. On some immovable cultural features, such as burned plaster floors, analysis of this geomagnetic orientation can tell us the direction to the magnetic poles at the time of the firing, and thereby (as the movements of the poles are quite accurately known) the point (or points) in time when this orientation was valid. This technique of dating, still in its infancy, offers much promise for the future.

Thermoluminescence

It was recently discovered that when baked clay was re-subjected to high temperatures, the glow point varied directly with the time lapse since primary firing. This meant that potsherds (other than cooking vessels, which were continuously refired) might easily be located in absolute time - - and vastly more economically than by current radioactive isotope techniques. If this can be done, it will be a bonanza to the archaeologist. The major difficulty thus far encountered is that these calibrations of glow point depend not only on time span since primary firing, but also on the quantities of several trace minerals in the original clay. Samples, therefore, must have the same chemical consistency of clay found in series of otherwise defined age, i.e., determinations can be duplicated but not originated. We

have some reason to hope that this vital handicap may be overcome.

Decomposition of obsidian

Obsidian artifacts are frequent in New World archaeological deposits, the irreplaceably sharp flakes exported widely from their original volcanic deposits. Once fragments have been chipped from the original core, a slow progress of patination begins. The depth of this patination has recently been used as a time index, and in certain conditions can be remarkably accurate. A basic, and perhaps irremediable weakness in the technique, however, is that progressive patination depends not only on time but humidity. Samples to be dated depend on comparison with a column dated by other means, and accurate determination requires identical meteorological conditions. The technique has rendered impressive results in surveys of large desert areas in northern Mexico, where climatic variations are minimal. Its eventual usefulness in the wet tropics is uncertain.

Hieroglyphic Dates

For about six hundred years, the rough span of the "Classic" period in the southern lowlands, the "Early" period in the northern lowlands, cultural events were closely dated by the elaborate Long Count of the Maya calendar. Hieroglyphic inscriptions not only ordered the sequence but defined the duration of its phases. The resultant chronology is rigid, but remains floating in absolute time until the solution of the correlation of the Maya and the European calendars.

For a long time there was strong support for the Spinden correlation, placing the Spanish Conquest at 12.9.0.0.0 in the Maya calendar. Later this was ruled out on astronomic grounds as a day-for-day solution, and most workers rallied to support the Goodman-Thompson-Martinez Hernandez equation dating the Conquest 260 years earlier at 11.16.0.0.0, thus placing glyphic dates and associated events 260 years later in absolute time. As time went on, acceptance became nearly universal.

There is no question that the Spanish Conquest took place in a Katun 13 Ahau. Possible correlations accepting this date must be spaced at approximately 13 Katuns, the length of the u-kahlay-katunob -- or the assumption must be made that there was a complete break in the calendar between Classic and Colonial times, something few workers wish to postulate (although Makemson, Smiley and others have done so).

Among the correlations accepting a Katun 13 Ahau Conquest date, only the 11.16 remains as a day-for-day equation. It passes the known, rigid, astronomical tests. And it certainly handles most adequately the fragmentary calendric evidence in the Conquest period chronicles. However, considerable recent archaeological evidence from the northern lowlands and from the Mexican continental highlands seems to indicate an earlier correlation around 12.9 (but not that of Spinden).

Nine pertinent C¹⁴ determinations from the northern area demand an early solution; of four others, three suggest one; only one favors 11.16 (i.e., in the last four, the median falls within the framework of only one correlation, but the 1-sigma spread overlaps the two). Further determinations in the central and southern highlands again point to an earlier cross-dating. In strong contrast, a very large and painstaking series of Tikal determinations, undertaken by Pennsylvania, point just as rigidly (and uniformly) to an 11.16 equation. Either of these bodies of dates alone would be most convincing. However, the fact that such divergent results could be obtained in adjacent areas demonstrates clearly that there are still major undefined sources of error in the process, and that until these are under control, the C¹⁴ technique will not have solved the correlation. Suess, aware of such variables, has simply added a century or two to the 1-sigma counting error, often placing dates only within four centuries ... considerably more than the 260 year u-kahlay-katunob interval.

Finally, recent development of a fuller cultural sequence in Yucatan has added at least two substantial periods to the sequence. The gap between the end of the Initial Series and the arrival of the Spaniard with the Gregorian calendar is a short one according to the 11.16 correlation ... 300 years. This satisfactorily allowed for what was assumed to be a tag-end overlap of the Classic and the entire "Toltec" period. It does not satisfactorily accommodate the entire rise and fall of the Puuc cities (Pure Florescent), the subsequent period of Mexican domination (Modified Florescent), and the new cultural entity we presently call the Black-on-Cream period. The compression of these cultural events into 300 years becomes embarrassing, and on purely archaeological grounds, we would welcome the 550 years allotted to these phases by a 12.9 correlation.

These remarks do not intimate that I consider we have proved a 12.9 correlation -- indeed no acceptable one exists. I do feel that sufficient new evidence has accrued to re-open the possibility, and that we must await further accumulation of factual data and perfection of analytic techniques before any final decision can be made.

THE RISE OF HUMAN CULTURE

Beginnings

The first known humans in Mesoamerica were nomadic hunters who appeared about 11,000 B.C. in the terminal Pleistocene, following herds of now extinct mammals, notably the mammoth, but probably many other extinct species (Aveleyra, 1964). Although widely spread in Mesoamerica, properly documented remains of these "Palaeo-Indians" have not been found in the Maya lowlands.

Engerrand published in 1912 a number of flint implements without

ceramic context, found between Concepción and Esperanza in southern Campeche, suggesting a very early date of manufacture. Actually, the resemblances suggested are to European Chellean and Acheulean artifacts, and there is no apparent similarity to local Palaeo-Indian lithic remains. Good flint is very common in this part of Campeche and was often worked at its outcroppings. Several such workshops have been found apparently without pottery or other associated human remains. However, identical axes are commonly found in cultural deposits of Classic or later age. Unless further evidence is forthcoming, the great antiquity of the Concepción finds can probably be discounted.

The origins of agriculture

Between 7,000 and 2,000 B.C., Mesoamerican man slowly supplemented his hunting economy by gathering wild foods and finally by growing his own (MacNeish, 1964). Agriculture was important by the end of the fourth millennium and dominant in some areas by the middle of the second or perhaps earlier, when people were established in stable agricultural villages, the economy based largely on corn. No remains dating to this period have yet been found in the Maya lowlands, despite scattered extensive excavations. This apparent vacuum may be the result of deterioration of diagnostic vegetable evidence in the wet tropics, but lack of pre-ceramic cultural features of any sort may be significant.

A possible exception is Longyear's discovery of apparently pre-ceramic remains at Copan separated by sterile layers from overlying deposits containing Formative pottery (Longyear, 1952). But these artifacts, if such they are, offer little positive criterion of either age or cultural context.

A detailed survey of coastal Yucatan in 1968-69 by Eaton concentrated on minute search for traces of this early level of culture in an area which seems to have been infinitely more hospitable than the colder and florally poorer highlands. No such evidence was found, although as will be noted below, a demonstrated change in the coastal geography may alter our outlook on where to search further.

The so-called "Formative" cultures

The term "Formative" has been widely applied to a large catalogue of Mesoamerican cultures in the period of roughly 2000 B.C. to 0 A.D. These, as a group, represent the slow transition from primitive agricultural life to the flowering of high culture, generally known as "Classic". Certain caveats, regarding the word "Formative", are needed. First, the term is in part chronological. Large areas of northern Mexico never reached a Classic stage of development; nevertheless, the sixteenth century Tarahumara would not be classified as "Formative". In other regions, local cultures regressed behind the line after having far passed it. The modern Lacandon would hardly

be classified by that name. Secondly, the word should not imply either a uniform or an inevitable cultural process. In each sub-area, the evolution took a different course of trial and error, often failing.

The Formative cultures which mark the first known occupation of the Maya lowlands are relatively late and their technologies were by no means primitive. According to extant C¹⁴ datings, the earliest of these is the first Formative phase at Dzibilchaltun in northern Yucatan, with a base date at 975 B.C. ± 340 (using Dr. Suess' cautious margin of error (Andrews, 1965a; 1965b)). Structure 605 at Dzibilchaltun, begun in this period, was constantly reworked and inhabited for almost 3,000 years. Fortunately for the excavations, considerable remained of the original occupation. There was little primitive about these people. The excavation included four simple one-room apsidal residences flanking a larger platform in two terraces. The houses were of mud and unworked stone walls stuccoed over and roofed with some perishable material. The terrace walls of the platform were also of mud and unworked stone heavily stuccoed over, as were the floors. The pottery of this first phase, which I named the Zacnicte Complex, seems both technologically and aesthetically superior to any which appeared in later times in Yucatan. It is characterized by delicacy of form and elaborate decoration in a variety of modelling techniques combined with polychrome painting... the latter perhaps Mesoamerica's earliest. Other artifacts include flint and imported obsidian blades and projectile points, beads of Spondylus and one finely carved jaguar-head pendant in jade. Ever-present manos and metates indicate a largely agricultural economy, but large deposits of molluscs indicate enjoyment of the nearby coastal fauna.

A number of colleagues have briefly examined these (presently) first remnants of emergent civilization in Yucatan. Their reaction has been that they bear very little resemblance to known material from other regions. Modal similarity to Mamom artifacts in the south comes later in the stratigraphy. A relatively full-blown higher culture seems to have appeared in northern Yucatan without presently traceable antecedents. "Civilization", as many students would see it, appears to have emerged elsewhere and to have been brought to Yucatan by its first wave of population.

Brainerd reported the recovery at Mani Cenote of a peculiar unslipped pattern-burnished water jar with an almost pointed bottom which must have been set in some form of shaped receptacle (Brainerd, 1958). It stratigraphically underlay deposits which he correctly analyzed as of Chicanel horizon, but it was not associated with other artifacts or chronological criteria. Folan (Folan, in press) describing it as a "monopod" vessel, found it elsewhere in caves in southern Yucatan. It has not been found at Dzibilchaltun, but has appeared in context with evolved Formative sherds of as yet unknown date by Eaton at sites in the Rio Lagartos area (Eaton, ms, M.A.R.I.) The date of this ware remains floating in time.

I mentioned earlier that Eaton's survey of the north coast of the peninsula has produced what I consider very strong evidence that the coastal barrier beach which, since Decadent times, has been the seat of coastal and portuary population was not formed until about A.D. 1000. A large string of shell mounds, camps and artifact workshops, belonging to the Formative and Early periods, has been found along what must have then been the coast but which now lies 200 - 1000 meters inland in presently uninhabitable swamp area. It may well be that we must search for remains of earlier man farther inland behind the present coastal swamp - - a project firmly on our agenda.

The second Formative stage in Yucatan, still only known at Dzibilchaltun, was obviously one of tremendous development in human culture. Simple aggregations of unit housing around platforms of possible ceremonial use give way to large terraced pyramids of faced stone around obviously civilly important plaza groupings. These continued to develop into massive acropolis-type aggregations, which were by far the largest of the monumental remains in the site's long history. The city must have been a magnificent one and the population must have been very large.

The second phase was one of very widespread trade and much modal similarity in pottery wares over long distances. Many sherds from as far apart as Dzibilchaltun and Chiapa de Corzo are quite undistinguishable in form and slip color (although a glance in the binocular separates them immediately). Two factors stand out strongly in this early flowering of culture. First, although trade was obviously extensive, I do not get the impression of distinctive outside influences reaching into the Maya lowlands and ordering culture development. Spinden's long discarded concept of a generalized "Archaic" horizon whence evolution specialized into more distinctive aggregations seems increasingly attractive. Second, and highly correlative, although we use the word "Formative" to describe the horizon, at least the middle phases seem to have none of the seeds of that remarkable entity we would all call Maya civilization. The modalities which later made the Maya different are simply not foreshadowed.

The terminal Formative in Yucatan (contradictorily) witnessed the beginning of a long process of decline. Massive monumental architecture seems to have been discontinued (although this might just possibly be an illusion stemming from inadequate sampling), replaced by low house mounds. The pottery degenerated in technics and aesthetics. And the population must have declined greatly. The end was marked by the gradual appearance of a few ceramic modes which were most characteristic of later Yucatan (but not Guatemala), e.g., basal break tripod bowls, trickle painting.

Formative cultures appear in the Belize-Peten-Pasion-Usumacintla crescent in the south at approximately the same time as in Yucatan in the north (Willey, Culbert and Adams, 1967; Willey, Bullard, Glass and

Gifford, 1965; Coe, 1965; Adams, 1970). Again they arrived with aesthetically and technically advanced pottery and were surely settled village farmers. The Xe and equivalent ceramic complexes at Altar de Sacrificios and Seibal bear the earliest C¹⁴ date in the south -- 745 B.C. \pm 185, and, according to Adams, contain modal resemblances to the Dili complex in Chiapas, which has been dated considerably earlier. From present and very probably incomplete knowledge, Formative cultures arrived somewhat later at Barton Ramie (Jenney Creek), Tikal (Eb), Uaxactun (Mamom) and in the Usumacintla Valley. Preliminary investigations at Becan in southern Campeche have thus far yielded no ceramics earlier than the Mamom horizon. Monumental architecture and evidence of an increasingly complex society apparently developed more slowly in the south. Indeed no architecture at all is known from early or even middle Formative (again possibly because of insufficient exploration).

On the other hand, present evidence would seem to indicate the southern lowlands as the birthplace of Maya civilization. For it is here that the late Formative became clearly formative of what was to come. In Chicanel times at Tikal, we find graphic and sculptural art forms with a Maya flavor and the corbelled vault, which was to be so important later, first appearing.

The Rise of the Maya

The sudden emergence of a syndrome of cultural innovations, appearing about the birth of Christ and foreshadowed by manifestations at the end of the Formative, led rapidly to the flowering of Maya culture. These achievements include the corbelled vault, a remarkable progress in mathematics, astronomy and the calendar (culminating in the unique Long Count), the refinement of hieroglyphic writing, and the cult of elaborate carved stone monuments.

Many people, for several centuries, have been tempted to attribute this impressive cultural surge to some outside stimulus -- beginning with Africans and Asians and ending recently with the Olmecs. Trans-Atlantic and trans-Pacific contacts have been rather generally ruled out as significant control factors in New World cultural development. Near Eastern influences, including Egyptian, would simply have been too early. Southeast Asiatic influences (the most frequently mentioned in these days) would have been too late -- the traffic would have gone in the other direction. I can see sporadic groups of traders, adventurers or castaways making their way to the New World in quite ancient times. But if they actually had done so, I feel strongly that their impact on indigenous cultures would have been close to nil. They would never have made changes in depth in ceremony, ritual, aesthetics, technics -- or even in domestic architecture. You cannot sell a spark plug to a Bantu until he owns a car -- and replacement parts are reasonably guaranteed.

As to the extraneous origin of Maya high culture closer to the heartland, I am equally skeptical. The very traits that make it such an exceptional culture are simply absent elsewhere. The corbelled vault which enabled

the remarkable architectural achievements of the Maya, was unknown elsewhere in Mesoamerica, and could hardly have been an imported concept. Nor could the evolved mathematics-calendrics and astronomy have been imported. They were too superior to any existing in the world.

Nevertheless, I am thoroughly in accord with Bernal (paper published in this volume) and many others that all of the higher cultures of Mesoamerica descended from a relatively homogeneous substratum containing at least the seeds of many of the common features still existing today. In different areas, these seeds produced different fruit at different times. According to radiocarbon evidence, the first "break-through" was that of the Olmecs who, about 1250 B.C., produced the earliest known monumental sculpture and architecture (Coe, 1970). Their very widely spread trade, based on either empire or commercial acumen, was certainly an important levelling factor among the nascent cultures of the region.

The earliest known calendric inscriptions have been found at Monte Alban (Bernal, op. cit.). It is equally probable, however, that bar and dot numerals, perhaps invented to record the positions in the 260-day almanac, were widespread in very early times. The few cycle 7 initial series are all found outside the Maya lowlands. But these may record mythical or historical dates from a distant past; or alternatively the base date from which they were calculated may not have been the same as that of the Maya "Long Count". Much more exploration and research are needed.

Monumental construction began in the Maya lowlands at a date not too disparate with Olmec achievements. But crystalization into the unique and highly individualistic assemblage we know as Maya "civilization" came perhaps a millennium later -- when the Olmec entity existed only as tradition. Invention of the corbelled vault may have triggered this upsurge, but more probably it occurred as a solution to immediate needs of expression in a growing and highly successful hierarchical society. Very few would hesitate to call the end result a "civilization". At what exact point transition to this status occurred is perhaps not of very great importance.

Bibliography

- Adams, R. E. W.
 1970 The Ceramics of Altar de Sacrificios. Peabody Museum Papers, Harvard Univ., Vol. 63.
- Andrews, E. W.
 1965a Archaeology and prehistory in the northern lowlands: an introduction. Handbook of Middle American Indians, Vol. 2, Art. 12, pp. 288-330.

Andrews, E. W. (continued)

- 1965b Progress report on the 1960-64 field seasons, National Geographic Society - Tulane Univ. Dzibilchaltun Program. Tulane Univ., Middle Amer. Research Inst., pp. 23-67.

Aveleyra Arroyo de Anda, L.

- 1964 The primitive hunters. Handbook of Middle American Indians, Vol. 1, Art. 11, pp. 384-412.

Brainerd, G. W.

- 1958 The archaeological ceramics of Yucatan. Univ. California, Anthr. Rec., Vol. 19.

Coe, M. D.

- 1970 The archaeological sequence at San Lorenzo Tenochtitlan Veracruz, Mexico. Cont. of the Univ. of Calif. Arch. Res. Fac., Univ. of Calif., No. 8, pp. 21-34.

Coe, W. R.

- 1965 Tikal, Guatemala, and emergent Maya civilization. Science, Vol. 147, No. 3664, pp. 1401-1419.

Folan, W. J.

- In press. A unipod water bottle from central Yucatan. Estudios de Cultura Maya, Mexico.

Longyear, J. M.

- 1952 Copan ceramics: a study of southeastern Maya pottery. Carnegie Inst. Wash., Pub. 597.

MacNeish, R. S.

- 1964 The food-gathering and incipient agricultural stage of prehistoric Middle America. Handbook of Middle American Indians, Vol. 1, Art. 12, pp. 413-426.

Willey, R. F., W. R. Bullard, J. B. Glass, and J. C. Gifford

- 1965 Prehistoric Maya settlements in the Belize Valley. Peabody Mus. Papers, Harvard Univ., Vol. 54.

Willey, G. R., T. P. Culbert, and R. E. W. Adams

- 1967 Maya lowland ceramics: a report from the 1965 Guatemala City conference. Amer. Antiq. 32: 289-315.

VIII. COMMENTARY ON: THE EMERGENCE OF CIVILIZATION IN THE MAYA LOWLANDS

Gordon R. Willey

Introduction

In his introduction Andrews (1970 Ms.) quite rightly sets down his beliefs and biases on the nature of "civilization." He eschews what he calls a "rigid" definition of that condition, meaning by this a listing of cultural traits or criteria which would mark such a developmental threshold. He prefers, instead, to conceive of civilization as an inextricable part of the whole process of human cultural development, a process of natural and socio-cultural ecological adaptation. He also feels that "'civilization' knows no rules of its own and develops in varying ways from area to area", ways that are unpredictable. He admits to an aversion to "Spenglerian and Neo-Spenglerian theorists" with their constructs of "chrono-cultural typologies" which plot an inevitability in cultural growth. Such typologies are, to him, "rarely valid in more than limited geographical context." This position is a conservative position, but it is adhered to by a majority of historians and, probably, by a majority of archaeologists. In brief, it is a position that is skeptical of ever arriving at valid positive generalizations as to the uniformity of culture developmental processes. As such, it is a point of view that must necessarily hold serious reservations as to the underlying theme of this symposium.

Let me now outline my own biases on these matters. In the first place, I will reject a Korzybskian or semantic approach to the concept of civilization and will argue that there is a specific segment of the continuum of human social and cultural development that can be marked off and labeled as civilization and that it is a profitable and legitimate exercise for the archaeologist to do this. I would claim this for the Maya lowlands, for Mesoamerica as a whole, and, still more broadly, for the history of human culture at large. This brings me to another area of disagreement with Andrews: I do not think that the search for universal regularities in the processes of cultural development is a hopeless task. Admittedly, much that has been written on this subject -- and written with great erudition -- has fallen far short of the goal of the discovery of meaningful explanatory process. To tell us, as Spengler does, that a culture, like a plant or a biological organism, has a youth, maturity, old age, and death, is to tell us nothing of cause. Toynbee, less fatally deterministic, provides hypotheses on the mechanisms of culture change, such as "challenge-and-response", but most of us, at least in anthropologically-oriented archaeology, find such "explanations" too all-embracingly simplistic. That hardy perennial, Marxist evolutionism, tends to find more favor -- consciously or subconsciously --

in archaeological eyes. It has the advantage of focusing on the tangible, upon the relationships of culture to natural environment, upon subsistence, and the production and distribution of goods. It has a piece of the truth, but its doctrinaire insistence that prime cause resides always in the technico-economic sphere is not convincing. One must concur with Andrews that the schemes that have attempted to tell us just how and why man has marched toward civilization have so far failed; but I think the reason for their failure is that they have not been grounded in a close-up understanding of how and why change has come about in specific historical situations. It is from these situations, and their comparative analyses, that we will make progress in the formulation of "regularities" in culture change.

This preamble, is, of course, an endorsement of the aims of this symposium, but how does this leave me in a discourse with Andrews, assuming our views to be so hopelessly at odds? I will answer this by saying that I don't think that our outlooks are all that far apart. Actually, we have some very basic agreements. As all archaeologists should, we see the investigation of regional particulars as a sine qua non. Further, I am in accord with his view of culture as essentially systemic, as a phenomenon that develops through natural environmental-socio-cultural adaptations. Finally, in spite of Andrews' disclaimers, he leaves the door open when he says that although he "will not attempt to define when 'civilization' began (or ended) in the Maya lowlands", he "will attempt to outline briefly what now seem the critical developmental stages of human culture in the area and how they have been or may be dated." The phrase "critical developmental stages" is the operative one here. He obviously sees important differences in the Maya continuum. Perhaps he is willing to be convinced if others can demonstrate to his satisfaction that these specific, differentiable Maya lowland "stages" conform to larger patterns of human cultural development.

Questions of Chronology

In pursuing my comments, let us first turn to some factual ground where I don't think Andrews and I see things very differently. His observations on chronology, especially as these pertain to radiocarbon dating and the correlation of the Maya calendar, are similar to mine. Given the uncertainties of the radiocarbon method, the pertinent dates from the southern lowlands support an 11.16 correlation while the majority of those from the north are more easily reconciled with a 12.9 correlation. So, lamentably, radiocarbon determinations have not, as yet, resolved the correlation question. My own appraisal of the archaeological dating for all of the Maya lowlands and, beyond this, for Mesoamerica as a whole, leads me to favor an 11.16 correlation. As Andrews has often pointed out, this correlation allows relatively little time to accommodate the northern lowland Pure Florescent, Modified Florescent, and Mayapan periods if we date the inception of the Pure Florescent as late as A.D. 800-900. Such a dating is based on an equation with the end of the Tepeu period in the

south, the interpretation which Andrews prefers. On the other hand, if we allow for chronological overlap between Tepeu and Pure Florescent then there is more time for the development of the latter. A full contemporaneity between Tepeu and Pure Florescent may be going too far in this direction, and I think now that I would favor the kind of alignment proposed by Parsons (1969) in a recent monograph where the beginning of the Pure Florescent is made coeval with the beginning of Tepeu 2 at about A.D. 700.

Although the Maya correlation problem is important to our understanding of events in the lowlands, and particularly the coordination of these events between north and south, it does not pertain very critically to the questions surrounding the emergence of Maya civilization. Almost certainly, the correlation falls somewhere in the range discussed, with a slippage of only two or three centuries in either direction at most. More crucial to our concerns here are radiocarbon dates relating to the Formative or Pre-Classic cultures. We have a number of these, both from the Maya lowlands and from elsewhere in Mesoamerica; and, taken in conjunction with stratigraphic excavations, they offer a generally agreed upon chronological framework for the long Formative Period and its major events. Briefly, and viewing Mesoamerica as a whole, it would appear that an effective agricultural subsistence came into being at somewhere around 2000 to 1500 B.C., in what is usually called the Early Formative. At 1200 B.C., we have the first great ceremonial centers of the Olmec, and the spread of Olmec influences after this mark the Middle Formative. The Late Formative, after about 400 B.C., was the time of the various successor cultures to the Olmec. The subsequent Classic Period developments of Teotihuacan, Monte Alban, the Maya lowlands, and elsewhere arose from these Late Formative and Proto-Classic cultures in the first two or three centuries of the Christian Era.

Diachronic Configurations of Development in the Maya Lowlands

We need many more radiocarbon dates on the Maya lowland Formative Period cultures and other kinds of information as well; however, from what we know now, it looks as though there was no settlement of any kind in these lowland regions until at least 1000 B.C., or until the Middle Formative Period. These earliest cultures of the Maya lowlands appear as developed farming, pottery-making phases, and it is assumed that they result from migrant societies who entered the jungle lowlands from elsewhere. In this connection, it is to be remembered that such societies were already extant in a number of places in southern Mesoamerica at this time -- in the old Olmec heartland of the Veracruz-Tabascan lowlands, in the Guatemala-Chiapas uplands, and in Oaxaca, but it is not clear, as yet, just which one of these Mesoamerican subareas played the parental role with regard to the Peten-Yucatecan cultures,

In the southern lowlands these earliest settlements of the Middle Formative were small villages. Perhaps the very earliest of these, dating at ca. 800-600 B.C., are the Xe phase components at Altar de Sacrificios

(Willey and Smith, 1969) and Seibal (Smith and Willey, 1969), on the Pasión River. Most of our information on Xe comes from small excavation exposures beneath later refuse and architecture, and this is also true for the succeeding Mamom phases (ca. 600-400 B.C.). In her current symposium paper, Proskouriakoff (1970, Ms.) has called attention to a small San Felix Mamom plaza with surrounding platforms at Altar de Sacrificios, and it may be that these relatively modest little buildings were temple substructures. Certainly, in the later Chicanel-like phase at Altar de Sacrificios these small structures were built over and enlarged, and the plaza in question very definitely became a ceremonial precinct. This follows developments in other southern lowland sites in the Chicanel-related,⁽¹⁾ or Late Formative, phases. In the Late Formative Period population increased greatly; new centers sprang up; and impressive ceremonial architecture marked these centers. Toward the end of the Late Formative, or in the Proto-Classic, distinctive stylistic features of Maya culture appear and assemble rapidly -- vaulted architecture, sculpture, hieroglyphics and calendrics, polychrome pottery -- to form the Early Classic Mayan culture of the third century A.D.

Now there are some contrasts between this southern lowland developmental picture and that which Andrews sketches for the north -- or, at least there seem to be, and we need further comment from him about these. His earliest phase at Dzibilchaltun, the Zacnicte, has a median radiocarbon date of 975 B.C., which would place it as somewhat earlier than Xe and Mamom in the south. Depending on just how one would draw the line between Early and Middle Formative, Zacnicte would be either at the end of the Early Formative or the beginning of the Middle. The architecture which Andrews describes, while not impressive, seems more advanced than anything we have yet been able to associate with Xe and Mamom in the south. The pottery, as he describes it, is definitely more sophisticated than that of Xe-Mamom; and the appearance of polychrome painting at this early time is most surprising. Thus, although both the earliest cultures of the southern and northern lowlands give the impression of pioneer communities that moved into these jungles from elsewhere, the status of development of the northern immigrants appears higher than that of the southerners. This suggests that the original homeland of the peoples who pioneered northern Yucatan may not have been the same as that of the early immigrants into the south.

Following Zacnicte, Andrews refers to the "Second Formative stage in Yucatan" as "one of tremendous development in human culture", featuring terraced and stone-faced pyramids at Dzibilchaltun. He notes widespread modal similarities in pottery over long distances, stating that "sherds from as far apart as Dzibilchaltun and Chiapa de Corzo are quite indistinguishable." He

(1) Following the terminology for phase designations agreed upon at the Guatemala City Conference of 1965, these Late Formative or Late Pre-Classic phases of the southern Maya lowlands would be linked together in a "Chicanel Ceramic Sphere" (Willey, Culbert, and Adams, eds, 1967).

qualifies this last to make clear that he is speaking of similarities of form and finish; in paste and temper they are quite different. In other words, the manufacture is local; what is being transmitted are stylistic features. This participation in widespread ceramic similarities suggests the Chicanel horizon or sphere in the south, and, if so, this would correlate with the comparable Late Formative configuration of southern architectural development; however, this correlation seems in doubt as Andrews refers to a "terminal Formative in Yucatan" which witnessed the beginning of a long process of decline", with the discontinuation of monumental architecture and a population drop-off. This does not correspond at all to the rhythm of development in the south where, contrariwise the Late Formative followed by the Proto-Classic were periods of steady expansion of population and ceremonial center build-up.

As to the emergence of Classic Maya civilization from the antecedent Formative Period cultures, Andrews and I have basic agreements in that we both see the rise of the Classic Maya as a lowland phenomenon; that is, it was not developed en toto elsewhere and then transferred to the Peten and Yucatecan plains. At the same time we also admit that the "seeds" of many features of the Classic Maya development were derived from a widespread and early southern Mesoamerican heritage. This is certainly true of the general forms of ceremonial architecture -- although not of such specialized things as the corbelled vault. It is true of hieroglyphics, mathematics, and calendrics although, as Andrews emphasizes, the unique Mayan evolution of these traits is matched nowhere else in Mesoamerica at any time. I see this development arising steadily, gradually, and then with accelerated speed all through the Late Formative and Proto-Classic. New ideas appear from time to time in the course of development until, taken cumulatively at a more or less arbitrary point, they can be said to mark a Classic Period threshold. This is seen very clearly at Tikal (W. R. Coe, 1965) and also at Uaxactun (A. L. Smith, 1950). In contrast to this, Andrews says of his northern Formative Period cultures that they "seem to have none of that remarkable entity we would call Maya civilization. The modalities which later made the Maya different are simply not foreshadowed." Andrews points up this difference between north and south by suggesting that, while the north may have been in advance of the south in the development of Formative Period monumental architecture and complex societies, the crystallizing elements of Maya civilization of the Classic -- writing, art forms, and the corbelled vault -- were earlier in the south. From there, presumably, they diffused to the north.

Comments Concerning the Condition of Civilization

At the outset of my discussion I said that I thought civilization could be defined as a social and cultural condition and that its evidences could be identified archaeologically. Leaving aside for the moment the lowland Maya and the Andrews paper, I shall attempt such a definition. I

conceive of civilization as having three essential dimensions: (1) large population size and density; (2) marked social complexity; and (3) a complex network of intercommunication among its social components. More specifically, I submit that a civilization integrates the lives of more than 5000 persons. This integration may be achieved in either a concentrated, or urban, settlement or in a dispersed, or non-urban, settlement. The crucial factor is that the energies and abilities of a population of this size are drawn upon and integrated to a common purpose. As to social complexity, a civilization is characterized by marked divisions of labor, by a complex ranking system or by social classes, and by an hierarchial governmental structure. These circumstances and institutions may be reflected in various ways in the archaeological record: in differentiation in the size and elegance of living quarters; in the presence of constructions dedicated to public purposes or personages -- temples and palaces; in evidences for the specialized manufacture of various goods; in evidences for the differential distribution and use of these goods as seen in dwellings or in burials. As to the nature of the governmental structure, I would say that this could be either that of a chiefdom or a state, as these terms have been used recently by anthropologists (Service, 1962). That is, I would not restrict the condition of civilization to the political form of the state. I accept the chiefdom-state distinction and the evolutionary implications of this distinction, however; and I would see the sanctions of a large scale force, as these can be manipulated by the state, as the essential differentiation between the two.

As to the network of intercommunications, the key points in such a network are either cities or ceremonial centers. It is from these that government, religion, and trade are controlled. Media of communication are obviously of great importance. Language is the foremost of these in any human communication, but in the context of a civilization it is important that the word be recorded, and so writing has become, deservedly, a classic hallmark of the status of civilization. But this is not the only way, in a broader sense, that the "word" is recorded. Art is another communicative form. As Proskouriakoff (1970, Ms.) notes, "Monumental ... arts provided validation for hierarchial society and maintained communication between administration and the populace." The communication network of a civilization binds not only the present with the traditions of the past, but it ties hamlet to village and village to city or major center. The construction and enlargement of such a network may be effected through political or military power, but it may also be effected through trade.

I make no claim here to great originality in the formulation of these criteria of civilization. Gordon Childe (1950) and others have offered similar ones. My attempt here has been to place them in systemic context; but they can be summarized as traits as follows:

- (1) Communities of more than 5000 people or the clear evidence of the integration of such numbers in a close-knit cultural system.
- (2) Marked divisions of labor.
- (3) A complex ranking system or social classes.
- (4) An hierarchial governmental structure.
- (5) Monumentality in architecture.
- (6) A codified symbolic system (such as writing or a pervasive art style.)
- (7) Interregional trade.

Before turning to the status of civilization in the Maya lowlands, we should consider one other matter: the different kinds of civilizations. In their symposium paper Parsons and Price (1970, Ms.) define two basic kinds of civilization for Mesoamerica. In referring to what they have said, I beg indulgence for anticipating the formal discussion of their paper, but their thoughts on the matter are very pertinent both to the symposium theme as a whole and to the Maya lowlands in particular. They refer to "urban" and "non-urban" civilizations. These have, respectively, the diagnostic feature of the presence or the absence of the trait of true urban settlement. They also have other associated traits. The urban civilization is associated with a market economy and a merchandising middle class, with a greater social class complexity than the non-urban civilization, with a landed aristocracy, and with a militaristic leadership. It is the setting for the state. The non-urban civilization is linked to a redistributive economy in the hands of an aristocracy, to a social ranking system, to corporate or kin ownership of land, and to a theocratically oriented leadership. It is the setting of the chiefdom.

The extent to which these two trait clusters are functionally associated with their respective urban and non-urban settlement types is yet to be fully demonstrated. Sanders and Price (1968), and again, Parsons and Price (1970, Ms.), have argued for functional interrelationships. They see the urban type civilization as developing in regions of diversified natural resources. In Mesoamerica, these are the upland valleys, with deep soils suitable for intensive cultivation techniques and a variety of items for exchange -- obsidian, jadeite, basalt. This micro-environmental diversity was best served by a local market economy, and such an economy, and the positive feedback from it, flourished best in a true urban setting. The lowlands, on the other hand, lacked environmental differentiation of resources and the symbiosis between micro-environmental niches. For them, the most important trade was long-distance trade which was mediated by the nobility or by the lineage heads whose ceremonial centers were the redistributive points for a dispersed peasantry. These are instructive models; I am inclined to agree with them;

whether they are correct or not in all details will be revealed, we hope, by further archaeological testing. The two models carry with them an implication of evolutionary sequence, with the stage of non-urban civilization preceding the urban. Parsons and Price (1970, Ms.) caution, however, that this need not be the case and cite Morton Fried's (1960) model of the "secondary state." The Mesoamerican non-urban civilization of the lowlands could be such a "secondary state" -- that is, one which developed in response to, and from contact with, the primary state of an urban civilization, in this case one from the Mesoamerican highlands. Although this point is not pressed in the Parsons-Price paper, it is favored in the earlier Sanders-Price argument where Maya Classic Tikal is seen in such a "secondary state" relationship to Teotihuacan. In this particular instance, I am inclined to doubt the "secondary state" model as being fully applicable to what happened in the Maya lowlands; but, as a way of going into that, let us get back now to my specific theme, the rise of civilization in the Maya lowlands.

The Status of Civilization in the Maya Lowlands

The greater part of our Maya lowland evidence for population size, settlement distribution, clues to social classes, and trade comes from the Late Classic Period, and, especially in the south for what is designated as the Tepeu 2 sub-phase (ca. A.D. 700-800). We will take a look at these Late Classic data first -- in the light of our foregoing criteria of the condition of civilization -- and then consider how far back in time we may project these patterns.

That there were Late Classic Maya lowland communities that integrated the lives and efforts of more than 5000 people is now fully demonstrated. Earlier versions of Tikal population estimates give figures of 10,000 to 11,000 persons for the 16 square kilometer mapped central zone, and this was supplemented by another 10,000 persons in a surrounding peripheral belt (Carr and Hazard, 1961; Haviland, 1965). Now more recent estimates following strip-sample surveys radiating out from the center of the site have increased these figures to a total of 49,000 people within a zone of 163 square kilometers (Haviland, 1969). As far as we know, this was the largest Classic Maya community of the south, and it seems to be unique in its great size; however, other ceremonial centers, although smaller than Tikal, are estimated to have controlled sustaining areas of more than 5000 people. Seibal is one example (Gair Tourtellot, personal communication 1970); Benque Viejo, in the Belize Valley, another (Willey and others, 1965); and in the north, Dzibilchaltan was the major center in a very large population zone (Andrews, 1961). It has been argued, indeed, that some of these Maya lowland centers were true urban communities, not just ceremonial centers with dispersed sustaining populations. Haviland (1969), especially, has made this point with regard to Tikal. To settle such an argument requires a more exact definition of what we mean by urban than I have given so far in this discussion. To me, there is a significant difference between Tikal's 49,000 persons scattered

over an area of 163 square kilometers and the 100,000 persons that are estimated as having been grouped within the 19 square kilometers of Teotihuacan (Sanders and Price, 1968; Millon, 1967, 1968). Still, I admit there is room for discussion and further examination of this urban question. For our immediate consideration, though, whether urban or non-urban, we can affirm without doubt that the Maya Classic Period culture of the lowlands had integrated communities of over 5000 people.

Marked division of labor seems well attested for the Maya Classic. It is unlikely that the fine craft goods, the monumental sculptures, Maya writing, and calendrics were made or manipulated by part-time farmers. Maya society must have had certain persons whose lives were devoted to such tasks and activities. Certainly there was an aristocratic leadership. We see this depicted in Maya art; we see it in Maya tombs and burials; we see it in the esoteric knowledge that was part of Maya religion. As to the size and composition of what might have been a "middle class", we are more in the dark. As mentioned, professional artisanry is implied by the nature of some of the luxury products that we find in graves and caches. Other proofs of full-time craft specialists are more equivocal. Culbert (1958, Ms.) stated that he saw no evidence at Tikal for craft barrios, such as are identified for Tenochtitlan and Teotihuacan; Haviland (Haviland and others, 1968) contrariwise, insists that there are indications that certain sections of the site had been the residences of flint or obsidian workers. Coe's (W. R. Coe, 1967) tentative identification of a Tikal marketplace is another datum that can be taken to support both economic differentiation and social differentiation within Classic Maya society.

An hierarchial governmental structure, monumentality in architecture, and a codified symbolic system (or systems) are all so heavily and obviously documented from Maya archaeology that they need no further discussion. The same now is true for interregional trade.

The Maya Late Classic, then, meets all of the traits or criteria that I have set down as diagnostics of the condition of civilization. How far back in time can we push this civilizational threshold for the lowland Maya? I do not think there can be any question about extending it back to the Early Classic. Although settlement data are less secure for this earlier period, we know that Tikal had a very large population by this time (W. R. Coe, 1965; Haviland, 1969). Social class differentiation was probably less marked than later (Rathje, 1970); nevertheless, it was in the Early Classic that Tikal enjoyed a trade in luxury goods with Teotihuacan, and the nature of this trade implies that a non-egalitarian society had already taken form in the Maya lowlands. Other traits -- great architecture, sculpture, and hieroglyphic writing -- are all present at the beginning of the Early Classic.

The Teotihuacan relations with Tikal, and the southern Maya lowlands as a whole, raise the question of the role of that highland site in the

development of Maya civilization. Can the Maya achievement be explained as a response to these contacts? Or, as we have asked earlier, was Maya lowland civilization a "secondary" formation made possible by Teotihuacan trade and political influence? I would answer this in the negative. We know that those unusually sophisticated Maya forms -- its architecture, its art, its hieroglyphics, and its calendar -- were all present before Teotihuacan influence is registered in the Maya lowland sequences; and I think it is highly probable that those other traits which I have listed here as marking the threshold of civilization were present then as well. Without question, Teotihuacan had a very important effect on Maya culture, but I do not see these Teotihuacan influences as the levers which raised Maya society and culture from the level of simple village agriculture to the status of civilization. Rather, the impact of Teotihuacan had the effect of moving a non-urban Maya civilization in the direction of full urbanism and the state; but, as I have said in a previous paper (Willey, 1968, Ms.), I do not believe that this transformation to the developed state was ever complete.

If we hold to the above arguments, and see Maya lowland culture as being on the level of a civilization at the beginning of the Early Classic, can we push this back to the Pre-Classic? Quite probably we can, although here we are handicapped by our relatively slight knowledge of the lowland Maya Proto-Classic and Late Preclassic Periods. For the moment, I think the best that we can do is to say that the Maya cultural continuum of the lowlands attained the status of civilization -- as I have defined it here -- in the span of the Late Preclassic-to-Proto-Classic or between about 400 B.C. and A.D. 200.

Comments on Process and Cause

Of all of the symposium papers, the one most concerned with process and cause is that of Parsons and Price on "Mesoamerican Trade." They see this trade as an important factor, perhaps the key factor, in the systemic relationships that led to civilization. It is their position that the generation of a non-egalitarian society is the first important step-up to the threshold of civilization; and they ask the question: under what circumstances will a society produce a surplus of goods and voluntarily cede it to others? The answer to the first part of the question is essentially an ecological one; in Mesoamerica it was man as an agricultural exploiter of his natural environment. Their answer to the second part of the question is that a society will voluntarily cede a surplus to others if there is some advantage to everyone in doing so. Such advantages accrue from trade, from the opportunity to obtain items that are not immediately at hand. These items may be either basic necessities or exotic luxuries. With the increase of Early Formative Period populations egalitarian mechanisms for inter-regional trade would be inadequate to supply the increasing demands for non-local products. Trade would come to be administered by an elite who would, thereby, become an aristocratic leadership through their control of the distribution of wealth.

This hypothesis deserves very serious consideration and should prompt further archaeological testing. At the moment, I am inclined to accept it and to go even further and add another "twist" to it, one developed by William Rathje (1970, Ms.) in a recent but still unpublished paper. This additional aspect of the interpretation impresses me as the first fully satisfactory explanation for the primacy of Olmec civilization in Mesoamerica. The early rise of the great lowland Tabasco-Veracruz ceremonial centers at La Venta and San Lorenzo, dating back before the first millennium B.C. (see Bernal, 1970, Ms.) has always been a puzzle, especially if one followed the Sanders-Price (1968) reasoning that Mesoamerican civilization must necessarily have arisen first in a subarea of diversified natural resources and with a potentiality for irrigation farming. In their present symposium paper Parsons and Price seem to shift away from this view, at least to the extent of explaining early Olmec leadership in the march toward civilization to the advantages in river levee soils for high crop yields. Undoubtedly, these local riverine conditions gave the early Olmec an initial boost and provided them with a surplus that they could invest in trade for needed items; but, to apply Rathje's hypothesis,⁽²⁾ the crucial transformation of an egalitarian to a non-egalitarian society resulted from this trade in the desired upland products -- stone for corn-grinding implements and obsidian for cutting tools. This trade was mediated by early entrepreneurs who eventuated into a class of aristocratic priest-chiefs, and with this change Olmec society was on its way toward the civilization whose monuments and evidences we see not only at San Lorenzo and La Venta but elsewhere in the Mesoamerican Middle Formative world.

Once trade was established by the lowland Olmec leadership with the highland regions the peoples of the latter, in a rapid accommodative adaptation, converted to non-egalitarian social modes. With their basic advantages in resources and demographic potential, they outstripped the Olmec by the end of the Middle Formative. Quite probably, they passed rapidly through the stage of non-urban civilization; certainly, by Teotihuacan II times they had become fully urbanized. The lowlands, on the other hand, never really accomplished this final step-up to full urban civilization although the Late Classic Maya, in places such as Tikal, were moving toward it.

As a final word, I'd like to enter one caution about these hypotheses concerning the rise to civilization. Parsons and Price (1970, Ms.) state:

"Archaeologically, the distribution of elite goods is merely the indication that we are dealing with a ranked society based economically on a system of redistributive exchanges. Such an indication cannot be analytically regarded as in any sense the cause of that system."

(2) Rathje's (1970, Ms.) hypothesis was applied to the lowland Maya; however, as he acknowledges (personal communication), it also seems to apply to the rise of the earlier Olmec.

I would accept that the goods, per se, are not the cause of the system - if this is what the statement is intended to mean. In fact, I would insist that they are not. A few years ago I published a paper (Willey, 1962) about the Olmec art style and its horizontal pervasiveness in Mesoamerica. I postulated that this style was the symbolic system of an ideology that had an important part in synthesizing the first Mesoamerican co-tradition, the first areal oikoumene of shared beliefs. I did not state that I believed the distribution of this style to have been carried by proselytizing force, nor do I think so now. In the light of the ideas which Sanders, Parsons, Price, Flannery (1968), Rathje, and others have advanced, I think it very likely that trade was the mechanism which carried the style. At the same time, I think that more was carried than the elite goods or the physical properties of the style. There was also transmission of ideas, of a religious ideology; and this ideology was an important force in the formation of all Mesoamerican civilizations -- or, if you like, of Mesoamerican civilization. It helped make and perpetuate it. The continuity of this ideology - undoubtedly modified - is seen persisting down to the Aztec empire -- as Bernal has pointed out to us in his present paper. In fact, I think we have here a fourth dimension of civilization to add to our other three - the dimension of ideology. Intercommunication among discrete social segments is a necessity for the rise of civilization, as I have argued at the beginning of this commentary, and, undoubtedly, McLuhan's concept that the medium is the message has much to recommend it; nevertheless, I would argue that the idea content of the message is the most important of all. For if we do not accept this then we are saying that there are no differences in ideas whatsoever, that ideology can be held as a constant as we seek for the causes of civilizational growth only among the variables of ecology, demography, and technology. With what I know of the world around me and what I know of the past through history and archaeology, this seems highly unlikely, and I cannot accept this view. I offer this as no cry of reaction, no retreat from the attack on the ecological-demographic-technological front. Archaeology has made great advances along this line in the last two decades, and there is still much ground to be won; but this approach will not tell us everything worth knowing about past human affairs. What I am saying is that I am certain that some ideas, some ideologies were "better" than others or were more successful adaptations that prepared the road to civilization. Whether we will ever be able to reveal the nature of these Precolumbian Mesoamerican ideologies in any meaningful way, to appreciate them as adaptive mechanisms of greater or lesser social and political success, remains to be seen. Obviously, it is archaeology's most difficult task, but I don't think we should pretend that such a task, such a challenge, does not exist. (3)

(3) This commentary is published essentially as it was written in June of 1970, prior to the symposium sessions at Burg Wartenstein in early July. Some minor changes have been made in the body of the text, and the final paragraph has been expanded somewhat over the original version.

Bibliography

Andrews, E. W. IV

- 1961 Preliminary Report on the 1959-60 Field Season, National Geographic Society-Tulane University, Dzibilchaltun Program, Miscellaneous Series, No. 11, Middle American Research Institute, Tulane University, New Orleans.
- 1970 The Emergence of Civilization in the Maya Lowlands. Paper Ms. prepared in advance for Burg Wartenstein Symposium No. 47, Wenner Gren Foundation, New York. (Chapter 7, this volume)

Bernal, Ignacio

- 1970 The Olmec Region - Oaxaca. Paper prepared in advance for Ms. Burg Wartenstein Symposium No. 47, Wenner Gren Foundation, N.Y. (Chapter 3, this volume)

Carr, R.F. and J. E. Hazard

- 1961 Map of the Ruins of Tikal, El Peten, Guatemala. Tikal Reports, No. 11, University of Pennsylvania, Museum Monographs. Philadelphia.

Childe, V. G.

- 1950 The Urban Revolution. Town Planning Review, Vol. 21, No. 1, pp. 3-17, University of Liverpool.

Coe, W. R.

- 1965 Ten Years of Study of a Maya Ruin in the Lowlands of Guatemala. Expedition, Vol. 8, No. 1, pp. 5-56, University of Pennsylvania Museum, Philadelphia.
- 1967 Tikal: A Handbook of the Ancient Maya Ruins. University Museum, Philadelphia.

Culbert, T. P.

- 1968 Specialization in Classic Maya Society. Paper presented at Ms. 33rd Annual Meeting, Society for American Archaeology, Santa Fe, N.M.

Flannery, K. V.

- 1968 The Olmec and the Valley of Oaxaca: A Model for Interregional Interaction in Formative Times. Dumbarton Oaks Conference on the Olmec, E. P. Benson, ed., pp. 79-117, Dumbarton Oaks, Washington D.C.

Fried, M. H.

- 1960 On the Evolution of Social Stratification and the State. Culture History: Essays in Honor of Paul Radin, Stanley Diamond, ed., pp. 713-731. Columbia University Press, N.Y.

- Haviland, W. A.
 1965 Prehistoric Settlement at Tikal, Guatemala. Expedition, Vol. 7, No. 3, pp. 14-23, University of Pennsylvania Museum, Philadelphia.
 1969 A New Population Estimate for Tikal, Guatemala. American Antiquity, Vol. 34, No. 4, pp. 429-433, Salt Lake City, Utah.
- Millon, R. F.
 1967 Extensión y Población de La Ciudad de Teotihuacán en Sus Diferentes Períodos: Un Calculo Provisional, 11th Mesa Redonda, pp. 57-58, Sociedad Mexicana de Antropología, Mexico, D. F.
- Parson, L. A.
 1969 Bilbao, Guatemala (Vol. 2) Publications in Anthropology, No. 12, Milwaukee Public Museum.
- Parsons, L. A. and B. J. Price
 1970 Mesoamerican Trade and Its Role in the Emergence of Civilization. Ms. Paper prepared in advance for Burg Wartenstein Symposium No. 47, Wenner Gren Foundation, New York. (Chapter 13, this volume).
- Proskouriakoff, Tatiana
 1970 Early Architecture and Sculpture in Mesoamerica. Paper prepared Ms. in advance for Burg Wartenstein Symposium No. 47, Wenner Gren Foundation, New York. (Chapter 11, this volume)
- Rathje, W. L.
 1970 Socio-Political Implications of Lowland Maya Burials: Methodology and Tentative Hypotheses. World Archaeology, Vol. 1, No. 3, pp. 359-374, Routledge and Kegan Paul, London.
 1970 The Daily Grind. Paper presented at 35th Annual Meeting, Ms. Society for American Archaeology, Mexico City.
- Sanders, W. T. and B. J. Price
 1968 Mesoamerica: The Evolution of a Civilization. Random House, N.Y.
- Service, E. R.
 1962 Primitive Social Organization: An Evolutionary Perspective, Random House, New York.
- Smith, A. L.
 1950 Uaxactun, Guatemala: Excavations of 1931-37. Publication 588, Carnegie Institution of Washington, Washington D.C.
- Smith, A. L. and G. R. Willey
 1969 Seibal, Guatemala in 1968: A Brief Summary of Archaeological Results. 38th International Congress of Americanists, Vol. 1, pp. 151-158, Munich.

Willey, G. R.

1962 The Early Great Styles and the Rise of the Pre-Columbian Civilizations. *American Anthropologist*, Vol. 64, Pt. 1, pp. 1-14, Menasha, Wisconsin.

1968 Urban Trends of the Lowland Maya and the Mexican Highland Model. Ms. Paper presented to the 33rd Annual Meeting, Society for American Archaeology, Santa Fe, New Mexico.

Willey, G. R., T. P. Culbert and R. E. W. Adams, eds.

1967 Maya Lowland Ceramics, A Report from the 1965 Guatemala City Conference. *American Antiquity*, Vol. 32, No. 3, pp. 289-315, Salt Lake City.

Willey, G. R. and A. L. Smith

1969 The Ruins of Altar de Sacrificios, Department of Peten, Guatemala, an Introduction. *Papers, Peabody Museum, Harvard University*, Vol. 62, No. 1, Cambridge, Mass.

Willey, G. R. and others

1965 Prehistoric Maya Settlements in the Belize Valley. *Papers, Peabody Museum, Harvard University*, Vol. 54, Cambridge, Mass.

IX. CALENDRICS AND WRITING

Hanns J. Prem

1. Introduction

Human societies seem inconceivable without an efficient communication between men. The essential transmission of cultural elements, though in some instances may be carried through by merely presenting examples and by imitation, usually requires verbal explanation. This culture-maintaining function of language is particularly important in the realm of abstract ideas. However, the effectiveness of "language" as a system of communication is limited by tight physical laws: space and time. Aside from modern technological advances, language is not able to span great distances of space and time. Both types of distances may indeed be bridged, step by step, through oral exchange, but on an extensive basis this is impeded by several obstacles. To mention only the most important of these: the relative unreliability of human memory, which actually has to fulfill the function of bridging over temporal and spatial distances. Thus, every message, which is passed on orally through intermediaries, runs the risk of being changed or of being partially or totally erased through forgetfulness.

1.1 World-wide evidence supports the assumption that in emergent civilizations a mechanism, still unknown in detail, was brought into play, which almost invariably led to the development of a record-keeping system. The growing needs for transmission of messages and for greater precision in their conveyance would have revealed the inadequacy of oral exchange, and thereby supplied the demand for a more functional system of message transmission. Whether the decisive impetus should be ascribed to the administrative or theological sphere may be difficult to determine, and may vary from culture to culture. However, there can be no denial that the existence of a written recording system influences all aspects of a culture; indeed, it engenders new ones through its mere existence. Consequently, it seems justifiable to look upon a writing system as an indicator of a civilization.

1.2 The origin of a writing system should not be interpreted as a sudden event (notwithstanding some contrary evidence of more recent times which as imitation of other systems being involved is atypical), but rather the product of a long and continuing process. Thus, long before the appearance of each writing system, graphic representation had become a matter of course. It includes the concrete two-or-three-dimensional representation of persons or events, the meaning of which is more or less clearly discernible to any observer, as well as the abstract ornament, whose significance is known only to the initiated. The transition from this manner of recording to narrative

pictography is rather hazy and at best is to be recognized in an intensified conventionalization. This tendency of narrative pictography to produce independent conventional signs offers the basis for the development of a true writing system.

2. Theoretical considerations:

2.1 The study of early writing systems and their predecessors in the stages of emerging civilization is an attractive project for archaeologists and students of writing. However, it is a difficult undertaking, fraught with dangerous pitfalls, for two main reasons.

1) In many areas, including Mesoamerica, there is a dearth of adequate source material for which the certain origin and dating can be determined. The solution of this should be the task of archaeological field work.

2) A methodological problem lies in the lack of an acceptable definition of what kinds of material can be regarded as "writing." Such a definition should be sufficiently clear and flexible to make reliable statements on any graphic systems found. This is important because an arbitrary classification including all graphic forms as a writing system (as is often the case) is not acceptable. Evidently, we have previously lacked manageable criteria to determine when we are dealing with a writing system or not. To avoid the vagueness contained in definitions proposed by Gelb (1954:21) and Diringier (1968:I:4), I (Prem 1967) have proposed:

A writing system is a code adapted to a visually readable information conveyer. Or to be more detailed, a writing system in a broader sense is any system for transmission of information through conventionally employed graphic symbols which are or can be made visible on a medium.

Through this definition, a graphic system, to qualify as a writing system, must contain three indispensable requirements:

| | |
|--------------------------|--|
| Function of the System: | Transmission of information (in verbal or non-verbally fixed form); |
| Methodological Solution: | Codification (creation of symbols which have a conventionally accepted meaning); |
| Technical Rendering: | Graphic (produced upon a medium and visually readable). |

This definition is very broad and encompasses all recording systems, beginning with mnemonic aids up to modern writing systems, including not only our alphabet, but musical notation, flags and flag signals, technical symbols, etc.

Within this wide field of varying writing systems, "true writing"

forms a special group, since it alone is able to record literally and render back a given verbal text.

All other systems, designated also as partial writing or notation, are not suitable for perfect text reproduction. Within the spheres for which they are tailored and in which they are used, they fulfill their task satisfactorily. The fluctuation between requirements and fulfillment is to be clearly recognized here.

The practical application of the definition provided above to archaeological material is not without problems. It is difficult to decide if undeciphered graphic forms had a message function and were able to fulfill this role. In other words, it has to be determined if a conventional agreement existed which could provide the necessary bridge between the graphic symbol and a retrieving of the contents. Simply put: if aside from the writer, there was a reader.

As soon as this question can be answered by demonstrating a certain internal regularity (a feature shared by all recording systems), one can speak of a writing system. The next question that is then raised is: How efficient was the system? Was it capable of reproducing literally a verbal text? Or was it limited only to noting down specific information of a narrow scope? The answer is not only of theoretical, classificatory interest, but is a precondition for every serious work of deciphering, which can only be begun after clearly ascertaining the manner of recording and the type of the system.

2.1.1 Partial Writing or Notations.

Partial writing systems (Barthel 1968) reproduce a given contents true to sense and with sufficient accuracy for its purpose. They may appear in many different forms. As narrative pictography they depict the events to be told. This may occur through naturalistic portrayal or in a stylized form, employing conventional abbreviations and signs (as an example, the halo in the European "biblia pauperum" or the "speech scrolls" in Mesoamerican codices).

As the degree of abstraction and the introduction of conventionalized formulas and representation increases, the representation loses its self-expression, and it becomes increasingly important to ascertain the meaning of the conventions utilized to ensure accurate understanding. One cannot speak of a real "reading" of a narrative pictography since by its nature it provides only reference points and a framework guiding the repetition of its content. Its purpose was a mnemonic support of oral tradition, not a word for word record. This means that for the examples of narrative pictography discovered by archaeologists, at best we may accurately interpret the skeleton of the original statement, while the complete contents must remain unknown.

It is clear that narrative pictography could not express satisfactorily certain contents, such as proper names or places, calendric dates, etc. For this purpose, "hieroglyphs" evolved out of the conventionally used symbols of the narrative pictography. This is an ideographic, and often phonetic as well, partial writing system, which had a limited range of applicability as well as expressive possibility since its initial function was merely supplementary to narrative pictography. Only if such a system subsequently was applied independently and improved to the extent that any verbal text in any field could be expressed literally with it can one speak of a true writing. Here, obviously, no abrupt change could have occurred, but rather there ensued a gradual transition with many intermediate forms. All known Mesoamerican writing systems probably remained in these transitional stages, with the only supposed exception being Maya writing.

2.2 Calendrics.

It has always been stated, and I personally can see no convincing argument against it, that the calendar had its origin in the cyclically transpiring changes observed in nature. Knowledge of the "year", its duration determined with varying degrees of accuracy, was likely quite early, at the latest with the appearance of an agricultural economy. Of course, this holds only for the solar-and the lunisolar-year, which rests upon the equation of the sun's year and multiples of lunar months. Nevertheless, "natural" time units are an adequate explanation neither for the division of the solar year into other units such as lunar months, nor for other time units, which cannot be correlated with natural phenomena such as the seven day week, the 60 day period of China, and the 260 days of the Tonalpohualli. Several attempts have been made to derive the length of the Tonalpohualli from natural time periods: from the length of pregnancy (length of pregnancy ca. 284 d.p.m., or about 265 to 270 d.p.c.), from the interval between the passage of the sun through the zenith, (critical discussion by Thompson, 1950:98-99); and the like, but none appear convincing. In current research the 260 day ritual calendar is more likely to be explained by the obviously already given length of both rounds permutated (numbers 1-13, 20 day signs). Any precursors or early forms of this peculiar calendar are unrecognizable. Thus, Thompson's statement that the Mesoamerican calendar "burst upon us full grown, like Pallas Athena springing from Zeus' head" (1950:5) still holds. In the archaeologically investigated past a calendar becomes tangible only by being fixed in writing. But since the development of a calendar in the form of the solar year or even the Tonalpohualli did not require a fixing in writing (as demonstrated by ethnographic findings), early phases of the calendar may remain forever unknown. In spite of this, it may be assumed that the mere existence of a calendar facilitated the formation of a writing system and through the latter, the calendar received new stimulation to further develop in complexity.

2.3 One methodological difficulty of this inquiry must still be dealt with. As already mentioned, the scriptural and calendrical material available of

archaeological origin must be interpreted from its own inherent information, since contemporary ethnographic data cannot possibly be available. This means that for the investigation of such writing system, the basic language or at least its equivalent form will be unknown. A reading, without a bilingual, in the case of a purely ideographic system is problematic, but is hopeless or pure guesswork when dealing with a mixed phonetic-ideographic system. (Old World examples show that it is not even easy to determine if one is dealing with a more or less known (which one?) or completely unknown language.) The quite unsatisfactory interpretation "from itself" is often completed or supplemented by conclusions from other better known material. It goes without saying that when no assurance of space/time continuity exists between the two types of material, the door is opened for dangerous misinterpretation.

The same danger exists for the investigation of calendars fixed in writing. Even in a "non-readable" writing system, the mere presence of a calendar permits a relatively easy interpretation as soon as the numeral system is known, and as long as the available numerals do not appear also as quantitative entities of goods and such. However, the exact functioning of the system can only be uncovered after all or almost all of the calendric signs are readable. It would probably be impossible to resolve a totally unknown calendric system only from the number scheme contained by the calendric material. The question remains whether the fact alone that archaeologically recovered calendar signs do not seem to contradict a known calendar system, would allow one to draw conclusions for its resolution when a fully evidenced continuity is lacking. I doubt it, particularly since for the early period of a calendar the existence of parallel similar forms may be assumed, even if only one form finally survived.

The following table provides data for the attempt to explain the origin and existence of the Tonalpohualli and the eighteen month vague year from the occurrence of signs meshed with numerals. It shows how many signs can occur minimally and maximally with which numerical values.

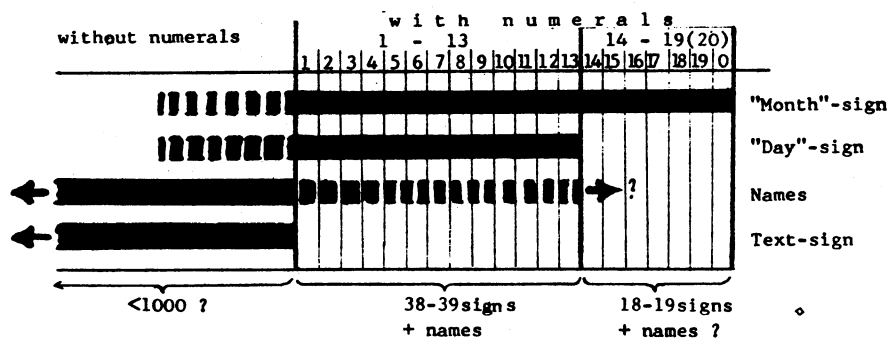


Table I

3. Inventory.

The known Mesoamerican writing of the Pre-Classic may be subdivided into two large groups:

- 1) Monte Alban writing in Oaxaca.
- 2) Intermediate writing systems (between Oaxaca and the Maya region) with two centers: "Olmec" or Isthmian (Southern Veracruz and Chiapa de Corzo Mayoid (Guatemala Highlands and Pacific Slope).

Since the discoveries which can unequivocally be dated as Preclassic are too sparse, it will be necessary to keep a broader frame of time for any work on available calendar and writing systems. However, projecting back any conclusions which are valid for later periods will be avoided when there is no assurance that they may be valid for earlier periods.

3.1. Monte Alban.

According to the chronology of Mesoamerica generally accepted at present, there can be no doubt that the inscriptions found in Monte Alban and assigned to Period 1 are the oldest which have been found in Mesoamerica to date. From this situation, however, it cannot be concluded that the origin of Mesoamerican writing must be found at this locality.

One can clearly classify the monuments with inscriptions of Monte Alban I into two separate groups:

- 1) The stelae, which carry only inscriptions without any pictorial representations. (The signs are arranged in vertical columns and the direction of reading is probably from top to bottom).
- 2) The representations of human figures known as the *danzantes*, which, if at all, present only short inscribed passages.

3.1.1 Sign morphology

(The discussion that follows is based on a very small inventory of 30 signs, of which 26 are different, in addition to the number signs.) The signs are carved from the rock in low relief. They occupy a quadrilateral space, in which the relation of sides varies greatly. A small number of the signs (4) are inserted in cartouches and always stand above number signs. Another part of the signs (12) should be regarded as illustrative or representational. It includes heads of persons or animals (9=30%) and hands engaged in different actions (3). The rest of the signs, almost half of the total inventory, are either not clearly recognizable or must be classified, for the time being, as abstract and inexplicable since no contemporary, explicative, iconographic material is available as an aid to interpretation. The same holds true for the signs enclosed by cartouches, which Caso on

good grounds has designated as day signs. In spite of several attempts by Caso to correlate the latter with the day signs of the Tonalpohualli, he has met little success.

3.1.2 Sign repertory: The numeral signs take the form of horizontal bars and dots, with the dots always above the bars. The numeral signs never occur isolated, but are always beneath the non-numerical signs. A great part of the text signs (7=23%) of the stelae is associated with bar and dot numerals. A peculiarity is the occurrence of bars which are recognizable as fingers through the indication of fingernails. (They appear three times in Monte Alban I and once in Monte Alban II.) The fingers appear only singly or in pairs and never in combination with dots. Differing from Caso, I think it is not certain whether they likewise are to be interpreted as numbers. In the however small corpus of inscriptions, no sign occurs both with bar and dot numerals as well as with the "fingers". These finger signs are limited to Monte Alban I-II, and do not reappear later. The form of the normal bars is simple, without a medial channel and other decoration; the dots likewise are simple disks without decoration. The highest numeral value determined is 18. A vigesimal number system can therefore be suspected. There is no evidence of the writing of higher numbers, as would be found for example in the place-value system.

3.1.3 Text Signs: Even a superficial examination of the non-numerical signs on the stelae of Monte Alban I shows that here we are dealing with a writing system. The placement of the writing signs upon stone slabs placed so as to be easily visible makes it all the more likely that they had a communicative function; it does not matter here whether the message was directed at real persons or transcendental beings. The graphic character of the signs and their standardization which presupposes a code are evident.

Because of the brevity of the texts, repetitions of single signs occur relatively seldom (4 out of 30). This fact would support the assumption of a rather large repertory of signs, of which only a small, though perhaps a very important, portion appears on the preserved stelae. For the complete repertory of signs one may expect many more than the 26 given.

The combination at times of a non-numerical text sign with a numerical sign signifies that it expresses a contents which was consistent in itself and was conceivable in multiplication. From this observation and the admittedly quite vague estimate of the amount of total signs of the system, one may conclude that the individual signs most probably are of an ideographic character and at times express a concrete idea. This excludes the possibility of a complex phonetic writing system, but leaves the possibility of homonymic writing.

Assuming that the text signs linked to numerals have calendric significance, the highest of the numerical values, which exceeds 13 only in indi-

vidual cases and which always remains below 18, allows two kinds of interpretation:

1) The signs combined with numerals express time periods. The numeral signs count these time periods.

2) The numerals and non-numerical signs are members of independent, but established, series, which are permutable with each other. Both signs together name a time period.

In the first instance the number of different signs would be rather small. In the second case the data of Table I would apply. Both interpretations are not mutually exclusive, but could, by all means, exist side by side.

Caso first interpreted all the signs combined with numerals as day signs of the Tonalpohualli (1928). Later, however, he interpreted at least some of them as month signs (1947).

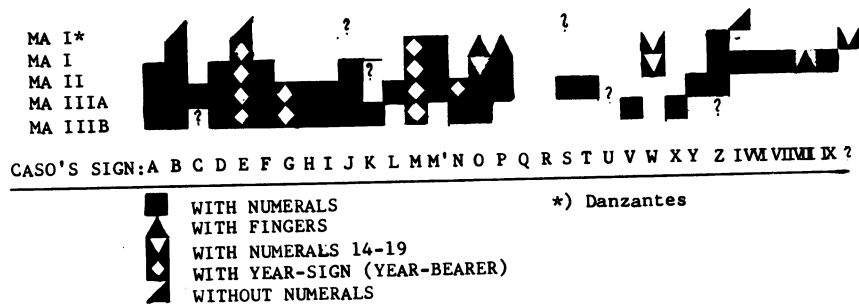


Table II

Table II tabulates with minor corrections of Caso's work, all these signs in relation to the period of their occurrence. Assuming that the universal Meso-american calendar did exist as far back as Monte Alban I, by following the considerations expressed in Table I, it would seem that the few signs which appear with numbers between 14 and 18 could conceivably be month signs. The other signs, which are engaged only with numbers, below 13, could equally well be either day or month signs of a Tonalpohualli. However, the complete inventory of 20 day signs and the necessary 18-19 month signs are not demonstrably present. As mentioned already, the available material is too meager to prove without doubt the presence of the Meso-american calendar.

Furthermore, it is clearly possible that some of the calendric signs are really period signs. In this connection it is to be noted that two of the three signs which appear in Monte Alban I and II with numbers over 13 do not reappear in later phases.

The so-called "glifo del ano" obviously represents a special situation among the signs. It always appears over only two different signs which are linked to numerals. Since the same sign appears fairly surely as the year bearer indicator sign in Monte Alban III, it would not be unlikely that it had a similar meaning in earlier phases, although the combination with only two different "day signs" requires caution in this matter.

Caso studied the signs which are not combined with numerals with little interest. Here there are few striking and recurrent forms; among them is however, one frequent sign which closes the inscriptions.

The form of the danzantes inscriptions is quite different from that on the stelae. The texts consist of only one or a few signs, and no time signs appear. The majority of signs appear only once, with the exception of the form called "tiradera" by Caso. In spite of this, there are undeniable parallels between the corpus on the stelae and the danzantes, which in isolated cases are also immediately apparent in the flow of the script.

While one can speak of the presence of texts on the stelae, although admittedly brief, the danzantes carry only meager information which probably represent personal names. If one wished to draw a parallel from a much later period, one could conclude that the presence of these signs represent abbreviated calendar names, lacking the usual combination with numerals.

Monte Alban II. The inscriptions are found almost exclusively on the numerous stone slabs (lápidas) dressing Montículo J. For many reasons, they are clearly differentiated from the passages of the preceding period. The signs are no longer carved in relief, but rather are formed by incised lines. The lines are somewhat less assured and animated.

The inscriptions are all arranged according to the same scheme. Approximately in the middle of the stone slab stands a sign which dominates the entire inscription; it is interpreted by Caso as "mountain or place," and from it a head hangs upside down. Several signs which have been interpreted as place-names appear atop of the respective "place signs." The interpretation "conquered place" has much in its favor.

The actual text is arranged in perpendicular columns of greatly varying length along both sides of the place-sign. As far as can be determined, it always contains a large number of calendric signs. Two of these, (one with the "year bearer indicator sign") are always situated on a prominent location outside the long text columns, preferably above or below the place-glyph. At the lowest point of the long columns, which need not always be present, however, stands a sign which Caso names "W" and which is one of the signs which can carry numerical values higher than 13. Only in one case is a long column ended instead by the sign "O" with coefficient 18; however, immediately above it appears the "W" sign inverted and with a superfix. On two additional

lápidas which are not available to me either in photographs or drawings, the "W" sign appears inverted, and once also combined with the "O" sign. Also in Monte Alban I, the sign "W" already appears once at the end of a text. This finding inclines me to be skeptical of Caso's interpretation that the signs associated with higher values than 13 (in Monte Alban II there are only two different ones) are month signs (the numerical coefficients indicating the position of a certain day in it), and I would prefer an interpretation as a count of elapsed time periods.

Besides that, there are not recognizable changes between the writing system in the texts of the lápidas versus that of Monte Alban I. Thus, the statements made in connection with the stelae retain their validity.

However, an innovation of Monte Alban II are the signs interpreted by Caso (1947) as toponymics. Correctly Caso states that of the place-name signs of the lápidas some hieroglyphs are:

claramente representativos o pictográficos, pero la mayoría compuestos por muy variados elementos, en apariencia disímbolos, que sugieren la representación de nombres de lugar por un sistema fonético, semejante al que empleaban los aztecas para designar los nombres de las localidades. (1947:135)

Nevertheless, it appears to me that in spite of the manner in which the glyphs are composed, it does not necessarily follow that we are dealing with phonetic writing, since they could just as well be compounded ideograms. Only actual reading will clearly enable us to prove whether a sign was ideographically or phonetically employed. However, some signs are found with varying combination in several toponymics, particularly the "tiradera" and an elongated band, carrying an object. Other signs appear simultaneously in the "place signs" and the texts. Generally speaking the "place-name" signs have a much more vivid appearance than the text signs and already recall in several respects the writing signs of later periods and the Mixtec codices.

I do not dare to present any conjectures as to the content of these texts, of which two-thirds consist of calendric signs, often several appearing directly in sequence. Neither do I have an explanation for the special situation of the texts of Monte Alban II period, which is manifested in their structure and their monotonous repetition as well as in the fact that they are all derived from only a single and quite unusual building.

Between Monte Alban II and IIIA the writing undergoes a distinct shift which is expressed quite clearly both in the style and the flow of the writing signs (loss of clear, elegant forms and neglect of the clearly arranged order of signs), as well as in the inventory of signs. (See Table II). Only a few signs continue directly into the later period. It is remarkable that

in Monte Alban IIIA, and later on, no numeral signs over 13 occur. (Just as with a single exception, the signs which were combined with these higher numerals disappear too). Even the regularly followed arrangement of dots above bars is reversed, the earlier manner of writing appearing only in isolated instances. At the same time, the relative frequency of calendric signs in the inscriptions shows a strong decrease. Thus, one may assume that even the subject matter treated in the texts has changed.

It is too early to draw conclusions from these observations which could still be expanded, but the following appears to be clear: in Monte Alban I, a well-developed writing system appears without any known traces of its preceding forms. Standardization and tightening up of the order and form of the signs are so advanced that one can safely assume that it was a writing system capable of producing at least limited texts. Whether phonetic writing (following the akroponic or homophonous principles) was employed is not discernible. This writing system is adopted without change in Monte Alban II, but evidently enriched with the writing of "place names" and altered in its application. Perhaps the composite "place names" on the *lápidas* of Montículo J, are phonetic writing. The strong emphasis on calendric statements during the first two phases is remarkable.

The writing system of Monte Alban I and II is clearly differentiated from that of Monte Alban IIIA and later periods. As the cause of this break, one could suggest a change of population and even perhaps language.

The calendar of Monte Alban I and II shows, without doubt, connections with that of Monte Alban IIIA and later. Whether they are identical, however, cannot be surely decided. (In this connection, the discontinuation of some signs and of the numerals above 13 are notable. Only two different signs appear in Monte Alban I and II with the "year-bearer indicator sign"). Possibly, the calendar which belonged to the writing system of Monte Alban I and II may have deviated as much as the writing did from the forms it took in later periods.

3.2. Intermediate writing systems:

The rather few texts which have been found and which I have designated as Intermediate writing systems are disseminated over an extensive area. However, strong internal similarities justify their inclusion in a single general configuration. The most striking characteristic of this Intermediate group is the presence of the Long Count. All these inscriptions have in common the employment of bar and dot numerals (dots positioned above), without period signs and arranged in columns. In the case of the Long Count dates of the "Olmec" group, specifically Stela C of Tres Zapotes, the Tuxtla Statuette and Stela 2 of Chiapa de Corzo, the day sign appears beneath the number series and with its coefficient prefixed vertically. In contrast, in the date from El Baúl,

which is to be placed in the Mayoid group, the day sign appears above the number column. The coefficient, also diverging is given in a horizontal position (the date of Abaj Takalik 2 = San Isidro Piedra Parada is too badly destroyed for a corresponding observation on it). All dates, excepting the Tuxtla Statuette, are incompletely preserved and must be reconstructed. In the case of the dates of Chiapas de Corzo and El Baúl, the day sign can be checked with the aid of the final position in the Long Count dates; in the case of the Tuxtla Statuette, the day sign coefficient can be checked. The same is true in the case of Tres Zapotes Stela C, if one reconstructs the first position of the Long Count date with "7". The unbroken Tonalpohualli-Long Count linkage is thereby demonstrated. Employing the zero point of the Maya Era and the Thompson correlation, the dates lie between 34 B.C. (Chiapa de Corzo) and A.D. 37 (El Baúl). The Tuxtla Statuette is about 125 years later.

Nowadays, there is agreement that these Long Count dates are contemporaneous. Much evidence seems to support an unbroken counting of the Long Count, particularly its inner structure. It may be pointed out here that the Long Count survived in later periods not only in the Mayan area (earliest date: Tikal Stela 29:A.D. 292), but also in the Intermediate area (Cerro de las Mesas, earliest date A.D. 467), in almost the same manner of writing and only with a change in the arrangement of the day sign coefficient.

Stela 10 of Kaminaljuyu, which does not show any Long Count information on the preserved parts, nevertheless carries calendric dates of the Tonalpohualli type.

With respect to the writing systems of the Intermediate area, only a few texts are adequately well-preserved: Stela 10 of Kaminaljuyu, a pottery fragment from Chiapa de Corzo and the rather quite late Tuxtla Statuette. Other inscriptions with textual passages such as Kaminaljuyu Alta I (Esperanza?), El Baúl Stela I, are too badly destroyed, or carry only a few unclear signs (La Venta Monument 13) to allow thorough study.

Given the scarcity of material, only a few statements can be made: the character of the writing system is without doubt; the inscriptions are not used as illustrations for a narrative pictography - thus are to be understood the numerous elaborate representations in bas-relief - but look completely independent. As far as can be discerned, the texts exhibit the external characteristics of Maya inscriptions: block-shaped signs as much as possible of equal size (relation of sides to each other 1:1 up to $1:\sqrt{2}$, but not so in the case of the Tuxtla Statuette); signs incised in shallow lines, sometimes on raised blocks or panels; arrangement of the signs in vertical columns, two or more side by side; direction of reading from top to bottom (in the case of Kaminaljuyu Stela 10 and the Tuxtla Statuette surely not in horizontal pairs as in Maya writing).

The two writing centers mentioned above have to be treated separately in a discussion of the repertory of signs. Mayoid (Stela 10 of Kaminaljuyu)* abstract forms are in the majority; only a few head forms are recognizable; other representational signs are, as far as discernible, completely lacking. The flow of the script and even individual signs strongly recall signs in Maya writing, without always being able to find exact correspondences. A major difference from Maya writing is that only a few isolated affixes below the main signs can be recognized. Affixes before or after the main signs do not appear. Only isolated numeral signs appear dispersed in the text, and as a consequence it could hardly be of calendric content. A key to further delimiting of the contents of the inscription may lie in the elaborated pictorial representations of the monument, which have, however, suffered some degree of destruction, just as the textual parts. "Olmec" (potsherd fragment from Chiapa de Corzo, Tuxtla Statuette; Monument 13 from La Venta, which carries three or four glyph-like elements is best left out of this consideration.) The abstraction is stronger, and the lines run into much simpler forms than Mayoid or Maya signs. On the small fragment from Chiapa de Corzo no head forms and only one hand are recognizable. However, the 49 text blocks on the Tuxtla Statuette contain at least eight, frequently very elaborate, head forms, but still only one hand form. Three signs appear twice, and two appear three and five times respectively, although in some instances with varying affixes. Only once a clause of two signs is distinguishable. At least nine different affixes (above or below the main signs) which up to six times each are found on the Tuxtla Statuette. On the Chiapa de Corzo fragment, one affix appears twice. Many signs remotely recall Maya writing forms, and interestingly, some affixes, especially. Little can be said about the content of either text except that they are not likely to be calendric.

It is remarkable that the day sign on the Chiapa de Corzo Stela appears in an unusual form for this area. It is almost exactly the known form from Xochicalco of the day sign "acatl", equivalent to the Maya "ben". This reading, as was indicated, is confirmed by the last position in the Long Count date.

It is quite likely that the structure found in the Intermediate writing systems may have enabled them to reproduce quite accurately verbal tests. However, one can say little more, given the scarcity of available material.

3.3. Teotihuacan

At the moment one cannot say with certainty at what time in Teotihuacan those graphic forms which often are called "hieroglyphs" appeared. It is obvious that the form of these graphic elements, which are highly formalized and are

* And a recently discovered monument from Chalchuapa [El Salvador] which is badly eroded [Sharer 1969].

inscribed in cartouche-like frames, suggests their designation as "hieroglyphic writing" (Coe 1962:114-115; more cautious Krickeberg 1956:406-407; Kubler 1962: 37; Graham 1964:245). But it has to be stated that in Teotihuacan there never occurred any configuration of these "signs"; they appear isolated as decoration of pottery and on murals. They lack any iconographic context and, moreover, they act as well integrated elements of an abstract decoration. The number of essentially different signs is very limited; as a clear distinction between them and purely decorative patterns has yet to be established, the corpus may only be estimated as containing slightly more than 10. Most common and therefore best studied is the "sign" which was called by Beyer (1921:63) "ojo de reptil". The thorough investigation by von Winning (1961:63) is based on 198 occurrences of this sign, but a lot of them do not stem from Teotihuacan. The various efforts made to detect the meaning of the "ojo de reptil" obtained different results and met with little lasting success. According to Seler (GA II:39, only Xochicalco) it represents the day "rain"; some years later (GA V:481) he explained it as "Geoffnete Blute", open blossom. Caso interpreted it (1928:62) as sign for the day "snake", later (1958-1959, based on evidence from Xochicalco) for the day "wind". Von Winning lists even further explanations (1961:124-125).

Regarding the other signs of Teotihuacan, which occur even more sparsely, the situation is worse, as the forced attempts by Caso (1958-1959) show. Only in some cases were the signs combined with bar and dot numerals. The bars and dots are decorated and in a horizontal position below the respective main sign. The highest numerical value is 12 (only once occurs a combination of two bars and four dots which Caso explains tentatively as denoting the two numbers 4 and 10 (1958-1959:52). This is the only evidence that could suggest the existence of a Tonalpohualli-like calendar system. It is obvious, however, that this is insufficient to provide an affirmative answer to Caso's question "Tenian los Teotihuacanos conocimiento del Tonalpohualli?" (1937) until the 20 days signs that are essential for the Tonalpohualli have been proved for Teotihuacan.

The famous Mixtec "year bearer indicator sign" occurs also in Teotihuacan, but I doubt that it had the same specific calendric meaning, for there is no evidence of four different (day) signs associated with it. Moreover the "year bearer indicator sign" occurs even without a numbered sign below it having purely decorative functions (Palacio de Quetzalmariposa), as in many other places of the Central Highland and even as far as at Chichen Itza.

Summing up, it can be stated that in Teotihuacan existed:

- 1) Bar and dot numerals up to the number 12,
- 2) Glyphlike forms which may have had a more or less conventionally accepted interpretation.

It should be noted, however, that it cannot be excluded that there was involved a process analogous to the well known adoption of foreign characters as near

decorative elements void of meaning (Maya hieroglyphs on Ulua polychrome). Up to the moment there exists no evidence for further achievements in writing at Teotihuacan.

3.4. Questionable Examples:

I define as questionable the following types of examples:

1) Short sequences (not more than five signs) of certain writing signs found on small and easily movable objects, whose origin and dating has not been ascertained.

2) Short sequences of signs (not more than five) which are commonly described as "glyph-like", but which have not been demonstrated as members of any known writing system.

Examples of these are:

Ad 1) Jade plaque provenance unknown (Kelemen 1956, pl. 246a) with two glyphs, which according to Kelley (1966:745) resemble those of the Tuxtla Statuette. Analysis of this material is hindered by the diminutive inventory and the uncertain date and provenance.

Ad 2) Such divergent pieces as: the two cylinder seals from Tlatilco (Kelley 1966: fig. 1, 744; Franco 1959:fig. 1C) and the one from Chiapa de Corzo (Kelley 1966: fig. 2d,745). The seals include both completely abstract forms and recognizable facial representations. The great variation encountered and already observed by Kelley (1966:745), forces me to exercise great skepticism in assigning any of these signs to a writing system.

The incised graphic forms encountered on various celts* do not give the impression of a standardized writing system, but rather a self-sufficiency of form which derives from narrative picture writing. Of course, it remains possible that in this way they were carriers of some message, even if only in a limited sense. One should not exclude the possibility that such signs were part of a repertory of abbreviated graphic forms, which had freed themselves from narrative representations and were flowing toward a writing system. However, the lack of dating and knowledge of the provenance of these celts forbids any further speculation in this direction.

4. Summary:

In view of the great scarcity of written material available for the Pre-classic outside of Oaxaca, it remains very daring to search for origin and dispersal routes, and since I am aware that all which I can say here may easily become obsolete through a single new find, I have no choice but to restrain myself in coming to any conclusions that may easily turn out to be premature.

* mostly of jade, ascribed to "Olmec" origin.

The earliest writing material found comes without exception from Oaxaca. We do not know its earlier forms or precursors. At its first appearance, the writing system is already well-developed and has reached a high degree of perfection (compared to the accomplishments ever reached in Mesoamerica in this particular field). In spite of the little that we do know about the writing system in the first two phases of Monte Alban, there can be no doubt that, in its original form and accomplishment as we know it, it was never surpassed and even reached again in Oaxaca and its northern bordering regions (including metropolises as Teotihuacan). Only at one other site, at Xochicalco, can the inscriptions be considered as again reaching a culminating point (even if a more modest one) in the Mesoamerican development of writing systems north of the Isthmus.

A similar statement holds for the writing systems classified as Intermediate. It is true that the Long Count and the "Olmec" writing survived into the early Classic at Cerro de las Mesas and even at Kaminaljuyu where objects dating from the Esperanza phase carry hieroglyphs which are probably not to be considered Classic Maya writing. But not much later, even these areas sink down to the general writing level of non-Maya populations (one may only recall the Late Classic stelae of Cerro de las Mesas, the not easily classifiable monuments of Piedra Labrada and Tonalá, and lastly the inscriptions of Santa Lucía Cozumalhuapa). The real successor of the Intermediate writing systems, in spite of the fact that the areas in which both appear, as far as we know, do not overlap even at their borders, is Maya writing, which is the only example from preColumbian America in which the decisive step from an imperfect notation system (partial writing system) was successfully taken toward a true writing system.

As far as conclusions may be drawn from the formation and dating of Mesoamerican writing finds, the development of a functional writing system and perhaps even of a Mesoamerican calendar, probably took place in the triangle (probably still too narrow) formed by Monte Alban, Tres Zapotes and Kaminaljuyu. (The longest side of this triangle of 44,000 km² surface is longer than the maximum distance between sites having Maya hieroglyphs.) Both writing systems (Monte Alban and Intermediate) seem to have had a common original base, but separated continuation in their development. Without really knowing where the originating site should be located, I am nevertheless inclined to consider the area of "Olmec" style, since I can see in the rich content of its relief representations almost a form of narrative pictography.

I see no reason why such a development of a writing system could not have rested solely on an autochthonous Indian basis and for the need cited by many authors to look upon trans-pacific contacts to explain even this aspect of Mesoamerican civilization. For example, Robert Heine-Geldern has repeatedly seen the root of Mesoamerican writing in China, (e.g. 1968:8) without really ever being able to present any kind of evidence for his supposition (see the rebuttal by Phillips 1966:311).

As far as the calendar is concerned, I like to think of it as having a similar geographical area of development as the writing systems. However, I cannot add anything new to the extensive reflections presented by Thompson on this subject (1950:97-99). Neither do I see any need to explain the origin of the Mesoamerican calendar by bringing in the subject of trans-pacific contacts. The complicated attempts made by Graebner (1921:6-37) and his follower, Kirchhoff (1964, I:73-100) to show derivations from the Chinese list of 28 lunar mansions and its corresponding animals for a shorter, 12 day Tonalpohualli, represented by its own corresponding 12 animal day-signs are too forced and sought after to be convincing. I see no reason why such searches for origin should be made, since it is clear that the American aborigines were perfectly capable of developing early forms of writing systems - there is no doubt that this occurred in pre-Columbia North America - and of calendric inventions as the place-value system and the Long Count, for which there are no contemporaneous parallels in the Old World.

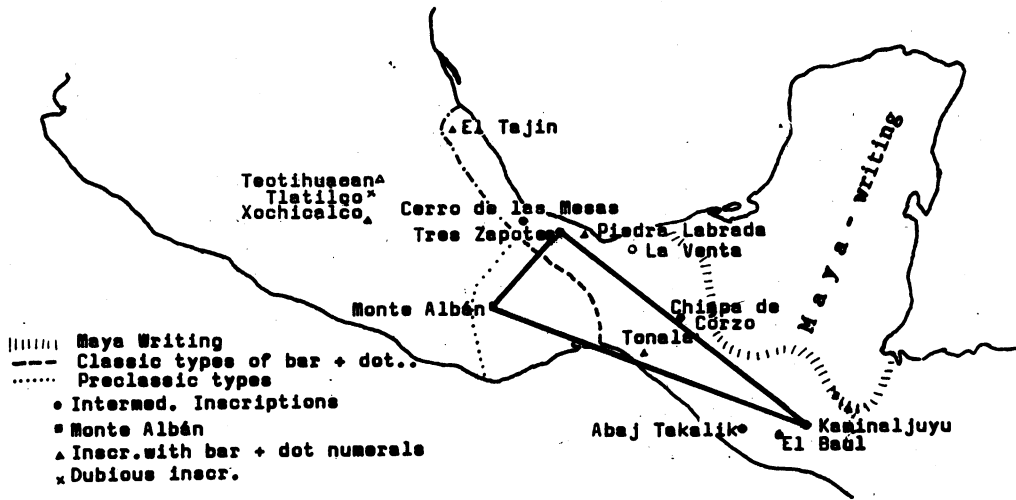
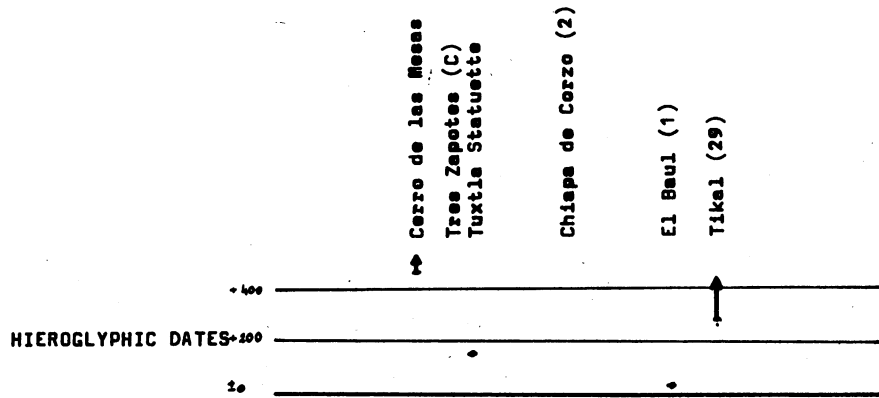
Due to the scarcity of material available, it was not possible to even give partially satisfactory answers on the questions raised concerning origin and dispersal routes of Mesoamerican calendar and writing systems. The purpose is rather to present the picture of frank disconcert in which the research on early Mesoamerican inscriptions and writing systems finds itself, and direct an urgent plea to archaeologists, to search for written material and make any such finds immediately available through publication. It is a sad state of things, when the already scarce material is even more decimated by restricting its availability for scientific research.

5. The role of calendar and writing in emerging civilizations can be considered in a mechanical way as a vague interaction. It is clear that in early civilizations there accumulated an amount of cultural data to be stored or transmitted. Parallel to the increase in these data, the necessity arose to have at hand suitable devices to handle them. The first step in doing so had to be to put these data into a certain order, i.e. to facilitate the processing.

This is the very point where codified calendrical systems and writing originated. The goal of every calendar is to note, order and store chronological data and make them accessible for record-keeping as well as prognostical purposes.

All data, calendrical as well as other ones, that were too ample to be kept in mind had to be set down by "writing". This required as a fundamental step to cut up the stream of information into manageable units. The order to be established here is a code that is suitable for non-verbal communication.

I feel that both the experience of putting into order and the opportunity to have something set down, animated and enabled civilizations to further development.



Added Remarks by H. Prem

During the discussion there were mentioned further archaeological pieces that are not listed in the paper as they cannot be dated unequivocally pre-Classic times (the earspool flares from Pomona and Chichen Itza cenote), or are too badly eroded to be treated successfully (Alvarado stela).

With regard to the glyph-like signs at Teotihuacan two different opinions were expressed: the first one agreed with the corresponding part of the preceding paper. The second opinion accepted the signs as sufficient evidence for the existence of a writing system. Though there are stelae and sequences of signs, it was argued that writing in Teotihuacan might have been performed in the form of codices on perishable material of which no vestiges have been preserved. At present these views are incompatible; further research must determine which is correct. With respect to the calendar, the participants agreed that the origins of writing were probably closely related to the calendar, which seems to have developed first. Divination was mentioned by others as a motivation for the development of a calendric system.

Following a proposal in the distributed version of the paper, the participants agreed on the necessity of a general and thorough collection of all the dispersed data pertaining to writing in Mesoamerica outside the Classic Maya area.

Bibliography

Barthel, Thomas S.

1968 Writing systems. In Current Trends in Linguistics. The Hague.

Beyer, Hermann

1921 Nota bibliografica y critica sobre el quinto tomo de las memorias cientificas de Seler. Memorias y Revista de la Sociedad Cientifica "Antonio Alzate",40:1. Mexico.

Caso, Alfonso

1928 Las Estelas Zapotecas. Mexico.

1937 ¿Tenian los Teotihuacanos conocimiento del Tonalpohualli? El México Antiguo 4. Mexico.

1947 Calendario y escritura de la antiguas culturas de Monte Albán. In Obras completas de Miguel Othón de Mendizábal, Vol. 1. Mexico.

1958-1959 Glifos Teotihuacanos. Revista Mexicana de Estudios Antropológicos 15. Mexico.

Coe, Michael D.

1962 Mexico. London

- Diringer, David
1968 The Alphabet. London.
- Franco, C., José Luis
1959 La escritura y los codices. In Cook De Leonard, Carmen, Ed.,
Esplendor del Mexico Antiguo, Vol. 1. Mexico.
- Gelb, Ignace J.
1952 A Study of Writing. Chicago.
- Graebner, Fritz
1921 Alt- und neuweltliche kalender. Zeitschrift für Ethnologie 52/53.
Berlin.
- Graham, John A.
1964 Sobre la escritura Maya. In Desarrollo Cultural de los Mayas. Mexico.
- Heine Geldern, Robert von
1968 Transoceanische kultureinflüsse. Zeitschrift für Ethnologie 93.
Braunschweig.
- Kelemen, Pal
1956 Medieval American Art. New York.
- Kelley, David H.
1966 A cylinder seal from Tlatilco. Amer. Antiquity 31,5. Salt Lake.
- Kirchhoff, Paul
1964 The diffusion of a great religious system from India to Mexico.
XXXV Congreso Internacional de Americanistas, Vol. I. Mexico.
- Krickeberg, Walter
1956 Altmexikanische Kulturen. Berlin.
- Kubler, George
1962 Art and Architecture of Ancient America. Harmondsworth.
- Phillips, Philip
1966 The role of transpacific contacts in the development of New-
World Pre-Columbia civilizations. In Wauchope, Robert, Ed.,
Handbook of Middle American Indians, Vol. IV. Austin.
- Prem, Hanns J.
1967 Die Namenshieroglyphen der Matricula von Huexotzinco. Hamburg.
- Seler, Eduard
1902-1923 (GA) Gesammelte Abhandlungen zur Amerikanischen Sprach- und
Alterthumskunde. 5 vols. Berlin.

Sharer, Robert J.

1969 Chalchuapa - investigations at a highland Maya ceremonial center.
Expedition 11.2. Philadelphia.

Thompson, John Eric S.

1950 Maya Hieroglyphic Writing. Washington.

Von Winning, Hasso

1961 Teotihuacan symbols: the reptile's eye glyph. Ethnos 26.3.
Stockholm.

X. COMMENTARY ON: CALENDRICS AND WRITING

John A. Graham

Hanns Prem in "Calendrics and Writing" has considered the phenomenon of writing and its characterization in theoretical terms. I am in thorough agreement with his excellent exposition, and I will not attempt to expand upon his treatment and the new insights he has given us of early writing and calendrics in Mesoamerica. Rather, I shall briefly review some of the evidence for early writing and calendrics, mainly indicating again my agreement and acceptance of his conclusions, and merely commenting upon certain aspects of the problems that have been of interest to me in my research. I will then conclude with remarks on origins and consequences.

Central Mexico. We are agreed that as yet there are no certain examples of writing from the PreClassic of Central Mexico which are acceptable to all students. I share Dr. Prem's great skepticism with respect to the Tlatilco cylinder seals published by Kelley (1966) and Franco (1959) and which, in one case at least, they both accept as writing. The markings of the two seals are radically divergent; and if they were writing, they would have to be assigned to two different, and presumably co-existing, scripts. The seal with lineal markings bears no resemblance, as Kelley notes, to any known Mesoamerican script and would probably, as Kelley suggests, represent the most advanced script ever developed in the New World. Although not commented upon by Kelley, the markings of this seal closely resemble various Oriental scripts ranging from Burma and China to the rim of the Mediterranean. If the signs of this seal were writing, and the seal were accepted as authentic, we would almost surely be dealing with an instance of Trans-Pacific contact during the PreClassic.

The other Tlatilco seal bears good Mesoamerican designs, but the impression is one of decorative function, and there is no proof of writing. A more satisfactory case therefore must be presented before the notion of writing can be accepted.

Most of our excavations into the Central Mexican PreClassic have not been conducted in localities where the retrieval of specimens of writings would be likely. Possibly if we had more extensive excavations at Cuicuilco we would be more likely to have uncovered traces of early writing. Nevertheless, the quite extensive excavations at Teotihuacan suggest that the apparent absence of advanced hieroglyphic writing earlier is in fact a genuine absence. The various examples cited by Caso and others of writing at Teotihuacan are not convincing as to the existence of an advanced hieroglyphic system at that great

metropolis. Although the possibilities are to be considered, I cannot regard the explanations advanced, such as the "avoidance of public display of writing," as entirely satisfactory solutions to this problem. Rather, I think the answer is to be found in Kubler's view that the mural art likely served a purpose or function performed by narrative picture-writing elsewhere. I would suppose that this provided a portion of the intellectual heritage of Central Mexican Post Classic writing although much of its repertory of signs is to be derived from elsewhere.

If we knew more about Quicuilco, I would not be surprised by the presence of the 260-day sacred round, the 365-day vague year, and an early narrative picture-writing of very simple design.

Oaxaca. Passing on to Oaxaca, there is nothing I would add to Prem's excellent and careful analysis. The idea of a Oaxacan origin for the Mesoamerican calendar goes back to Seler. I would agree with Prem, however, that this seems unlikely despite the fact that the inscriptions of Monte Alban I may indeed represent the earliest examples of writing now uncovered in Mesoamerica.

Southern Mesoamerica. South of Monte Alban our PreClassic examples of writing do not occur in quantity at any single site and are therefore rather more difficult to deal with. Prem makes a very useful suggestion to catalogue these examples under the heading of Intermediate and some such neutral terminology is very desirable. I would suggest that it would also be useful to select neutral terms for the sub-categories under the Intermediate designation, namely "Olmec" and Mayoid. Prem indicates the questionable nature of the "Olmec" category and I think an alternative non-ethnic term would best serve our purposes. The term Olmec has been so divergently used in the past that we are only now coming to a better order in this matter with efforts as those of Bernal with his ideas of Metropolitan Olmec, Colonial Olmec, and Olmecoid. Possibly the term "Early Isthmian" might be considered as an alternative to "Olmec" to describe these writings.

The presence of a developed writing at PreClassic Chiapa de Corzo is quite well demonstrated in the discovery, in PreClassic mound fill, of a stela fragment with bar/dot number series and a potsherd bearing several rows of glyphs of a longer text arranged in at least two columns. The mound fill of Late PreClassic age (so assigned on the basis of the pottery present) allows the possibility of a Cycle 7 reading for the number series of the stela yielding a date of 34 B.C. in the GMT correlation. Although other stela fragments are known from Chiapa de Corzo, their carvings do not seem to represent writing.

The bar/dot number series of the Chiapa de Corzo stela provides one link with Southern Veracruz in the form of the Tuxtla Statuette and Stela C of Tres Zapotes. I believe it is safe to accept these pieces as of Late Pre-

Classic age although the question of their interpretation as Initial Series of Maya style and as contemporaneous dates in the Long Count still is not proved. Bar and dot number series, seemingly of Maya style, occur later at Cerro de las Mesas, and I believe both of these inscriptions should be regarded as of that tradition rather than Olmec. Other bar/dot notations, as the bed rock inscriptions at Tres Zapotes and the supposed tenth cycle notation on the Tuxtla cylinder seal, are more problematic, but are unlikely to be of greater age. The Tuxtla Statuette and Tres Zapotes texts occur long after classic Olmec times and are, I believe, surely indicative of alien cultural intrusion into the Veracruz region from the southeast. Squier, in his unpublished study of the Tres Zapotes sequence, discusses the very mixed nature of the cultural complex there from quite early in the history of the site.

Although the Olmec must surely have possessed calendrical knowledge, and I think probably of a relatively sophisticated sort, enough sculptures have been found to show that the carving of dates in the style of Maya stela inscriptions was not practiced in Olmec culture. Only on the unusual Monument 13 of La Venta are there three or four eroded reliefs which can be regarded as glyphs but interpretation of these is difficult. I would accept Monument 13 as indicating the presence of at least limited notations by the end of the La Venta period, if not earlier considering the excavational evidence for the repositioning of Monument 13. But more evidence is needed.

Of course various portable objects in Olmec or Olmecoid style bear various types of incised designs with repetitive motifs and symbols; here again, however, I must agree with Prem that these do not give the impression of a standardized writing system but rather are more derivative from narrative picture-writing.

Bar/dot number series and associated glyphs also derive from the Pre-Classic of the Pacific slope of Guatemala, and continuing into Salvador they form a northwest to southeast axis with the Southern Veracruz examples in the northwest and Chiapa de Corzo near the center of the axis. As I have indicated in an earlier paper, I think the origins of this bar/dot number series are nearer the southern end of the axis than the northern; but until more discoveries are made others will prefer alternative interpretations. The associated glyphs of the Pacific slope monuments are too badly eroded to do much with, but at Kaminaljuyu in the highlands there are probably several excavated monuments with inscriptions attributable with certainty to the Late PreClassic. Unfortunately, only on the so-called Stela 10 fragment is there a long series of glyphs recognizable, but again this text is badly damaged. A quite sophisticated writing system is evidenced, and Prem has commented upon this. Similarly, the recent discovery at Chalchuapa of a Late PreClassic monument with apparently a lengthy text supports the notion of a southeastern origin for advanced hieroglyphic writing rather than to the northwest as many commentators have preferred.

Turning now to the Maya lowlands, I would note that it is usually observed that there is little or no evidence of PreClassic stelae or writing. Nevertheless, these are important bits of evidence which strongly point to the existence of stelae as well as a sophisticated system of writing by Late PreClassic times. The inauguration of a Classic pattern of stela cum altar and bearing cyclical-ending dedications was probably a major factor in the destruction of PreClassic Peten stelae while the intensive and extensive activities of six centuries of succeeding Classic Maya civilization further obscure the traces of PreClassic monument practices, which like the Classic pattern was also probably a stela cum altar complex.

I think a case can probably be made that the most significant example of PreClassic Lowland Maya writing now known to us is preserved on the great jade flare excavated from Tomb 2 at Pomona in British Honduras. Although the tomb has been attributed to the Early Classic, there can be no reason to doubt the greater antiquity of the flare, which, as one of the largest jade flares ever discovered, in itself would declare its probable heirloom status. The incised hieroglyphic text, however, is pretty clearly of Late PreClassic age. Although a portable object, the character of the script is clearly very early Lowland Maya with ties to the Leyden Plate locally, and hence the Tikal vicinity, and, less intimately, to the Kaminaljuyu Stela 10 writing further afield and which it may only slightly antedate. The placement of numerical coefficients below the associated glyphs indicates this practice more abundantly seen in the early writing of Monte Alban was probably the original pattern and one which probably antedated the invention of Initial Series notation in Long Count chronology.

Other examples of PreClassic Lowland Maya writing are also found on several portable jades -- such as the pectoral very fully described by Coe (1966)-- but many of these pieces are without provenience and so do not constitute as firm a foundation for interpretation, in my opinion, as does the Pomona flare. If authentic, the great simplicity or primitiveness of their scripts can be attributed either to temporal or spatial distance from the scribes of the Pomona flare.

Origins. If the reliefs of Monument 13 at La Venta are to be considered at least as old as the end of the La Venta period, or about 600 B.C., a not implausible interpretation accepting the antiquity of Monte Alban I writing, I think it is reasonable to suggest the probability of early glyphic notation in the form of simple narrative picture-writing even earlier in Olmec civilization. Whether this means an Olmec invention of earliest narrative notation is not certain, but certainly this is a good interim hypothesis.

Advanced hieroglyphic writing I think more likely occurred first among the early Maya, but I would not insist upon this view in terms of present hard evidence available.

Long Count chronology, reflecting the most sophisticated approach to time reckoning in ancient Mesoamerica, was probably a later development and likely was part of the context of the sophisticated writing systems evidenced by Kaminaljuyu Stela 10, the Pomona flare, and perhaps the Chalchuapa stela. Whether this occurred as late as 8.6.1.9.0 4 Ahau 8 Cumku (AD 160), hypothesized by Satterthwaite (1959) as the inaugural date of the Long Count, I am not certain, although I do think the Satterthwaite epoch is the best that can be determined using the arithmetic approach. Furthermore, the fact that this date is very close to certain early dates of the Dresden Codex, which I would follow Thompson in regarding as probably actually historical, makes the Satterthwaite hypothesis attractive. The Satterthwaite hypothesis is not invalidated by regarding the Cycle 7 dates of Tres Zapotes, Chiapa de Corzo, and elsewhere as Initial Series notations, but would require that they be non-dedicatory or non-contemporaneous as of carving. The archaeological context of these monuments is not sufficiently constraining as to deny such an interpretation. The astonishing number of numerical classifiers now known for Maya dialects possibly suggests the intellectual context for the creation of Long Count chronology.

Implications of early writing and calendars. Although a frequent hallmark of civilization, the absence of writing in ancient Peru clearly demonstrates that it is not an essential ingredient, and indeed that it is not even necessary for the existence of elaborate administrative bureaucracies. This fact is also dramatically shown in the confines of Mesoamerica itself where sophisticated writing systems and numerical notations co-existed with much more primitive devices. Efficiency, however, was a concept seldom appreciated in the ancient Mesoamerican world where methods and means were judged by other scales of values (Cf. bar/dot notation side by side with simple additive numerical notations).

Nevertheless, if the non-essential nature of writing is recognized this does not mean that in the case of Mesoamerican cultural development it did not play an important role. Profound intellectual development may not result in much without food surplus, but in the emergence of civilization I would think they play a far more important role; food surplus producing economies are far more common and feasible than civilizations seem to be. We should look to the realm of intellectual developments, which is more difficult to identify and meaningfully comprehend than are matters of trade networks and similar economic or technological features which often are regarded as causal or primary factors. The intellectual capabilities of many human societies are not reflected in the material expressions of their cultures. The exact moments of the emergence of civilization will predate the material symbolism of mythic justification, and it may be that the intellectual resources necessary to spiritually sustain a civilization precede at times the development of economic surpluses to feed an expanding population, to sustain great commerce, and similar economic or technological developments.

I do not know what the great ideas were that produced Mesoamerican civilization in the first instance, and I doubt that these ideas will ever be expounded on more than a simplistic and hazy basis by modern archaeologists. But even simplistic exposition will be closer to the heart of the emergence of civilization than will be complete and detailed understandings, which are of course very desirable, of economic capabilities and practices.

In the realm of cosmogony, religion, and world-view are most likely to be found the great ideas of Mesoamerican civilization; and while I do not propose the identification of any of these, writing and the calendar would provide one of the means, possibly not the most important, in the spiritual conversion of the participants. Narrative art, probably later to originate writing, was surely a principal means.

The art of divination is basic to Mesoamerican civilization and is a very pervasive aspect of it. There is little doubt of its extreme antiquity which must reach back to the very emergence of Mesoamerican civilization. The faculty to predict certain types of events is always wonderful to the uninitiated who thereby easily become the devotee. Astrology was one form of Mesoamerican divination, and celestial prognostication is certainly one of the most impressive feats that can be performed by specialists in the primitive world.

The extent to which peoples with no spectacular material culture but developed interests in celestial phenomena are capable of observing and defining pragmatically certain patterns of celestial behavior is frequently not appreciated. Students of Maya astronomy have generally supposed that the formula of the Dresden eclipse table was in use during Classic Maya times, and the table in fact uses a Classic age era. Satterthwaite's studies of moon age deviations and lunation-zero shifts have led to the implication of successful solar eclipse prediction during the PreClassic (Satterthwaite 1948, 1951). The fear of the cataclysmic consequences of lunar and solar eclipse was universal in Mesoamerica; and the early appreciation by specialists that solar eclipse dangers occur only about a dozen easily definable times during the year would have been valuable information. Combined with a few successful eclipse predictions by early formulae, the ability must have been formidable.

The cyclical organization of events which structured Mesoamerican thought is the intellectual handmaiden of Mesoamerican divination; and it provides an ideal orientation and background to successful manipulation of celestial phenomena. Maya calendrical calculations are often difficult and perplexing to modern students, but I am confident that matters involving the manipulation of hundreds of thousands of units were not such complex problems to ancient Maya mentality and the specialists who worked in these arcane spheres. That calculations which by our lay standards are deemed complex were restricted to Late Classic and PostClassic Maya civilization is I believe extremely unlikely.

I also strongly endorse Heizer's theme of the role of the shaman or early priest in weather control activities and its relation to agriculture and its importance to the tropical farmer. I also insist that almost any kind of simple calendar and record keeping devices combined with approximate knowledge of the length of the tropical year (very easily ascertained) would have provided adequate tools to early practitioners of weather predicting. Parenthetically, I would further note that it does not matter whether the magician or sacred doctor was in the service of secular lords or fellow members of the confraternity of theological princes. Nor in this respect does it matter what was the content of the sacred charter of great ideas that he served, although his activities detected would provide a clue to simplistic decipherment of a portion of the contents of that charter.

Although I have not chosen to discuss the value and use of writing and calendrics in other spheres where the growth or crystallization of civilization would be stimulated, I do not mean to limit it to the role in the transmission and service of the great ideas which are the germ of civilization.

And here, in conclusion, it is appropriate to also remark upon the medium of writing as well as its burden. Just as in his very significant paper of fifteen years ago in which Willey identified the crucial importance of ideology in the first crystallization of Nuclear American civilization, he also touched upon the significance of the medium when he saw in the wide distribution of Olmec and Chavin styles the factor of ideology. Thus, it is not only the development of the great ideas that is essential to the emergence of civilization, but a successful medium is also required. The medium need not necessarily serve to accurately transmit the content of the ideas, and whose details are immaterial, but certainly the medium must be sufficiently communicative on an emotional level to provoke an appropriate response. Fervor may in effect become synonymous with intellectual comprehension and therefore of corresponding significance in the emergence of civilization.

Writing, numeration, calendrics all have their emotion evocative dimensions. Writing, in its earliest stages, is closest to the expressive emotion conveying qualities of the art styles of the culture. Some modern writing systems preserve this dimension to a high degree, such as Chinese calligraphy. And Maya and other early Mesoamerican writings are other examples.

Bibliography

- Coe, M. D.
 1966 An early stone pectoral from southeastern Mexico. *Studies in Pre-Columbian Art and Archaeology*, No. 1. Dumbarton Oaks.
- Franco, J. L.
 1959 *La escritura y los codices. Esplendor del Mexico Antiguo*, Vol. 1. Mexico.
- Kelley, D. H.
 1966 A cylinder seal from Tlatilco. *American Antiquity*, Vol. 31, 5.
- Kidder, A. V. and G. F. Ekholm
 1951 Some archaeological specimens from Pomona, British Honduras. *Carnegie Institution of Washington, Notes on Middle American Archaeology and Ethnology*, No. 102.
- Satterthwaite, L.
 1948 Further implications of Thompson's readings of Maya inscriptions at Copan. *28th International Congress of Americanists*, pp. 467-493. Paris.
- 1951 Moon ages of the Maya inscriptions; the problem of their seven-day range of deviation from calculated mean ages. *29th International Congress of Americanists (Tax: The Civilizations of Ancient America)*, Vol. 1, pp. 142-154.
- 1959 Maya long count. *El Mexico Antiguo*, Vol. 9.

XI. EARLY ARCHITECTURE AND SCULPTURE IN MESOAMERICA

Tatiana Proskouriakoff

However one defines "civilization", in actual practice there is often no choice but to recognize it by the monumentality of its remains. Massive constructions indicate a technology and an organization that could concentrate human energies and talents on pursuits other than subsistence activities. More significantly, they testify to a concern with permanence: an awareness of the past and a purposeful regard for the future beyond the immediate interests of the living. To regard culture as a response to economic needs, is to ignore the fact that cultural activities always outrun the exigencies of existence, and form a pool of intellectual resources, which can be drawn upon when occasions arise. The Mesoamerican ceremonial center, in addition to being a focus of social and political organization, promoted the development of arts and sciences, which, in their early stages, were dedicated largely to ritual purposes.

The origin of temples and of ceremonial centers in Mesoamerica is still a matter of speculation. Currently, it is customary to postulate a period of settled agricultural villages which antedated the development of specialized ritual centers, but an alternate possibility -- that meeting-places with permanent constructions preceded settled village life -- cannot be altogether ignored. The fact is that we have not yet tapped the earliest remains of temple construction, and do not know under what circumstances the religious citadel became the focus of social life. Evidence of Early Preclassic constructions is still limited to scattered finds of levelling fill, to deeply buried floors, and to one fragment of a platform.

Coe's excavations at San Lorenzo, in southern Veracruz, indicate massive constructions there during the Bajio Phase, which, according to his estimate, covers the period between 1350 and 1250 B.C. (M. D. Coe, 1969). In addition to some steps leading to a platform, Coe notes "vast quantities of fill", levelling off the rise on which the ruins stand, and making additions to it. The scale of the operations implies a ceremonial center of considerable size, but its architectural layout cannot be uncovered without destruction of overlying remains and the removal of an immense mass of later accumulation.

In fill pertaining to the Chicharras Phase (1250 to 1150 B.C.), fragments of carved monuments were found, and the next phase, the San Lorenzo (1150 to 900 B.C.) yielded a splendid collection of large sculptures in the round made of imported basalt boulders, long drains constructed of shaped stones, and many luxury items of other imported materials. We have no data

however, either on architectural assemblages or on the forms of buildings at that time.

Surface remains at San Lorenzo and at La Venta apparently represent the Middle Preclassic era. The core of the larger constructions was evidently of clay and earth, and their profiles are completely eroded, showing only natural slopes of debris. There is no stone in the vicinity of La Venta, but it was imported from some distance away and used for special features. Within two of the mounds were found tombs lined and roofed with columnar basalt, and a carved stone sarcophagus. More interesting, but rather perplexing, are deep foundations of horizontally laid stone and of adobe bricks laid in clay, which once may have supported enclosures formed of basalt columns backed by thick clay walls. Two buried foundations of this sort, built at least partially underground, and arranged symmetrically on the sides of a court or plaza, were flagged with slabs forming a mosaic design. Sections of the buried southwest platform published by Drucker, Heizer and Squier (1959, figs. 26-28), suggest that walls had been removed from this construction for the salvage of columnar basalt. It occurs to me that the deep foundation may have been laid down to prevent the seepage of water, and that such constructions may have been pools, similar in function to the depressions observed by Coe at San Lorenzo.

The architectural assemblage of the main group at La Venta is very distinctive. It is dominated by a single high structure, now eroded to the shape of a conical mound. Smaller constructions are laid out on its north-south axis. North of the main "pyramid", two long mounds delineate a rectangular court, and two other mounds and a low platform are disposed on its extended central axis. A somewhat similar disposition of mounds, forming two parallel elongated plazas, was observed by Shook in some abandoned Preclassic sites of Highland Guatemala (Shook, 1952). Here, however, the largest structure tends to be on the side of the Plaza, and the orientation veers considerably to the east of north. These very early assemblages are consistent with Kubler's observation that Mesoamerican architecture is designed primarily with a view to the organization of exterior spaces (Kubler, 1962, p. 29). Other, more complex arrangements were developed in various regions during the Classic Period, but the dramatic effects of Mesoamerican architecture remained inherent in the contrast of pyramidal masses of temples and low, extended facades of secular buildings. In the larger sites of the Maya area, soaring pyramids contrast with compact quadrangles of "palace" buildings, and the Street of the Dead at Teotihuacan preserves a vestige of the early elongated plaza in the long rows of low temples and courts, punctuated by the great Pyramids of the Sun and of the Moon.

The principal building materials of the Preclassic Period were earth, puddled adobe, and wood. Masonry construction gradually replaced them, but adobe fill continued to be used in regions where stone was not readily at hand. At Kaminaljuyu, facing of masonry and lime plaster was used sparingly even in Classic times. In Oaxaca, an early structure recently excavated at

Dainzu (Bernal, 1967) shows a facing of large vertical slabs topped by huge blocks of stone. The slabs are carved individually with figures, recalling a very similar use of "Danzante" slabs at Monte Alban. Bernal suggests a date of about 305 B.C. for this structure, a time that may precede the use of true masonry in this area. In the Valley of Mexico, the innermost platforms of the large round structure at Cuicuilco, built of clay without masonry facing, pertain to the Middle Preclassic Period (Heizer and Bennyhoff, 1969). The first of three superimposed cobble-faced platforms, however, was built before this period ended. The assemblage of this site is obscured by lava-flow which covers it, and it is not clear whether the stepped round structure is the foundation of the main temple at this site, and whether it is truly representative of Preclassic architecture of the valley.

The most dramatic architectural developments took place in the heart of the Maya area, in the limestone region of central Peten, where materials for masonry construction were readily available. So far, no early Preclassic architectural remains have been uncovered here. The Middle Preclassic Period is also poorly represented, and only at Altar de Sacrificios, at the confluence of the Chixoy and Pasion rivers, are there clear indications of a ceremonial assemblage of buildings before the Chicanel Phase. Remains of deeply buried and dismantled platforms pertaining to the San Felix Phase (600 to 300 B.C.) were found under several buildings of Group B, suggesting that the plaza of this group was already laid out (Willey and Smith, 1969, p. 25). The earliest platforms are faced only with adobe, but overlying them are Late Preclassic terraces faced with lime-encrusted mussel shells. Since there was no stone in the vicinity of Altar de Sacrificios, masonry was not used here until the beginning of the Classic era, when it could be brought in from a distance. The scarcity of stone inhibited the development of the vault and other heavy masonry construction, and the architectural sequence at this site remained atypical for the Peten.

At Uaxactun and Tikal, the known sequences of temple platforms probably begin in the latter half of the Late Preclassic Period, although their complex forms and well-developed masonry techniques are evidence of an earlier origin. The best preserved structures are Pyramid A of Complex A-1 at Uaxactun, and Pyramid E-VII-sub. They are built with a core of rubble, earth, and marl, and a facing of horizontally laid stone, roughly shaped and finished with a thick coat of lime plaster. Post holes on the summit indicate that they once supported buildings of perishable construction. Although in restorations these perishable buildings are usually shown as simple thatched huts, they were probably much more elaborate, and may even have been plastered and designed in much the same way as later stone temples. The foundation platforms are not truly pyramids, but a monumental intent in their design is quite evident. Pyramid A of A-1 (R. E. Smith, 1937) is a single low terrace supporting a three-level building platform. At the back, the two units are merged into a single slope by a projecting panel with a typical apron molding. Smith distinguishes three developmental stages that overlie

the two lowest buildings. The typical Maya pyramid, with its multiple terraces and inset corners, emerges only in the last two Classic stages of these constructions.

Structure E-VII-sub (Ricketson and Ricketson, 1937) is designed in three superimposed units: a unit of four low terraces with almost vertical aprons, a unit comprised of a single sloping terrace with two simple mouldings, and a unit which is a typical two-level building platform. The building platform is differentiated from the substructure by being slightly set back, and by having a single stairway, instead of steps on all four sides, as on the lower terraces. Each of the three units is decorated with a distinct set of large stucco masks. Group E was excavated before the ceramic sequence was firmly established, and the order of constructions there is not altogether clear, but it is worth noting that the elongated rectangular plaza, oriented slightly west of north, suggests a Preclassic layout, though the surface buildings are Early Classic in date. At one end of the Plaza is a raised terrace supporting three small temples facing inward on a court. This is also the arrangement of the first Classic stage of Structure A-V. Pyramid E-VII, on the west side of the Plaza, faces a long platform on which are three temples set in a row, which, when viewed from the steps of the pyramid appear to mark the position of the solstices and equinoxes on the horizon. We can recognize this arrangement in a number of other early Maya sites, and as this is being written, a communication from Edwin Shook to Lee Parsons (Dec. 30, 1969) reports an arrangement of three stelae and a mound at Monte Alto, similarly oriented and presumably Preclassic.

The development of masonry architecture in the Peten shows progressive improvement in the techniques of burning and mixing lime. This led to the construction of buildings made entirely of stone and conglomerate, with corbelled vaults strong enough to uphold the heavy load of high roof-combs. The sequence of temples recently excavated under the floor of the North Acropolis at Tikal illustrates this development. It begins, according to present estimates, in the final century before the Christian era, which corresponds to the Cauac Phase at Tikal and is correlated with late Chicanel at Uaxactun. The earliest assemblage here is very similar to the grouping of three temples around a court in Structure A-V at Uaxactun, and in both locations elaborate tombs were put through the floor of the main terrace. The earliest preserved temple, Structure 5D-Sub.1-1st, (W. R. Coe, 1965, p. 15) had masonry walls, an upper facade decorated with modelled and painted stucco, and large stucco masks on the upper terrace of its platform. The platform and the walls of the building are designed as a unit. The slope of the heavy apron moldings below is repeated in the slope of the upper facade of the building. The rise of the rear room is reflected in the rise of the upper platform, which follows the building walls and is marked by only a very slight projection. The stairway is inset into the room through the doorway. The lower terrace of the platform is integrated with the upper by a single projecting panel at the back, so that the whole design is seen as a single form. The building may have been

vaulted, or may have been roofed with beams and mortar. The latter is most probable, since its walls are lighter than in Early Classic temples. Nevertheless, it is clear that the exterior form was the focus of its design. From the beginning, the Maya temple is more like a sculptured monument than like a building.

The Cauac Phase reveals also the earliest known mural paintings, on tomb walls and on exterior walls of a small shrine associated with a tomb. Fragments of stone sculpture were found in the fill, but no stelae were associated with the early temples. The question remains whether the multi-terraced pyramid and the stela represent later developments, perhaps due to influences from Guatemala, or if they were located elsewhere on an open plaza, and simply were not suitable to the kind of assemblage which was excavated here.

Several times in the years that followed, the North Acropolis was raised and enlarged. On the final terrace built in Early Classic times, the plan remained substantially the same, although more temples were added from time to time, until there were finally fifteen in all, two of them, partly off the terrace and facing the plaza, set on high multi-terraced pyramids of standard design. Clearly, there is here a continuity of development from at least 100 B.C. through the Classic Period, and the well-developed details of masonry construction suggest a much earlier beginning.

In Highland Guatemala, the situation was somewhat different. Here we have evidence that many Late Preclassic sites were abandoned at the end of the period, and Classic assemblages differ radically from arrangements in earlier sites. Unfortunately, none of these sites has been investigated, and excavation has been concentrated at Kaminaljuyu, where centuries of later constructions obscure the pattern. The earliest high mound so far observed is Structure C-III-6, partially excavated by Shook in 1951. It contained no sherds of the Late Preclassic Period, and an intrusive cache, made in its summit in later times, was lined with columnar basalt in the manner of Olmec tombs. These columns were clearly reused, since one of them was carved on three of its five sides, and included with the columns were broken tenons of what are called "pedestal" sculptures. The material inside the cache was attributed to the "Majadas" Phase, now sometimes linked with Providencia. The practice of building tombs on the summit of other such mounds at Kaminaljuyu perhaps suggested to Michael Coe the idea that the Maya pyramid developed from the burial mound (M. D. Coe, 1956). Sanders and Michels (1969, p. 166) further propose "that the pre-Miraflores civic centers all consisted of mounds, many of them conical structures, arranged along a street-like plaza and that they functioned as a ritual center for the funeral of an elite element in the population." This suggestion contradicts Shook's observations in the Valley of Guatemala. His description of the site of Piedra Parada, for example (Shook, 1952, pp. 22-24), which he believes was abandoned before the Miraflores Phase, shows clear evidences of temple construction. Adobe

foundation platforms are often completely eroded on the surface and may appear as "conical mounds", but the places to investigate early architecture are such abandoned sites as Canchon and Piedra Parada, where there may not have been such massive destruction of early remains as at Kaminaljuyu.

The Late Preclassic Miraflores constructions under Mound E-III-3 at Kaminaljuyu (Shook and Kidder, 1952, figs. 4-8) are of interest because they show low-U-shaped platforms, suggesting an arrangement of buildings not unlike early three-temple arrangements in the lowlands. The adobe-faced walls of the terraces are vertical, but at the side of a step leading to one of the higher platforms is a well-finished apron molding, a typical feature of the Peten. Structure D-III-13, excavated by Berlin (1952), falls in the earliest Classic Phase, Aurora. Its first structures were built entirely of adobe and show vertical terracing and inset stairways. None of the evidence so far adduced indicates a derivation of Peten architecture from the highlands. It shows only that during the Late Preclassic era the two regions show some similarity in architectural arrangement, notably, the disposition of buildings on elongated rectangular plazas, a feature probably of much earlier origin. They show also a common tendency to inset stairways, but in the profile of the terraces and in the location of tombs they differ sharply. In part, the differences are due to the use of entirely different materials, but to test the hypothesis of highland derivation of Peten sites, we need more information on earlier periods.

Even the Esperanza Phase, inspired by influences from Teotihuacan, poses some problems. The first Esperanza platforms do not have the typical "talud-tablero" profile, but rise in a single slope capped with a rectangular molding, over which is a low building platform. Evidently the adobe construction could not uphold a heavy "tablero", and the Teotihuacan design came into use only after pumice began to be included in the fill.

On the early stages of architecture at Teotihuacan I have no information at present. Cuicuilco offers no precedence for this architecture, and there seems to be a discontinuity also in ceramics. There is a possibility that the Teotihuacan style originated in central Veracruz, for the decorative style of the coast is strongly represented in Teotihuacan II, but Preclassic architecture in central Veracruz is virtually unknown, and the direction of influences is still in dispute. We await final publication on Tehuacan and Izapa, and the results of the Cholula project. Parson's excavations at Monte Alto promise to give us important data on the early architecture of the Pacific coast, but the stratigraphy of this site has not yet been studied.

To sum up what we do know: for the Early Preclassic Period we have definite indications of large earthen construction with some use of stone

in southern Veracruz. The Middle Preclassic reveals the typical Olmec assemblage, but not the form of the larger structures. There is reason to think that at this time there were ceremonial centers in the highlands of Mexico and Guatemala, on the Pacific coast, and on the Pasion River, but their character is poorly defined. Stone faced constructions appear at Cuicuilco and in Oaxaca at the end of the Middle Preclassic Period. Typical Late Preclassic assemblages can be defined in the highlands of Guatemala, and there is evidence that the mounds served as substructures for temples, at least as early as the Providencia Phase. Only for central Peten, near the end of the Late Preclassic Period, is there sufficient data to allow us to observe the development of an architectural style. The transition to the Classic Period here is gradual. It is marked by the adaptation to masonry buildings of the stone vault used earlier only in tombs, and by the differentiation of the building platform, which remains integral with temple design, from the design of the pyramid that supports it. Increasing emphasis on secular buildings and improved masonry techniques later resulted in more efficient design, with larger vault spans, but it was only in the Postclassic Period, when interior columns were introduced, that building plans began to take precedence over exterior effects in architectural design.

Monumental sculpture, in addition to being used on architectural forms, had an independent development as a representative art. There is a rich body of early sculptures, but most of it has not been correlated with ceramic sequences, and there has been no systematic comparative study of styles. Spinden's study of Maya art (Spinden, 1913) was followed by sporadic investigation of particular iconographic elements, but intensive study of modes of symbolic formulation in the arts was only recently initiated by George Kubler (Kubler, 1967, 1969). Although writing is often mentioned as a criterion of civilized life, and it is recognized that mathematics is a basic factor in industrial civilization, the importance, in developing societies, of visual communication through the medium of the arts is often overlooked. When writing and mathematics were still specialized esoteric arts, the community relied largely on visual imagery, both for the creation of efficient and amenable surroundings and for the expansion and refinement of ritual sentiments. The monumental arts, hand in hand with spectacular ritual, provided validation for hierarchal society and maintained communication between administration and the populace. The invention of visual forms capable of denoting complex non-material entities and relations was no mean accomplishment of the fine arts.

In Mesoamerica, the monumental arts apparently developed concurrently and in close association with writing. Monuments 41 and 42 at San Lorenzo, the earliest sculptures we know, clearly exhibit a pictographic intent. Monument 42, found at the very base of San Lorenzo deposits, is a broken column of basalt, shaped and carved in very low relief. Its upper portion is missing. At the top of the surviving fragment is carved a forearm and hand,

and just above it is a trace of what may be another hand. Monument 41 is similar and is almost complete. At the top is a mask with grotesque features, which is assumed to be a jaguar mask, but which is not at all clear. Below, are two forearms, one hand with fingers curled, and the other overlying it, with fingers spread wide apart. There is no indication of other anatomical features. This can hardly be a pictorial representation; it is more like a composition of signs of conventional meaning: a visage and a gesture. A similar use of hands, arms, and masks occurs in inscriptions on Olmec jade celts (M. D. Coe, 1965, figs. 18, 19). Masks in profile and gestures of hands are signs which are used frequently in later Maya writing. On Monuments 41 and 42, we have a kind of symbol that bridges the gap between artistic representation and the written word. It may be that at this time (1150 B.C.) writing was still in the process of formation.

There is a marked difference between these low-relief carvings and the full-round buried sculptures of San Lorenzo. In the latter, the integrity of the visual image is paramount, and any detail that may have extraneous meaning is muted. Images are overwhelmingly concerned with a heroic presentation of man and his affinity to the jaguar, a beast embodying the virtues of valor and nobility. There has been much speculation about the meaning of this mystical component in Olmec art, and especially the theme of the jaguar-infant, who has been identified as a victim of sacrifice, as a god of rain, and as a result of inherited abnormality. What is more important, however, is that the mysticism does not interfere with fine sensitivity to natural forms, although the symbolism is inherent in the subject, in which human and transcendent qualities are blended into a single being. Even in dominantly human subjects, such as the colossal heads, there is a subtle exaggeration of normal racial features in which we sense a feline aspect, and some of the seated figures (as, for example, the figure from Cruz Milagrosa, in Piña Chan and Covarrubias, 1964, unnumbered plate) lean forward with their fists on the ground, reflecting the pose of a seated beast.

The more explicit portrayal of jaguar faces on human bodies may come somewhat later, but the decapitation of many Olmec statues leaves the point uncertain. What is indicated more clearly is the later shift of symbolic content from the figure itself to its dress and accoutrement, suggesting conferred rather than intrinsic status, consequent to a growth of officialdom. The fine incision of masks and other ideographic forms on human faces is another feature probably lacking in the San Lorenzo sculptures, but more important is the absence of sculptured stelae. Presumably the La Venta stelae were erected during the Middle Preclassic era, but whether their origin is indigenous or the inspiration came from outside remains a moot question. The stelae appear to represent a new emphasis on historical themes and a gradual return to bas-relief carving. Rock carvings in the Olmec style outside the "Olmec heartland" reflect a similar historical concern. The large cliff carving at Chalcatzingo introduces new features in the seated pose of the personage, in the Serpent grotesque which surrounds him, and more particularly in the round bifurcated scrolls that distinguish the Late Preclassic styles

of the Pacific coast of Guatemala, and that do not occur at La Venta. A recent report by Grove (1969, fig. 2) describes a polychrome painting high on a cliff face above the grottos of Oxtotitlan, Guerrero, which shows a figure in bird-costume seated on a mask that is clearly derived from the Olmec style. It is impossible at present to date either the rock-carvings or the paintings, but stylistic comparison suggests that the expansion of the Olmec art style took place after the abandonment of San Lorenzo and possibly even after the occupation of La Venta.

The major difficulty in appraising the significance of the Olmec development is that we have virtually no information on what was going on in surrounding regions at that time. Too little is known of the early periods in central and northern Veracruz to indicate whether local styles were present there. On the Mexican plateau there is no body of sculpture that we can attribute to the Middle Preclassic era, with the possible exception of the Olmec rock-carvings at Chalcatzingo. The southern highland of Puebla, which Covarrubias suggested may be the locus of the origin of the Olmec style, has been insufficiently explored. The center of the Yucatan Peninsula seems to have been at that time a marginal region of minor settlements, and there have been no major excavations on the gulf coast, but only superficial surveys, which have not located any major Preclassic sites. Only from Guatemala do we have sufficient early sculptural material to give an indication of possible regional styles distinct from the Olmec and comparable in date.

Miles (1965) has outlined four "divisions" of Preclassic sculpture in the Guatemala highlands and on the Pacific coast. Her first division consists of various boulder sculptures. The most numerous and most widely dispersed group depicts puffy-cheeked, pot-bellied figures carved on rounded boulders. At Monte Alto they are associated with colossal heads in much the same style. These are much cruder in execution than the colossal heads of the Olmec, and their closed puffy eyes may connote death or sleep. Hachas and small crested heads from Veracruz have the same low, puffy cheeks and somnolent expression (Proskouriakoff, 1960, fig. 10, k-n), and, apparently much later, similar faces reappear on certain dwarf-like figures from northwestern Yucatan (Proskouriakoff, 1950, figs. 95, i, 97, a). Excavations at Monte Alto have so far yielded no confirmation of the very early date ascribed to the colossal heads by Miles, but proof or disproof of their antiquity will not be easy to establish. In the same early division Miles includes the headless figures on pedestals which Shook found re-erected in a Late Classic group at the site of Sin Cabezas (Shook, 1950). These figures, in contrast to the figures of Monte Alto, are carved in full round, and sit cross-legged and leaning forward, recalling certain early Olmec figures. Parsons and Jenson (1965) reviewed the problem of boulder sculpture on the coast, and suggest a date transitional from Middle to Late Preclassic for the Monte Alto group, but the style itself can hardly be termed "transitional", for it shows little relation to Late Preclassic sculpture that has been coming out of Kaminaljuyu in recent years.

Somewhat better related to stratigraphy is the columnar basalt relief from the Majadas cache in Structure C-III-6 at Kaminaljuyu, which Miles assigns to Division 2. Since it was clearly reused in an intrusive cache, it was probably dismantled from a construction earlier than the cache itself, and the material suggests a Middle Preclassic date. The figure, however, shows none of the characteristics of the Olmec style. It is slim in proportions and angular in body lines. Behind and around the feet of the figure is a complex composition of formal elements, difficult to make out but suggestive of a grotesque being, and in front is a geometric figure that may be a hieroglyphic sign. The uniqueness of this carving suggests an early highland style of which other examples are still to be found.

Miles' Division 2 contains a great variety of sculpture, most of it probably Late Preclassic, and covers also some of the stelae at Izapa. Her Division 3 includes more elaborate compositions, as well as the two monuments discovered at Kaminaljuyu in Miraflores fill: Stela 11, which, though a single figure, has elements in common with the Izapa style, and Stela 10 (probably not a stela) which is more closely related to the Classic Maya style, and contains the earliest known inscription arranged in a compact block, in the manner of the Maya script. It is difficult to conceive the rich variety of sculpture found at Kaminaljuyu as the product of a single developing style. Apparently sculptors from many localities resided and worked in this cosmopolitan center.

In this respect, the style of Izapa is much more uniform and consistent. It is mainly in the compositions of this style that we find precedents for some compositions of the Classic Maya. Archaeological reports on Izapa are not yet available, and I do not know on what stratigraphic evidence rests the assumption that the sculptures are Late Preclassic in date. Nevertheless, this was the era that saw the formulation of a very complex iconographic symbolism which later characterizes the Classic styles. The dominant sculptural form at Izapa is a small stela with its accompanying altar, often carved in the form of a saurian monster, or, in one case, a crab. The monuments often depict human figures in action, but these figures are usually subsidiary to a larger composition of fantastic forms. Among these are various serpent and bird-masks, a winged figure descending from the sky, a grotesque creature that may be the prototype for a widespread Earth Monster of later times, and round, tightly curled volutes that suggest a representation of clouds. The upper register of many monuments contains a band of conventional figures signifying the sky, possibly derived from the upper jaw of a monster, which is drawn in more realistic form on Monument 2. These monuments bear no inscriptions, but a single glyph occurs in at least two of the compositions.

Miles interprets these monuments as predominantly religious, illustrative of myth, and without historical import. I seriously question this conclusion. Mythical and religious themes are usually presented in fixed conventional compositions, but each monument of Izapa is original in its arrangement and forms. I do not know if there is any parallel in the arts of the Old World to the remarkable visual symbolism that was developed here. Certain

elementary principles they hold in common, such as the combination of various zoomorphic forms, as well as the human form, to represent transcendent beings; but the free recombination of symbolic elements in individual compositions seems to be uniquely characteristic of Mesoamerican arts. It implies a highly organized symbolic system, more pictographic than pictorial in character, which, by the manipulation of images derived from animate forms, achieves a wide range of expression, depicting various events or social conditions validated and controlled by the natural order of the universe. I believe that the real difference between the stelae of Izapa and the Classic stelae of the Peten is not thematic, but lies in the emphasis of the Classic art on the individual figure, the portrait of the ruler, implying perhaps the formation of a higher aristocracy, and the growth of autocratic rule.

A number of monuments in coastal areas, from Tres Zapotes on the gulf, to El Baul on the Pacific coast, are representative of this transition to individual portraiture. These monuments are accompanied by numerical series that seem to record dates in the last quarter of Baktun 7 (about 30 B.C.) (M. D. Coe, 1957). Not all scholars accept these dates as valid, but early Cycle 9 dates from Cerro de las Mesas, written in the same fashion without period glyphs, appear to be normal Initial Series, and a tentative acceptance of the Cycle 7 dates probably would not greatly distort the historical sequence even if the monuments are found to be somewhat later.

All Classic Mesoamerican arts make use of heteromorphic symbols to express cosmic ideas. The grotesque forms are probably derived from ancient ritual dances and were preserved in the ceremonial vestments of the priestly office. However, it was only in the great Classic centers of Teotihuacan and in the Maya area that this symbolism was used with the virtuosity of a great art. Elsewhere it takes fixed conventional forms as, for example, the sky motif in the Classic sculpture of Monte Alban.

Earlier Monte Alban sculpture, represented in the figures of the Danzantes, in its simplicity and lack of extraneous symbols is similar to the early sculpture of the Olmec, but in its themes and in its intent it is completely different. The nudity of the figures, their phallic emphasis, and their contorted poses contrast with the restrained dignity of the Olmec style. The carving is done almost entirely in line incision, and there seems to be no scheme of composition in the assemblage of the stones. If the buildings in which they were used were covered with a thick coat of plaster or adobe, as most early buildings are, the carvings could not have been seen, and perhaps were not intended to be. Their use may have been entirely magical in intent. The figures are accompanied by hieroglyphs, some with bar-and-dot numerals, and Caso's study of them (Caso, 1947) shows an uninterrupted transition to Monte Alban II. The representations, however, have little relation to the Classic sculptures of Monte Alban, and constitute a very special case which needs further elucidation.

The origin and development of the art of Teotihuacan remains another unsolved problem. We have no examples of sculpture or of painting attributable to Teotihuacan I. In Teotihuacan II times, appear sculptures with decorative motifs in the style of Classic Veracruz, but these motifs were not incorporated into later Teotihuacan sculpture or painting, and their relation to the native style is problematical. The mural art here was probably derived directly from pictorial manuscripts, for, as Kubler has noted, it reflects some of the aspects of pictographic description. Early paintings and reliefs, if they were executed on adobe, may have left very few traces.

It would be futile to attempt a synthesis of the disjointed information we now have on the early development of the fine arts in Mesoamerica. In concluding, I can only call attention to some peripheral problems that had to be solved before the arts could achieve their classic maturity. In architecture, the quarrying and transport of stone had to be provided for before any degree of permanence of constructions and refinement of detail could be achieved, especially in regions where stone was not immediately at hand. Equally important were improvements in the preparation of mortars and plasters. This is a subject that requires intensive technical study, for we can only conjecture what materials and methods were used.

Sculpture and painting, though also dependent on availability of suitable materials, were relatively free of technical difficulties. The Olmec of San Lorenzo could already handle a hard material like basalt with superb artistry. The main problem of the sculptor was to discover how to convey the significance and value of historic events and ritual occasions by means of visual images. He did this by presenting the human world against a background of cosmic order, drawing on mythology, on forms used in ritual dances, and on many signs used in writing. Relief sculpture was probably often copied from manuscripts. Where manuscripts were mainly pictorial, as in Mexico, reliefs and paintings share many symbols with pictographic writing. Among the Zapotec and the Maya, the formal script took on explanatory and descriptive functions, so that the artist was once more free to concentrate on the visual image, but on many early Peten stelae, the subject of the representation is all but lost in a complex arrangement of symbols, many of which are conventional pictographs

During the Classic Period, regional styles were sharply distinct, and the two dominant styles - the lowland style of the Maya and the highland style of Teotihuacan - expanded their influences, meeting finally on their frontiers in Highland Guatemala. Stylistic regions are not so clearly defined for the Preclassic periods, but whether this is because there was a more diffuse cultural sphere, or because we lack precise information, remains to be seen. We have made great progress in recent years in correlating stratigraphies at many key points and in conducting superficial surveys, but no Preclassic site has been excavated yet with the thoroughness of Uaxactun or Tikal. Any synthesis of early cultural progress that we attempt now must draw heavily on presuppositions, and cannot avoid being prejudiced according to what periods are exposed in surface remains of different regions and where and what sort of archaeological work has been done.

Bibliography

Berlin, Heinrich

- 1952 Excavaciones en Kaminal Juyu: Monticulo D-III-13. *Antropologia e Historia de Guatemala*, 1:3-18.

Bernal, Ignacio

- 1967 Excavaciones en Dainzu. *INAH Boletin* 27:7-13. Mexico.

Coe, Michael D.

- 1956 The Funerary Temple among the Classic Maya. *Southwestern Journal of Anthropology* 12:387-394.
- 1957 Cycle 7 Monuments in Middle America: a Reconsideration. *American Anthropologist* 59:597-611. Menasha.
- 1965 The Olmec Style and its Distribution. *In: Handbook of Middle American Indians* 3:739-775. Austin.
- 1969 The Archaeological Sequence at San Lorenzo Tenochtitlan, Veracruz, Mexico. MS.

Coe, William R.

- 1965 Ten Years of Study of a Maya Ruin in the Lowlands of Guatemala. *Expedition* 8:5-56. Philadelphia.

Drucker, Philip, Robert F. Heizer and Robert J. Squier

- 1959 Excavations at La Venta, Tabasco, 1955. Smithsonian Institution, Bureau of American Ethnology, Bulletin 170. Washington.

Grove, David C.

- 1969 Olmec Cave Paintings: discovery from Guerrero, Mexico. *Science* 164:421-423.

Heizer, Robert F. and James A. Bennyhoff

- 1969 Archaeological Investigation of Mounds Covered by Lava at the Cuicuilco Site, D. F., Mexico. MS.

Kubler, George

- 1962 The Art and Architecture of Ancient America. The Pelican History of Art. Baltimore.
- 1967 The Iconography of the Art of Teotihuacan. *Studies in Pre-Columbian Art and Archaeology*, 4. Dumbarton Oaks, Washington.
- 1969 Studies in Classic Maya Iconography. *Memoirs of the Connecticut Academy of Arts and Sciences*, Vol. XVIII. Hamden, Conn.

Miles, S. W.

- 1965 Sculpture of the Guatemala-Chiapas Highlands and Pacific Slopes and Associated Hieroglyphs. In: Handbook of Middle American Indians, 2:237-275. Austin.

Parsons, Lee A. and Peter S. Jenson

- 1965 Boulder Sculpture on the Pacific Coast of Guatemala. Archaeology, 18:132-144. New York.

Piña Chan, Roman and Luis Covarrubias

- 1964 El Pueblo del Jaguar. Mexico.

Proskouriakoff, Tatiana

- 1950 A Study of Classic Maya Sculpture. Carnegie Institution of Washington, Publ. 593. Washington.
- 1960 Varieties of Classic Central Veracruz Sculpture. Carnegie Institution of Washington, Contributions to American Anthropology and History, 12:61-94. Washington.

Ricketson, Oliver G., Jr. and Edith Bayles Ricketson

- 1937 Uaxactun, Guatemala, Group E - 1926-1931. Carnegie Institution of Washington, Publ. 477. Washington.

Sanders, William T. and Joseph W. Michels

- 1969 The Pennsylvania State University Kaminaljuyu Project - 1968 Season. Part 1 - the Excavations. Occasional Papers in Anthropology, Pennsylvania State University, No. 2. University Park.

Shook, Edwin M.

- 1950 The Ruins of Sin Cabezas, Tiquisate, Department of Esquintla, Guatemala. Unifructo, August.
- 1951 Guatemala. Carnegie Institution of Washington, Yearbook No. 50:240-241. Washington.
- 1952 Lugares Arqueologicos del Antiplano Central de Guatemala. Antropologia e Historia de Guatemala, 4; No. 2:3-40.

Shook, Edwin M. and Alfred V. Kidder

- 1952 Mound E-III-e, Kaminaljuyu, Guatemala. Carnegie Institution of Washington, Contributions to American Anthropology and History, 11:34-128. Washington.

Shook, Edwin M. and Tatiana Proskouriakoff

- 1956 Settlement Patterns in Mesoamerica and the Sequence in the Guatemala Highlands. In: Gordon R. Willey (ed.), Prehistoric Settlement Patterns in the New World. Viking Fund Publications in Anthropology, 23:93-100. New York.

Smith, Robert E.

- 1937 A Study of Structure A-I Complex at Uaxactun, Peten, Guatemala. Carnegie Institution of Washington, Contributions to American Archaeology, 3:189-231. Washington.

Spinden, Herbert J.

- 1913 A Study of Maya Art, its Subject Matter and Historical Development. Memoirs of the Peabody Museum of American Archaeology and Ethnology, Harvard University, Vol. VI. Cambridge, Mass.

Willey, Gordon R. and A. Ledyard Smith

- 1969 The Ruins of Altar de Sacrificios, Department of Peten, Guatemala, an Introduction. Papers of the Peabody Museum of Archaeology and Ethnology, Harvard University, Vol. 62, No. 1. Cambridge, Mass.

ADDED REMARKS by T. Proskouriakoff

Since this paper was written, Susanna M. Ekholm has published an important report on the excavations in Mound 30a at Izapa. If we accept the suggested estimate of 700 to 600 B.C. for the inner constructions of this mound, it will extend the use of stone for terrace facing and in the fill of platforms back for at least two centuries. No plans of the constructions were recovered, but the stepped profiles of pyramids upholding differentiated building platforms demonstrate a greater antiquity for building practices of later periods than any other site has revealed so far. Although in these early constructions the stone is unshaped and serves merely to strengthen essentially earthen masses, later developments made possible by the use of lime mortar are clearly foreshadowed here. Thus, the architecture of the lowlands known so far presents an entirely consistent sequence of development from the Middle Preclassic period to the Classic. In the Mexican highlands, however, the sequence appears to be discontinuous, and Cuicuilco remains the sole example of its type, offering no precedent for later developments at Teotihuacan. Neither Cuicuilco nor Teotihuacan in its earliest stage yielded any examples of the major arts, even after Teotihuacan had become a large urban center. The significance of this fact was not made clear.

The first problem to be brought up in discussion was the origin of painting, and in this connection mention was made of the polychrome cave and cliff paintings of Guerrero. Their Olmec style was not in question, but their chronological relation to the arts of San Lorenzo and La Venta remains in doubt. Also mentioned was the possibility that numerous plain stelae at Monte Alto and in the Guatemalan highlands may once have been painted with

designs or with hieroglyphic texts. The perishable nature of pigments and of the materials other than stone to which they were applied makes it extremely difficult to trace the early development of painting. At Teotihuacan, polychrome seems to precede monochrome rendering, and it was suggested that color symbolism played an important role in mural decoration from the very beginning.

Another point discussed was the giantism of some of the Preclassic sculptures. Aside from the technical considerations discussed by Kubler, giantism may have been an expression of authority and power. I would like to point out that today huge portraits are linked to the popular adulation of individual leaders rather than to honors accorded to traditional office, and perhaps the colossal statues of the Olmec reflect a chieftainship by popular acclaim intermediate between rulership by tribal council and an established hereditary autocracy.

The final topic of discussion was the importance of gesture in virtually all the arts, beginning with the stelae of La Venta. Although gesture is reflected also in writing, the question of the development of coded iconography and its relation to writing was not discussed further, though Kubler's paper presented some cogent arguments for the primacy of image over sign. The suggestion that in the sculptures of San Lorenzo we are observing the product of a long evolutionary process, rather than its incipient stages, perhaps discouraged further consideration of the early development of complex symbolic systems. It is possible that the unresolved question: whether the peoples of San Lorenzo and of Teotihuacan had or had not systems of writing, hinges on the particular definition of "writing" that we espouse. In any case, without the specification of a particular system and its uses, the argument seems to have little cogency.

XII. COMMENTARY ON: EARLY ARCHITECTURE AND SCULPTURE IN MESOAMERICA

George Kubler

Miss Proskouriakoff's paper is evenly divided in two halves, the first about architecture and the second about sculpture. The organizers did not call for remarks about painting, but in her pages on sculptural imagery, she treats painting and writing in some detail where relevant.

I shall therefore discuss her architectural observations first, then sculpture, and finish with the implications of her paper for the study of painting and writing.

Settlement plans and architectural technology

In the opening paragraph her remarks on economic needs suggest that early public architecture multiplies such economic needs, rather than merely responding to them. With this I would agree. Whatever the independent variables of cultural history may be, they are not alone the economic life of the people. They are also other ill-defined cultural factors of which economic behavior is only one among the results. Indeed it may be that artistic activity itself is closest to being an independent variable. Because of it, much change is likely to happen, as we note in early societies, where the production of ritual and its artifacts was a changing activity satisfying many needs, rather than being a grudging occasional service to a greedy pantheon and its priests. For example, can the plan of Teotihuacan be correlated with a faculty for planning and ordering the society as a whole? If so, which is the prior expression or independent variable? The town or the society? Or do town and society integrate conjointly, like a mollusk and its shell?

In the second paragraph she wonders about the priority of the village or the ceremonial center. This is the question raised also by Bernal, when he discusses his belief that Oaxacan architecture is older than Olmec. I believe the differences between Oaxacan and Olmec architecture may have to do with climate and ecology. Buildings were needed in temperate upland Oaxaca, but ceremonial spaces were favored in Olmec coastal rainforests. Of course, preservation may be the differential factor as to dwellings. The spatial order of Monte Alban seems more tentative, being achieved gropingly during many centuries and reflecting the "outside" monumentality of La Venta, which, as Bernal observes, lies closer to the beginnings of civilization.

Bernal's thesis, however, that Oaxacans invented architecture while the Olmecs perfected sculpture is not easy to accept. He declares that architecture "hardly...existed amongst the Olmecs", but he has selected materials, and structural solutions for his criteria, and he disregards architectural thought, which is to materials and structure as mathematical thought is to bookkeeping. At La Venta or San Lorenzo, the main themes of monumental Mesoamerican architecture all were already clearly stated and articulated long before 400 B.C. These I have tried to classify in four ways.

As monumental form, architecture commemorates valuable experiences by distinguishing one space from another in a durable way. The basic modes of monumentality are the precinct, the hut, the cairn, and the path. The precinct marks off a sacred area; the hut encloses it in part; the path signals a direction; and the cairn marks a point by elevation. From precinct to stadium forms one typological series; from hut to cathedral another; from path to arcade-lined boulevard another; and from cairn to pyramid still another. The combinations of path, precinct, hut, and cairn yield all the possibilities of monumental architectural form, not only in terms of solids, but also in terms of the spaces bathing those solids. All these occur at La Venta.

Miss Proskouriakoff's remarks about three-sided platform-and-building clusters in Mesoamerica lasting at Tikal for a thousand years from the very base of the North Acropolis on up, reassure us that whether at Tikal or Oztoyalco or Kaminaljuyu, or Uxmal or Quimatzin, these three-sided clusters underline the traditions both of house and temple construction. She is reluctant to derive Peten architecture from the Guatemalan highlands, but I think she believes the tradition of clustered construction to be the fundamental one in Mesoamerica, rather than the closed-corner quadrangles appearing only at advanced dates in the Classic period, which correspond to new functional types, such as judicial courts, or guild-houses, or seasonal residences for an elite population. Looking again at the aerial photos of Monte Alban (see Acosta, 1965, 816) I am always astonished by the discrepancy between the published plans and the reality. Many axial systems seem to compete in the plan published by Marquina.

The "observatory" seems as if it had been gradually surrounded by changing systems of reoriented axes. Its original axis is uncertain: it may once have been aligned with the earliest facade of the Danzantes, to which nothing else is parallel. These two structures alone belong to Period II. The South platform later on aligns with mound M. The North platform connects better with System IV than with anything else. One is led to ask if there is not an early angular two-sided enclosure resembling Monte Negro in MA I, evident in the Southwest quadrant, and defined by the platforms of the central pyramid, Group M, Danzantes, and Group IV, which later was enlarged east and north by levelling. The observatory thus might reflect, in its complicated and atypical arrowhead plan, these changes in the field of axial

forces. But other reconstructions are possible on this most complex layout, for which Acosta (1965, HMAI, 3, 818) suggests that the levelling now visible is no earlier than Period II (400-100 B.C.) when the first murals appeared in tomb architecture, like the early glyphic inscriptions upon stelae. It is certain only that Mound J is eccentric to every axial force. Mound J is like an elder and peculiar grandparent living within an excessively ordered family, and differing from it in every perspective, but reflecting an earlier way of existence. The western courts are like temples for the residence of gods, but the newer eastern range is lined with residential platforms for a newer kind of dynastic dweller, and it has a ball court of East Court plan, perhaps even of post-Classic date in MA IV, like that of Quotepec. Thus Monte Alban appears to have grown northward and eastward from the southwest corner. The north platform with its sunken court resembles the classic architecture of Teotihuacan and the Maya lowlands. The east range recalls classic Vera Cruz architecture, and the residential structures seem akin to late Classic Maya art of the centuries approaching 1000 A.D. As Acosta makes clear, the southwest nucleus began in Monte Alban I, but the leveling of the Central Plaza did not occur until Period II after 400 B.C., when an overall planning scheme was initiated along lines first evident at La Venta.

The situation at Izapa is especially suggestive in this respect. The platforms and plazas are oriented upon a north-south axis turned a little towards early-summer sunrises, as at Teotihuacan or Cholula, in a grid designated as the Mesoamerican "solstice plan". Miss Proskouriakoff in her Wenner Gren paper regards this plan as a Preclassic layout. Shook sees the axis as filled with four-sided courts. At Izapa are many sculptured monuments all aligned in relation to the platforms, usually paired as altar-and-stela combinations. These face south more often than north and east more often than west on this plan by Martinez in Susanna Ekholm's report on Mound 30a. The sculpture is pre-classic, but the setting and the alignment are like those of classic lowland Maya sites. May we not suppose that pre-classic sculpture was reset by late classic people? In this connection the Bilbao site is of this "solstice-plan" type and its sculpture, like that of Izapa, stressed narrative scenes in formal alignments. This is at some middle-classic date, to use Lee Parsons' welcome term.

Whatever their date at Izapa, these alignments bring us to the topic of proportional relationships, about which I regret to note that Miss Proskouriakoff has no room to give us her views, but perhaps I can draw her out here.

Proportional Studies

Among the great gaps in Mesoamerican studies is the study of architectural proportioning, which is still an untouched subject, although the topic in Egyptian, Mesopotamian, and Minoan architecture has proved extremely fruitful, especially with the work of Badawy in Egypt and Preziosi in the Aegean.

They have shown that the dimensioning of these pre-classic architectures conforms to geometrical figures constructed mathematically upon numerical relationships, such as arithmetic and geometric ratios and Fibonacci series, which are all implicit in number itself and without which it would be difficult to achieve the scaling, placing and conforming of large units of construction. Some ratios are apparent at La Venta: the geometric masks are square, but the diagonal of the square is the length of the panel including the four pendant ornaments in the ratio $1:\sqrt{2}$, which is Serlio's "diagonal proportion" in the architecture of the Renaissance in Europe. It reappears at Teotihuacan, in the still-unpublished court on the west side of the Street of the Dead immediately north of the axis of the sun and the macrocomplex reported by Wallram in 1966. I paced this off and its width is to its length as 2:3 at the foot of the platforms surrounding the court.

Frontiers and Style

Miss Proskouriakoff refers to "...classic meeting of Maya and Teotihuacan traditions on their frontiers in highland Guatemala."

This wording, which implies a tightly packed jigsaw puzzle map does not seem to me to fit the emerging notion of pre-classic Mesoamerican geography. Jigsaw maps appear where definite territorial interests mark out boundaries. That the shores of the lakes in the Valley of Mexico were thus demarcated, we know from a 16th-century Texococan document like Códice Xolotl. But the jigsaw idea still cannot be made to apply to what we know about pre-classic Mesoamerica. Important valleys were trading partners, like the valley of Oaxaca and the Olmec heartland, as Flannery pointed out in 1968 and as Parsons has reminded us here. These trade routes surely attracted settlements profiting from the movement of people and goods. The primary motive may have been trade doubling with religion in the form of cults attracting large numbers of pilgrims to the sanctuaries maintained by priestly corporations. Trade developing along these pilgrimage routes would have served the needs both of pilgrims and priesthoods, in a pattern of marketplace devotions which persists today in the great romerías to Esquipulas or Chalma or Guadalupe, or Chichicastenango. Thus if we were to imagine the mental geography of pre-classic travelers, it would resemble a network of paths rather than a jigsaw map, and it would display the nodes or crossroads more prominently than the network or the boundaries. Unpopulated deserts and mountains would be less important than towns and their alignment along rivers and road. Thus a pre-classic "map" would have looked like points, and lines connecting them, rather than a "map" of areas sharing boundaries.

The correlation between this geography of marketplace devotions, and the history of art is best documented in phenomena like the great pilgrimage roads of twelfth-century Europe, when peoples came together as pilgrims at the edges of the known world, in Santiago de Compostela, or at Le Puy, in a behavioral pattern documented by Chaucer's Canterbury Tales. The history of the

art of the European pilgrimage roads is well known, and it forms a distinct period of medieval art. A similar tracing out of pre-columbian pilgrimage roads in Mesoamerica is already possible, using such traits as architectural profiles on platform terraces, and iconographic motifs and themes.

Olmec Heads

TP does not touch upon the problem of the seriation of the big Olmec heads, perhaps because she did not wish to overcrowd her inventory paper with a question that requires a long history. But to art historians (and we all are art historians when our main evidence is the sculpture itself) the seriation raises an issue of period and workshop. When I proposed a seriation (written in 1959 and published in 1962 in the Pelican History of Art), it was based upon a number of 2-valued traits: conical heads or long heads; yoke brows or furrowed brows, blank eyeball or carved iris; closed lips or parted lips. The heads having conical shape, yoke brows, blank eyeballs and closed lips form one group (e.g. LVI) and the long heads with furrowed brows, carved irises, and parted lips are another (e.g. SL 4). Assuming that schematic conventions preceded more lifelike ones, I placed the first group earlier than the second. Charles Wicke's dissertation soon after made use of Gutmann scaling to attempt a seriation, which seemed to confirm mine as TZ/LV/SL in chronological order. Michael Coe's own seriation made before his 1966 excavations at San Lorenzo places TZ at the end instead of the beginning. His excavations then convinced him, later on, that SL preceeded LV, on the evidence of C14 dates for the ceramic stratigraphy in the pits where the San Lorenzo heads had been buried. But there still were heads at SL with LV traits, and vice versa, so that Coe's seriation seemed to disregard the stylistic evidence, although he speculated at first "that there was a transfer of some monuments...and presumably leaders to La Venta..about 800 B.C." (mimeographed abstract by M. Coe.)

Later on in 1968 Coe suggested that all the heads had been carved in less than a century. The problem of seriation was not discussed at the Dumbarton Oaks Conference. But it is clear that one style centers at La Venta, and another at San Lorenzo. What is the meaning of these distinct styles? Do they reflect period or workshop? If all are nearly the same age, two workshop traditions must be present. If the two groups are of greatly different ages, such as 1200 B.C. and 400 B.C., there is room for slow development. By analogy however, with Greek Kouros figures, or early Gothic portal figures in France, a brief development not longer than two centuries seems likely, perhaps with migrant sculptors moving from site to site. But as TP remarks on page 2 concerning San Lorenzo "we have no data either on architectural assemblages or on the forms of buildings at that time".

To her words I want to add my own doubts about Coe's placing of the megaliths in the Olmec sequence. These large stones behave differently from sherds. Sherds are discards - but megaliths are too valuable to stay long

like sherds on the refuse heap. Megaliths are as restless as heirlooms and they rarely remain long in one place. They return to use again and again, being exhumed, transported, smashed, mended and reappearing where and when the need for big sculpture recurs. An ancient megalith incorporates tradition and it therefore invites removal while resisting destruction. Being mineral its own historic age cannot be known by radiocarbon: it looms like an uncharted island upon our imperfect maps, skewing our graphs, and drawing our theories to destruction. Dating megaliths by the surrounding strata is like dating a piece of sculpture by the architecture of the museum containing it today.

Why are the heads so big? For such work to exist there must have been an artistic tradition and a psychological demand, as well as a suitable setting. Artistic traditions comprise meanings, figures and techniques. The iconographic tradition was humanistic, in that important meanings were conveyed as personifications. The figurative tradition permitted portrait likenesses and natural appearances. The technical tradition allowed subtle effects of fleshy texture and animated gaze.

None of these is likely to spring suddenly from nowhere, and if Coe is right in assigning the great heads to the San Lorenzo phase (1200-900), the antecedent stages are totally unknown to us, and we find ourselves again in what I call Vaillant's dilemma by having to assign an early position to late productions which we know intuitively to have emerged from a long preparation.

Macrotechnics

Men's rational observations and experiments during stone age periods often required extremely large scale instruments and theaters of operation. Stonehenge and Avebury in England are gigantic observatories prefiguring small optical instruments of glass and metal. Like Stonehenge are those observation platforms in America composed of buildings at whose calculated intervals the sun was seen to rise on the solstices and equinoxes, as at Teotihuacan or Uaxactun. The star-sighting lines stretching many miles across the south Andean coastal deserts, which have been studied by Paul Kosok and Maria Reiche, are another instance of the effort to achieve accuracy by magnifying the size of the instrument or position taken by the observed.

It also seems justified to speak of a macrotechnic character in early instrumentation, a character which reappears in craft operations where primitive instruments are used to achieve work of great delicacy and precision. People using stone tools must also observe a direct and necessary relation between the size of the instrument and the scale of the work it can be made to produce. A stone hand-axe cannot be made to produce minute effects nor can the drills useful for working jewel stones like jadeite be made to produce large sculpture economically. Indeed the effort to shape stone with stone tools inevitably led to the realization that an enlargement of the work

to colossal proportions was the only way to achieve finely detailed control over sculpture. Stone hand tools have their characteristic weights and shapes: a stone blade-edge will cut finer detail when the size of the work itself is enlarged, but below large work-sizes, stone tools cannot shape lines or modelling finer than their own edges. It is like the problem of trying to draw a map with a pen coarser than the scale of representation: the line showing a river looks many times wider than the river should. Thus the Olmec sculptors, envisioning and wanting finely modelled anatomical detail, discovered that they could achieve it in stone only by working at the largest available scale.

The lessons thus learned must have been analogous to working today under great magnification: the mind can witness the effect of every stroke in a manner otherwise unknowable at ordinary scale. Colossal sculpture thus was a mode of discovering the correspondances between organic forms and their representation. The work permitted the invention of ways of representing life forms all while verifying their plausibility or fidelity to the model, by magnifying the work-size beyond the limitations of neolithic tool-size. In this perspective, colossal sculpture was analogous or equivalent to drawing in more recent time. Where we experiment by drawing our idea, the Olmec sculptors felt their way into the unknown or uncharted domains of exactly representative art by sculpture with stone celts and mauls and picks, which they wielded as sensitively as a draughtsman handles his pencils and brushes. Among early civilizations elsewhere, the emergence of painting is likely, as in the Mediterranean civilizations, to follow after sculpture, and to depend upon conventions of representation established in sculpture. This was perhaps because of the same proclivity among early figural artists to prefer full-round work to illusion in two dimensions. Illusionism was technically more difficult, depending for its appearance upon a prior mastery of full-round replication before the devices of illusionism could be approached, first in low relief sculpture, and later in paintings and drawing. This simplistic version of the earliest history of art has an old history in art theory, but this version is suggested by the archaeological record for Mesoamerica, as Michael Coe and Ignacio Bernal have made clear in their writings, and as the colossal heads themselves lead us to believe. Bernal's phrase about classic Maya "painted stone" is a happy find.

Our most penetrating recent insights into the nature of all artistic process was given by Ernest Gombrich in Art and Illusion, when he showed how images arise from coded schematic conventions more than from direct observation. In providing a psychological model for this process, whereby works of art are generated out of other works of art rather than by the artist's returning to nature, Gombrich was extending the argument first presented by Henri Focillon in 1934 as the Life of Forms, which was later popularized by André Malraux in 1950 in The Psychology of Art.

This argument proposes that the making of images depends upon schematic conventions. These are codes for stating relations which will make images look like nature. Such schemas are: placing forms, coloring them, marking their texture, and devising clues to expression. The schemes do not simplify or abstract so much as classify and articulate. They are relational coding conventions, classifying experience in a game like that in which the players agree to describe everything in a two-term language with no other words than "ping" and "pong". It is Gombrich's contribution, based upon the psychology of form-perception, to have seen that finding such a code must precede the making of images. In a next stage, the making of images precedes their matching against nature. Finally, matching precedes correction. This model of operations explains why art has a history. Indeed all artistic discoveries are equivalences enabling us to see reality as an image and vice versa.

Gombrich goes on to establish that the form of an image is affected by its function. Greek images serve a narrative function; Renaissance forms convey a structure of space; Chinese landscape painting serves the aims of poetic invocation. Modern art in turn proceeds by finding, making, and matching equivalences for the inner psychic world in a coded relational convention like those of the other major historical configurations.

No part of American antiquity was considered by Gombrich in this context, but Mesoamerican visual traditions fit easily into the schematic conventions of his analysis. He regarded "nature" as the object of European mimesis or imitation, but in ancient America, there is no systematic effort in this direction, because the idea of "nature" was differently present, being conveyed more by a wide range of cult practices and animistic beliefs than by natural philosophy.

Because our knowledge of ancient American thought about the natural world is mainly restricted to artifacts which suggest ritual use for cult purposes, we may substitute "cult" for "nature" as the object of imitation.¹ The pre-Columbian artist's aim was to find coded conventions corresponding to the profusion of cults in which American myths were embodied and to make images that would be recognized as portraying cult practices. The relational code and the making of equivalent images, followed by matching and correction, thereupon yielded, as they did elsewhere in the world, a history of art.

Ever since Greco-Roman art, as in Pompeian murals, the key inventions in the European relational code have been foreshortening, tonal modeling, texture by highlights and physiognomic clues to expression. But few of these inventions appeared in ancient American art.

1) In place of the perspective convention of foreshortening, however, we can substitute another sort of drawing. Here each delineation is spread out for the greatest ideational clarity, in forms often approaching the orthogonal projection of architectural drawing, as in Mexican manuscript and mural traditions.

2) Instead of tonal modeling, we can consider color symbolism in ancient America. These flat tones without shaped modeling describe ideas rather than appearances. They mark cardinal directions, and symbolize elements, such as earth, fire, air, and water, as well as portions of calendar and places and titles. As in heraldry, ancient American color is not descriptive but prescriptive: color changes as to meaning instead of changing as to appearance.

3) The suggestion of material texture by highlighted accents derives from tonal modeling and it is therefore absent from the American relational code. If the nature of materials cannot be described by conventions in line or color, ideas such as ripeness, richness, or glossiness can be suggested by other means. For instance, an ideograph signifying preciousness and representing jewelled ornament may be infixed or affixed as an explanation in a glyphic composition which approaches the pictorial forms of writing.

4) The European coding of expression by physiognomic clues has many ancient American parallels. Transcendent rapture can be suggested by prayerful posture as in the classic Maya wooden kneeling figure in the Museum of Primitive Art. Erotic excitement appears in some Jaina figurines, where theatrical posturing and menacing gestures were also possible. Maya wall painting at Bonampak resembles Egyptian New Empire mural art as to expressive variety, symbolic color, and linear indications of texture. Classic Maya ruler portraits in monumental sculpture distinguish young and old in several age groups, but the sculptor's resources for indicating emotions were underdeveloped, being channeled into allegorical forms and associated glyph-like attributes.

Early writing

Several points about early writing are in order here. Writing can properly be regarded as a method for miniaturizing or compacting of more bulky communications, such as a sculpture or painting. In this context writing seems to separate two functions. Where figural art both represented and communicated, performing two services simultaneously, phonetic writing does not imitate by images. It merely communicates, by non-representative signs.

But in Mesoamerica it is not yet clear whether writing was either phonetic or logographic or both. The advantage of logographic writing, as we know from European road signs for motorists, is that pictures are instantly legible in every language, whereas phonetic signs require translation. If Maya writing, as Thompson or Proskouriakoff suppose, was less phonetic than logographic, then Olmec written signs, which still are undeciphered, can be supposed to have been mainly logographic, for use by pilgrims and foreigners as well as by local adepts. This, I take it, is the sense of Prem's "compounded ideograms."

TP assumes the existence of manuscript painting as early as Olmec time, unless I mistake her meaning on page 152. I think that she finds her support only in the similarity between early sculptural conventions and the manuscripts we know, none dating from earlier than 1000 A.D. at the earliest. It is well known that classical Mediterranean manuscript painting appeared only in late Imperial Roman books, recapitulating long prior sequences of sculpture and mural representation.² The case is mentioned, not to suggest a necessary law-or-necessity, but only to mark the generic "lateness" with which book illustration is usually associated among art historians.

On page 147 TP assigns a greater role among peoples to visual imagery than to writing and mathematics like Prem on page 112. I would agree, with the modification that visual imagery in Mesoamerica was adapted very early to serve as writing, and that what is called writing never was divested of all its attributes as visual imagery.

The case of classic Maya inscriptions is most revealing here. Thanks to TP, we have gained since 1960 an entirely new historical approach to the inscriptions, but it is now evident that about half the glyph blocks, or less, in most texts pertain to calendrical matters. The remaining blocks give names and titles. Some verbs - 8 or 10 "action glyphs" - have been identified, and another handful of place-names. The gist of these historical clauses seems always to pertain to local individual rulers or priests whose lineage, titles, offices, and services in war or peace are enumerated. But the calendrical armature of the Initial Series date, supplementary series, and distance numbers, as well as occasional cyclical counts like the 819-day augural count, actually take up most of the room. The interstices, which sometimes admit only one or two glyph blocks, are not big enough to contain vast amounts of information. As Thompson put it, "tenses and pronouns seem to be absent".³

Another inference to be drawn from the historical signs concerns the intended values of the graphemes. Like the calendrical portions, these historical sections convey little or no phonetic value. They are more logographic than we used to believe. Entire thoughts are conveyed by one glyph block, composed of many graphemes, as in modern advertising "logos" (shortened from logograms), in which one simple but pregnant schema conveys the nature and use of something being advertised. In the Maya glyphs phonetic and syllabic values⁴ are not excluded, but their occurrences seem less systematic than one would hope for in an alphabetic writing like the one Knorozov has proposed.

It may be that Maya writing records few Maya sounds, and that its function was more to provide a visual language to be understood without reference to any single language or dialect. Thus the bar-dot numerals are intelligible across all barriers of speech, like the period glyphs and the lunar expressions, all of which get meaning from their positions in the long Initial Series clause. In this respect Maya inscriptions are less like writing as we know it than like a pictorial coding for historical information. Thus an emblem is usually terminal

in a clause opening after a secondary series date. Action glyphs can precede names, but names occur without such prefatory remarks. Another glyph-cluster states that the subject captured a prisoner; others have to do with sacrifices and bloodletting; with birth, inaugurals, anniversaries and death. Of this code, the rare full-figure glyphs convey historical material, as on monolith B at Quirigua. There, the appellative of "Two-legged sky" and the emblem of Quirigua are given in full figure variants at the end of the full-figure clause. This code may have originated with schematic pictorial expressions which were keyed into a sequence. If so, it is possible that the full-figure (Stela 1, B_z2) glyphs like those at Tikal or Yaxchilan of early classic date reflect more of the earliest preliminaries of Maya historical coding than previously believed.

Thompson (HMAI, 3:2, 1965, 636) was the first to compare Maya non-calendrical writing to historical coding in Oaxaca. Such records appear on the Zaachila slabs as well as in genealogical manuscripts. Their pictorial character is much more primary than in the Maya coding, but the relationship between the date and the event to which it pertains is like that in Maya inscriptions. In Oaxaca, the record is more concerned with events and less obsessed with dates, but the intended meaning emerges from the position of the pictures in the sequence, and the relationships of the figures are regularly coded to a limited number of types. Barthel has recently commented on these parallels between Mixtec genealogies and classic Maya stone reliefs.⁵

To conclude: "emergence" is like the actor coming on in the prologue to the play. But unless he can say something of value to the audience they may walk out on him. Here is the question once again, of the value systems in this, the grandest of games, about which G. Willey spoke in his Wenner-Gren Conference paper (this volume).

ENDNOTES

1. Arild Hvidtfeldt, *Teotl and isiptalli*, Copenhagen, 1958.
2. K. Weitzmann, Flinders Petrie was the first to propose such a sequence.
3. Thompson, 1956 HMAI, 657.
4. Thompson (HMAI, 3:2, 1965, 939, 645, 652-3) shows that "shifting of affixes argues against syllabic decipherment;" that particles were expressed as affixes (al, il, te); and that Yucatec rebus puns alone received pictorial treatment. On the other hand, he regards pictorial glyphs as insignificant (656). Thompson recently has developed the idea of "Metaphorgrams".
5. ZE, 1969.

XIII. MESOAMERICAN TRADE AND ITS ROLE IN THE EMERGENCE OF CIVILIZATION

Lee A. Parsons
Barbara J. Price

It has long been recognized that commerce, trade, and market systems were institutions integral to the fabric of Mesoamerican civilization in the Late Postclassic period. Blom (1932) notes that the first Spanish contacts with the Indians of Middle America were with Maya traders off the coast of Yucatan. Ethnohistoric sources citing the instrumental role of long-distance commerce in the establishment and maintenance of the Aztec Empire are exceptionally rich (e.g. Sahagun 1959, Diaz del Castillo 1958). The relationship of trade to social complexity has been noted by, among others, Julian Steward, who considered trade comparable to irrigation in stimulating centralized political control and empire formation during the Classic (Steward 1955). The principal concerns of this paper will be developmental: how did these very striking Postclassic patterns emerge? We feel that trade relations between populations living in closely juxtaposed ecological zones of widely different characteristics and potentials probably existed virtually from the initial human settlement of Mesoamerica. But we also consider that at different times, with the growth of population and the evolution of complex society, the cultural patterning of this trade would have been very different. This paper will thus be a diachronic consideration of the relationship between trade and other sociocultural institutions.

By Early and Middle Preclassic times (1500-600 B.C.), commercial networks, on the basis of evidence to be presented later, were well developed; in many regions of Mesoamerica the critical steps toward the emergence of civilization had already been taken. The framework we shall use to analyze these developments will be that of the co-tradition, on Bennett's (1948) and Armillas' (1948) models (cf. also Parsons 1964). We thus have locally specialized sequences of cultural evolution crosscut periodically by pan-Mesoamerican horizon styles. The first of these was the Olmec, following subsequently by Teotihuacan, Toltec, and Aztec; all involved widespread diffusion of artifacts, raw materials, iconography, and ideology. Because all these constitute horizon styles, however, does not imply that the cultural patterning of the diffusion was the same in each instance. We shall reconstruct the Formative institutions as quite different from the Classic and Postclassic ones. To varying extents in each case, commercial contacts, military conquests, or interchange of religious and other specialists may have been involved. Trade in objects and commodities would have been accompanied by the diffusion of the religious and sociological complex common to the Mesoamerican co-tradition. For periods prior to the Late Postclassic we must rely exclusively upon archaeological evidence to infer and reconstruct the

total cultural context of interregional trade.

Understanding of the geography of Mesoamerica is essential to understanding its entire evolutionary sequence. The simplest and most fundamental dichotomy is between highland and lowland areas; throughout the archaeological sequence the ecological differences between the Mexican highlands to the northwest and the Maya lowlands to the southeast were significant dimensions of cultural contrast. As will be discussed subsequently, each of these areas is in turn culturally complex and internally diversified, particularly the highland region. Besides these two major zones, there is a third perhaps equally important one, a transitional area called the "peripheral coastal lowlands" (Parsons 1967, 1969). Included in this long continuous region is the Gulf Coast of Mexico and the southern Pacific Coast of Chiapas-Guatemala-El Salvador; the Isthmus of Tehuantepec is the geographic link between these two coastal plains. Throughout the course of Mesoamerican history these linked coastal strips served as channels of cultural transmission. Evidently also, important steps in the development of civilization were taken in this transitional region during the Preclassic: it was the heartland of both the Olmec and the subsequent Izapan cultures, and of the still enigmatic Monte Alto culture of the Pacific Coast of Guatemala (Parsons and Jenson 1965). It is, furthermore, this well-watered region which provided the best lands for the growing of cacao, which was a major pan-Mesoamerican medium of exchange.

The close proximity of different ecological zones in Mesoamerica was of major importance to the evolution of complex societies which at no time in their history possessed any means of overland transport or communication more efficient than the human foot and back (Sanders and Price 1968). Both the highlands and the lowlands supported high civilizations, but civilizations of different types, stimulated by different causes. In the highlands microgeographic zoning fostered, with increasing populations, specialized cultural adaptations in adjacent subregions offering different resource potentials. Local symbiotic trade relations developed between such specialized ecological niches (Sanders 1956). This intra-regional trade involved local-level exchange of basic subsistence and craft commodities. The geographical diversity provided both permissive and, with population growth even forcing, conditions stimulating local commerce and the probable early development of markets--a situation linked intimately and causally with the growth of cities (Coe 1961, Sanders and Price 1968). Trade in the highlands was thus local, as well as long-distance or interregional.

By contrast with the highlands, the Maya lowlands are relatively undifferentiated ecologically. Intra-regional trade in subsistence staples was thus comparatively undeveloped; virtually all usable lands produced more or less the same things, and there were few differences of harvest times within the lowland zone. With the evolution of complex society, however, long-distance trade in exotic sumptuary goods is well-documented (cf. Roys 1943, Chapman 1957). Sabloff and Tourtellot (1969) correlate this long-distance

trade with a pattern of direct exchange between elite personages of distant territories, primarily of prestige or luxury goods--goods which would have been sufficiently valuable in small enough quantities to permit regular exchange. Maya utilitarian imports included salt, obsidian, and basalt.

At least by Postclassic times there are striking differences in the sociological patterning of long-distance trade in the Mexican highlands and the Maya lowlands: these are different kinds of civilization. Chapman (1957) observes that while the Aztec used professional merchants, Maya trade was the prerogative of the nobility. This distinction in personnel may be a function of the relative importance of and degree of reliance on the trade network in these two areas--i.e. a function of market size and volume of trade. The Aztec maintained networks of sufficient scope and volume to both warrant and support a group of full-time professional middlemen. Maya trading contacts were, however, more restricted and could thus be handled perfectly well by the small group which would itself ultimately consume the luxury goods in question. There probably would not have been enough business to maintain a sizable class of professional traders.

Through the course of Mesoamerican cultural development the intensity and volume of interregional trade varies quite markedly. Periods of relative local retrenchment alternate with what seem to be bursts of commercial activity and cultural expansion. These latter constitute the horizon styles which periodically unify an extraordinarily diverse area into a single co-tradition. Well crystallized by the Middle Formative (Parsons 1969: Ch. 5), this co-tradition based on trade among culturally diverse units provided a mechanism for the spread of many other culture traits as well.

Since the topic of this symposium concerns the emergence of civilization, it may seem odd to begin with the Postclassic. Yet it is here that our evidence is most complete; further, the Postclassic represents the maximal development and greatest complexity of Mesoamerican exchange systems. One of our aims is to clarify the relative chronology of various aspects of the system, and it thus seems advisable to begin here. We have mentioned the differences between the Aztec and the Maya institutional arrangements for long-distance commerce, and their correlation with different types of civilization. The Aztec long-distance trade pattern cannot be understood except in the context of the Aztec state and its policy of militaristic expansion. Professional merchants--the *pochteca*--were a hereditary class of considerable wealth and high, though non-noble, status, who directly served the ruling elite and received protection from them in return for supplies of luxury goods. In much the fashion of medieval European guilds, they had their own deities and rituals. Perhaps their most noteworthy structural characteristic was the fact that they were in large part directed and controlled by a well-developed state; they served as one arm of an expansionist political hierarchy, and their economic activities were part of state economic policy. Chapman's hypothesis is that trade precedes tribute. Aztec *pochteca* would enter an area, conduct

commerce in politically neutral ports of trade (established at ecological and/or political frontier zones), and spy out the land. The trade routes were protected by military garrisons, and the merchants frequently acted not only as spies but as agents-provocateurs. Once an area was conquered and consolidated into the Aztec Empire, its goods were channeled into Tenochtitlan not by trade, but rather by taxation and tribute. Presumably not all groups of professional merchants shared these structural characteristics; we would consider it misleading to call them pochteca. Unless merchants exist in this kind of relationship to a state, they are functionally and probably structurally a very different kind of organization. We feel it probable, on the basis of archaeological evidence to be discussed below, that the origins of the pochteca are probably in Teotihuacan times. There is little evidence that the Lowland Maya ever possessed a comparable institution.

In all periods land transport was primitive, dependent on foot porters. This acted as a severe limitation on the kinds of goods that could be exchanged profitably over long distances, restricting these to items valuable in relatively small quantities. It has been suggested that the subsistence staples imported to feed Tenochtitlan came from a radius of only about 200 km., though the Empire as a whole was much larger (Sanders and Price 1968). Bulky and heavy subsistence goods such as grain could not have been adequately handled; thus the sustaining areas for population clusters remained local ones. Land routes followed lowland trails, open plateaus, and mountain passes. Coastal, riverine, and lacustrine navigation were practiced; Thompson (1964:20) quoting Ponce de Leon notes

A sea route for commerce from Tehuantepec and points beyond to the province of Soconusco, and thence one may suppose, to Guatemala, existed, the canoes traversing the coastal lagoons sheltered from the sea by long spits of land.

Scholes and Roys (1948) discuss the evidence for coastal trade routes around the Yucatan peninsula, from the Gulf of Mexico to the Gulf of Honduras. The use of boats was known as well in local trade where geographical conditions permitted; Cortes could starve out Tenochtitlan by his control of Lake Texcoco.

It is probable that the major trade routes, by land and water, were established during the Formative and continued in use thereafter. As previously mentioned, by Aztec times politically neutral ports of trade were established at strategic junction points along these routes, often at ecological or political boundaries or on coastlines (Chapman 1957). Among the major ports of trade at the time of the Conquest were Xicalango on the Laguna de Terminos, the inland town of Acalan at the base of the Yucatan peninsula, Chetumal on Yucatan's east coast, and the coastal areas along the Gulf of Honduras. Soconusco, along the Pacific side of Chiapas and Guatemala, was only in part a port of trade; part of this area had already been incorporated into the Aztec Empire.

Ports of trade, known from various parts of the world [Guinea (Arnold 1957); the eastern Mediterranean (Revere 1957); India (Leeds 1961)], were distinct from markets in physical location, function, and personnel. Those engaged in long-distance commerce met there directly; warehouses were provided for the storage of goods awaiting transshipment, as were living quarters for merchants. The areas in question constituted politically neutral territory, presumably because it would have been profitable for all concerned to maintain this status; nonetheless, the neutrality must have been at best precarious, a function of balance-of-power relationships among the parties involved at any given time. As one party gained advantage over the other, the neutrality of their meeting place would be lost, in that the stronger would in all probability absorb it, thus pushing back the buffer zone between the polities. Most of the goods so exchanged were elite or luxury commodities, destined ultimately for consumption by an upper class; this seems to have been true particularly for the Lowland Maya, where local markets for the exchange of utilitarian produce were undeveloped. Where the ports of trade were adjacent to cities with markets, they were at the outskirts, with physical separation between long-distance and market trade and their respective participants. For Tenochtitlan-Tlatelolco the separation between the administered trade and the market system seems rather less clear. Bernal Diaz' description of the daily market at Tlatelolco (1958:215-217) implies that at least some of the exotic goods imported into Central Mexico either by pochteca or by the tribute system found their way into the market, where they could presumably be purchased by anyone able to afford them. In his partial inventory he includes, for instance, precious stones, gold, silver, copper, skins, slaves, cacao, feathers, cotton cloth, dyes for sale. Few if any of these items are local utilitarian produce of the Basin of Mexico. Exchanges in ports of trade were primarily by treaty, while in markets copper axes, quills of gold dust, and cacao beans served as forms of currency.

The institutional patterning of Postclassic commerce is in both highlands and lowlands a context of fully developed civilization, what Service (1962) calls state organization. We have earlier observed that these civilizations were of different types, and that the distributions of these types correlate with geographical and ecological differences. Since this paper will deal with the problem of the emergence of civilization, it may be that the differences observed synchronically in the Postclassic have diachronic implications. Coe (1961) links social typology to the degree of environmental differentiation. Relatively heterogeneous environments tend to stimulate the growth of "organic" societies, composed of many interdependent specialized groups. More homogeneous areas, such as the Maya--or the Olmec--lowlands, tend to be correlated with what he calls "unilateral" (Durkheim's "mechanical solidarity") societies, where specialization of component groups is weak or lacking. Both types are hierarchically organized, but their settlement patterns differ. The growth of nucleated settlements, a necessary condition for urbanism (Sanders and Price 1968), is characteristic of the "organic" society in the heterogeneous environment. It may in part

be the relationship between economic specialization on the one hand and the concomitant symbiosis between groups that makes nucleated settlement adaptive: where even rural producers are dependent on regular access to markets for necessities of daily life they do not themselves produce, this settlement pattern may facilitate such access (Price 1968). In Coe's unilateral, Sanders' and Price's nonurban civilization, the typical settlement pattern is instead one of dispersed rural populations serving ceremonial or cult centers governed by elite rulers and controlled by a dominant religion. Given more generalized rural producers and weakly developed markets, no advantage would accrue to nucleated settlements. In the lowlands, moreover, the agricultural system would have militated quite strongly against such settlements, while in the highlands permanent and often irrigated cultivation acted to permit them.

Coe (1961:84) considers that

....these poles might also represent different points of origin of the state; one based on the necessity for trade regulation (organic societies), the other on the authoritarian control of tribute and corvee (unilateral societies).

This, we feel, is open to question as stated. Steward (1955) considers the regulation of trade to have been a major power base for the Teotihuacan elite, while for the Maya trade would not have been as critical to the total economy. It is evident that trade and all kinds of associated institutions reached a greater complexity in the highlands than was the case in the lowlands. So too did the total societies, of which these institutions are parts. By the Postclassic, highland societies were characterized by a complex system of social classes, with the pochteca as a possibly emerging true middle class. While Maya society was also stratified, there were fewer classes, and the relationships between and among such classes appear simpler. The unilateral or nonurban civilization is thus simpler--fewer parts and relationships among parts. This does not necessarily imply that it is earlier. Sanders and Price (1968) have suggested that it may represent rather a secondary state in Fried's (1960) terms, derivative from neighboring fully urban states which reached this level considerably earlier. The Sanders and Price interpretation would fit at least Coe's two examples, Classic Maya and Classic Khmer.

This problem will become acute as we turn to a discussion of the Middle Formative, clearly a threshold period in the evolution of Mesoamerican civilization. We will subsequently consider this question of institutional continuity between the Preclassic and the Classic-Postclassic. Our problem is complicated first by the absence of documentary data--we must rely exclusively on archaeological evidence to reconstruct cultural institutions. Second, we cannot assume that all elements of the Postclassic complex, particularly of the highland variety, are of equal time

depth; this begs the question we wish to investigate. Coe (1965a:122-123) has suggested that the essential features of the Aztec system of foreign trade originated in Olmec times and continued as a basic pattern throughout the history of Mesoamerican civilization. The succeeding discussion will indicate our very real disagreement with this point of view.

We will begin with a consideration of the substantial archaeological evidence of long-range trade among the Olmec. The principal non-perishable Preclassic trade commodities--obsidian, jade, serpentine, magnetite, and ilmenite--will be discussed below; it is these that are most easily documented on the basis of purely archaeological evidence unaided by the written sources of later periods. It is highly probable that many of the perishable commodities listed below as of known importance in the trading networks of later times were significant in the Preclassic exchange systems as well. Of known importance in Postclassic times were the following: herbs, dyes, tobacco, copal, salt, honey, wax, rubber, cotton, textiles, feathers, animal skins, shark teeth, stingray spines, marine shells, lime, flint, amber, cinnabar, hematite, pyrite, mica, semiprecious stones, volcanic and metamorphic rocks, and captive slaves.

It is significant that probably the earliest trade network thus far documented for the Olmec involves the procurement of obsidian from a number of sources. The green obsidian at La Venta derives from the lava flow at Pachuca, Hidalgo (Heizer et al. 1965:96): "Since the La Venta site is three hundred miles distance from Pachuca we have clear evidence of long-range trade." Two samples of black obsidian found at La Venta have as their probable source the famous deposit at El Chayal in the eastern highlands of Guatemala (Stross et al. 1968:61). As early as the Ojochí phase at San Lorenzo imports of obsidian from a number of sources have been established by X-ray fluorescence spectroscopy (Coe and Cobean 1970)--including the Pachuca and El Chayal deposits and the deposits at Teotihuacan itself. This last-named source is interesting because the associations of this obsidian at San Lorenzo antedate the evidence of significant occupation at Teotihuacan Valley itself (cf. Sanders 1965). The demographic history of the areas of Pachuca and El Chayal is not well known. Some obsidian may thus have been imported into the Olmec heartland by expeditions sent into unpopulated or relatively unpopulated areas, as well as by exchange with local populations which controlled these resources. At this time it is difficult to say. We shall, however, later return to the question of the cultural implications of trade in this very basic commodity--one of the earliest known trade goods and one which remains significant through the entire Mesoamerican sequence.

Olmec centers are known to have transported quantities of volcanic rock (basalt) and metamorphic rock (such as greenschist) from specific sources as far away as the Tuxtla Mountains and the Sierra Madre del Sur, respectively (Williams and Heizer 1965). Raw materials for manufacturing Olmec

concave mirrors--magnetite, ilmenite, hematite--had to be imported from the Sierra Madre del Sur (the highlands of Oaxaca and Chiapas) some one hundred kilometers to the south. Williams and Heizer (1965:12) believe that the source of ilmenite was the vicinity of Niltepec on the southeastern margin of the Isthmus of Tehuantepec. Flannery (1968) presents strong evidence that the Olmec obtained magnetite and possibly even finished mirrors from sources near the Valley of Oaxaca where workshops and even small magnetite mirrors identical to those at San Lorenzo were excavated. Something like 5000 tons of serpentine are known to have been carried to La Venta alone (Heizer 1961:44). That author suggests that its source also was Niltepec. However, deposits of serpentine are fairly widely distributed in the highlands, and it is noteworthy that serpentine and jadeite may be expected to occur together geologically. Serpentine deposits may be found in many localities in the Guatemalan highlands, and also near Tehuitzingo in southwestern Puebla (Foshag 1957). It may be significant that Tehuitzingo is not far, as Coe (1965a:123) notes, from the Olmec outpost of Las Bocas.

Surprisingly there is to date only one positively known source of jadeite in Middle America--the Manzanal region in the Sierra de las Minas, on the edge of the Motagua Valley in eastern Guatemala, where displaced jade boulders have been found in quantity in stream beds. Since jade was the most highly prized Olmec luxury substance, commerce in this material especially may have been responsible for much of the observed distribution of Olmec materials in various parts of Mesoamerica. Raw jade was probably imported to the Olmec heartland from more than one locality; finished portable jade sculptures in Olmec style became widely distributed, perhaps as re-exports, throughout Middle America--from the Central and Western Mexican Highlands as far south as Costa Rica. Unfortunately, most known examples of carved Olmec jade celts and figures from localities outside the Gulf Coast come from unknown archaeological contexts. Other possible sources of native jade are the Maya Mountains in British Honduras (Thompson 1964:27), the Guatemalan Highlands, Costa Rica, and the Rio Balsas Valley in Guerrero. Carved jade artifacts are especially abundant in the last two regions, including the translucent blue-green variety so highly prized by the Olmec. Coe (1965a:123) proposes that the Olmec established and maintained a Jade-Serpentine Route leading through Puebla and Morelos to Guerrero for the purpose of importing these raw materials and perhaps finished artifacts; he suggests that the principal Olmec export may have been rubber and ball game paraphernalia.

Costa Rica is an even more likely source of the Olmec blue jade, as Stirling (1961:46) observes; this view is strongly endorsed by Easby (1968:87), who proposes that the prolific jade working tradition in Costa Rica developed because of Olmec stimulus in the Middle Preclassic. The mechanisms of such stimulus will be discussed below. However, in Costa Rica, besides a few objects of pure Olmec style, there is also an indigenous Olmecoid style. According to Easby's evidence, trade contacts between Middle and Central America continued to be strong through the Late Preclassic and Early Classic, when jade working gave way to craftsmanship in gold.

There is no doubt that Olmec was thus capable of maintaining a regular, patterned and fairly far-flung network of import-export trade in a number of commodities. It is probable that most of the goods involved in such networks in later times were already being exchanged in the Middle Formative. But it remains for us to analyze the probable sociopolitical matrix of this commerce, and thus of Olmec culture as a whole. Any ultimate statement of the unquestionably critical role of Olmec in the evolution of Mesoamerican civilization is incomplete without an attempt to infer the causal parameters.

As we have previously mentioned, Coe (1965a) hypothesizes that Olmec trade networks were ancestral to the Aztec institutions:

A more mundane explanation of the Classic and Pre-Classic states of Mesoamerica shows structural unity between the earliest--the Olmec, and the latest--the Aztec. I do not believe the Aztecs were very different from all the peoples who preceded them in central Mexico. (1965a:122).

and

Specifically, it is proposed that the Olmec ruling class, in its role as the allocator of scarce goods in a redistributive economy, had certain needs for rare raw materials and other luxuries which could only be met by long-distance trade beyond the frontiers of the Olmec state, and that a professional trading class satisfied these needs, carrying the culture and art style, along with Olmec religion, to remote lands. (1965a:123).

Coe speaks (cf. also Coe 1965b) of Olmec *pochteca*, ports of trade, and colonies established by missionaries (1962) and by military conquest (1962, 1965a). In effect he is projecting documented Aztec institutions back into the Middle Formative in what we consider to be an uncritical and somewhat misleading fashion. It is our view that the Postclassic pattern indeed represents continuity with the past, but that it does not crystallize until the Classic, following which it was maintained and probably expanded but without major change in principle.

Evidence for long-term, as opposed to intermittent, Olmec presence in regions well outside their Gulf Coast heartland is incontrovertible. Non-portable stone monuments and carvings are found from Morelos to the southern Pacific Coast. Sites with heavy Olmec influence include Tlatilco, Tlapacoya, Las Bocas, Chalcatzingo, and Gualupita in Central Mexico; Padre Piedra and Pijijiapan in Chiapas; San Isidro Piedra Parada and Sin Cabezas in Guatemala; Chalchuapa in El Salvador. The relationships between the location of these

sites and probable trade routes has been noted by Grove's recent work in Morelos and southwestern Puebla (Grove 1968). Las Bocas, Chalcatzingo, and other similar sites are situated strategically at the bases of cliffs and at the outlets of principal mountain passes. Coe's suggestion of a Jade Route is accepted by Grove, who considers these sites as Olmec garrisons to protect and maintain the route to the Rio Balsas and that

Olmec sites in Morelos and western Puebla served as commercial control centers, directing the flow of goods from Guerrero and Central Mexico to the east and ultimately the Gulf Coast. (Grove 1968:183).

The Coe-Grove model is thus based on a direct projection of the Aztec pattern. The Olmec-influenced sites in question are taken to represent anything along the continuum between ports of trade and outright colonies. Our view is that they are in all probability trade-connected, but that this need not imply that the Aztec model is applicable. There is no direct evidence of militarism apart from the distribution of the Olmec style, and to invoke this distribution as evidence of military activity is circular. There is similarly no evidence of any proselytizing religion anywhere in Mesoamerica prior to the Spanish Conquest.

Actually, another model, proposed by Flannery (1968) would seem to fit the observed data rather better. This is thus far one of the most sophisticated attempts to explain and interpret the economic institutions of the Middle Formative, and it pictures a total society very different in structure and function from those of the Classic and Postclassic. Not only is it smaller, but its principles of organization appear to have been dissimilar. Flannery's model is capable of explaining the nature of the Olmec influences on neighboring areas, of clarifying the parameters relevant to the spread of this first of the Mesoamerican horizon styles.

During the Middle Formative there are clear indications of the cultural precocity of the Gulf Coast Olmec relative to the rest of Mesoamerica. The explanation of this precocity lies in the ecological and demographic situation of the time (Sanders and Price 1968: Ch. 7). At a time prior to the development of the technology of intensive, permanent cultivation, given a population whose economic base was one or another variant of swidden agriculture, the most favorable, the most productive area for such a population would have been the Gulf Coast plain. The same technology applied to most highland areas would yield less return, per unit of land and probably also per unit of labor input. Phrased another way, the carrying capacity of the Gulf Coast was greater; it had higher demographic potential than did other areas. The relationship between population size and social complexity has been noted elsewhere (Sanders and Price 1968, cf. also Stevenson 1968). Add to this the probability of differential land use within the Gulf Coast (Coe 1968), with riverine floodplains capable of supporting permanent agriculture, a permanent agriculture requiring little labor input (contrast

the highland areas, where permanent cultivation usually requires a heavy investment of labor); the Gulf Coast in the Middle Formative constitutes a clearly nuclear area.

But in explaining the impact of this nuclear area on other regions it is neither necessary nor accurate to assume that other areas, perhaps somewhat smaller, perhaps somewhat less complex, were static. They cannot be viewed as mere passive receivers of Olmec civilization, contributing nothing themselves to cultural development. This is why viewing the Olmec as the mother-culture is misleading (Price 1970). Various techniques to augment agricultural production were being developed in the Highlands (Flannery et al. 1967; Fowler 1969), which ultimately permitted these areas to overtake and surpass the initial Olmec precocity. Sanders and Price (1968:118-119) have observed that the Olmec or Olmec-influenced highland styles of the Middle Formative seem to contain a sophisticated and not inconsiderable indigenous component they call Amacusac.

These are the considerations underlying Flannery's interpretation of cultural patterns in Middle Formative Mesoamerica. Based on recent work in the Valley of Oaxaca, his conclusion is that it is because Olmec-contemporary cultures elsewhere had independently reached a nearly comparable level of complexity that they could maintain regular relationships of mutual trade. The trading contacts, moreover, affected, again quite explicably, all parties concerned. Many, if not most, of the elite goods found in the Olmec heartland originated elsewhere, and thus represent imports. The wide distribution of portable Olmec objects throughout Mesoamerica represent exports (probably also the perishable goods rubber and cacao). This implies that population groups outside the Olmec heartland controlled certain resources that the Olmec wanted. It was profitable for the Gulf Coast Olmec to obtain such goods through trade, which involved the maintenance of regular ties with the populations in question.

We cannot thus regard the achievement of a relatively high degree of social complexity by non-Gulf Coast peoples as due to Olmec contact. This is not to deny that such contact was without repercussions on these local economies. What Flannery adumbrates, though does not develop fully, is that Olmec trade contacts further stimulated local processes of economic growth. People who already used a given local resource were encouraged to exploit such resources more fully, since they had a ready market for their goods or raw materials. In turn, this provided the base for the expansion of these local economies, opportunities for increased specialization of production and a resultant increase in internal social differentiation. Thus, the working of magnetite in the Valley of Oaxaca; thus also the working of jade in Costa Rica: business in such commodities was booming.

On the basis of the archaeological evidence and reasoning from ethnographic analogies, Flannery infers a sociological pattern quite unlike the

Postclassic. His trade networks are seen as resembling in principle a more elaborate development of, say, Northwest Coast potlatching, or Melanesian Kula ring exchanges. Key individuals in each local group collected the surplus production from that group, for reciprocal exchange with key individuals from other local groups. These nodal points in the economic network were positions of high status; it is possible that sumptuary rules existed to govern the consumption of certain elite goods. It is likely that non-luxury goods were similarly collected and redistributed among groups; the nodal individual would collect these, like the luxury goods, from his followers, and then redistribute among them what he himself received in exchange. We have then a combination of reciprocal and redistributive exchanges. Formalized trading partnerships and/or intermarriage may have regulated this system. Flannery describes the system as follows (1968:105):

First, it seems that the upper echelon of each society often provides the entrepreneurs who facilitate the exchange. Second, the exchange is not "trade" in the sense that we use the term, but rather is set up through mechanisms of ritual and so on. Third, there may be an attempt on the part of the elite of the less sophisticated society to adapt the behavior, status trappings, religion, symbolism, or even language of the more sophisticated group--in short, to absorb some of their charisma. Fourth, although the exchange system does not alter the basic subsistence pattern of either group, it may not be totally unrelated to subsistence. It may, for example, be a way of establishing reciprocal obligations between a group with an insecure food supply and one with a perennial surplus.

And (p. 108);

And the overall function of the whole system may have been to create one big economic sphere where previously many small ones had existed--to set the stage, in a way, for the great interregional symbiotic networks which Sanders (1956) describes for late periods of Mesoamerican prehistory.

Our reluctance to infer Preclassic institutions from Postclassic ones thus stems from a number of considerations. Beyond the trade network itself--which is what we are attempting to reconstruct--there is no evidence, for instance, of a Formative period empire in Mesoamerica. Trade and commerce proceed in the absence of empires, in fact clearly antedate such empires and are instrumental to their formation--but will be very differently patterned. The Formative demographic, settlement, agricultural and other productive systems, on the basis of archaeological evidence, were demonstrably different from those of the Classic and Postclassic; it seems reasonable to suppose that these observed differences may be closely correlated with other institutional differences.

Although there is thus far no indisputable evidence of significant long-range trade postdating the fall of Olmec and prior to the rise of Teotihuacan--the Mesoamerican Late Formative seems to be a period of relatively local cultures without major horizon styles--we postulate the continuation of at least parts of the Middle Formative network during this period. Such continuity would be especially probable in the types of commodities exchanged (though with a decline likely in total volume), and in the principal routes. Teotihuacan may thus have incorporated parts of the older system, but transformed the existing structure into one more consonant with centralized control, a state policy of imperial expansion, and a postulated intimate relationship to military conquest (Sanders and Price 1968: 202-204). The trading networks inferred for Teotihuacan would thus parallel in structure those documented for Aztec times, although quite probably on a somewhat smaller scale, in that the total demographic base for the former seems to have been considerably smaller than the Postclassic maximum. We will thus regard the institutional setting of Classic trade as similar to the Postclassic, but quantitatively and qualitatively different from those we have described for the Preclassic. The discussion which follows will provide the justification for an approach using a model for the spread of the Teotihuacan horizon style different in principle from that which explains the diffusion of Olmec.

We consider Teotihuacan to represent the first empire of virtually pan-Mesoamerican extension. While we will not discuss in detail the components of this horizon style (cf. Parsons 1969: Ch. 5), it is nonetheless our impression that its spread involved a far heavier blanketing of local traditions than was the case with the Olmec style. Teotihuacan objects, including essentially utilitarian or semi-utilitarian ceramic wares and forms, have a far wider distribution in Mesoamerica than even the Olmec luxury items. Local ceramic traditions were profoundly influenced by Teotihuacan styles; Tiquisate ware on the Pacific Coast of Guatemala, for example, includes figurine and pottery types in relatively free copies of Central Mexican types. In the Maya Lowlands, Teotihuacan covered cylindrical tripods have long been considered a diagnostic of the Late Tzakol ceramic complex along with Peten polychrome basal flange vessels; they often occur together in the same tombs. By contrast, Olmec influence on local styles outside the heartland seems largely confined to sculptures (portable and nonportable), and to luxury goods; more utilitarian items seem to remain essentially localized. Furthermore, though Olmec influence is widespread, it appears to be far more spotty, more selective, in its overall distribution--limited to what were probably the peaks of the site stratification hierarchy in the region in question in the Middle Formative--as though, hypothetically, we found considerable foreign influence at Tikal but none at nearby Uaxactun. This is an initial indication of a probable difference in the patterning, the institutional matrix, of the diffusion.

This does not imply, however, that the Teotihuacan influence was quantitatively uniform throughout Mesoamerica. Nor do we suggest that it

constituted a territorially contiguous empire. Rather, the impact of Teotihuacan upon local societies varied according to certain specifiable factors: How distant, geographically, was one from the other? Given primitive transport and communications, all else being equal, the more distant an area was from Central Mexico, the more effort must have been expended to incorporate it. What did the local society have, produce, or control that Teotihuacan wanted? This would determine whether and to what extent it was worthwhile or profitable to control it. What kind of social structure was present in the society in question, and how large was it? This would exert tremendous effects on the patterning of social and political relationships between the groups, including competitive relations. Not all these questions are necessarily answerable at present. However, we may recall that the Aztec Empire itself was equally selective in its expansion, that conquered territories and peoples differed among themselves in relationships with the center, that the empire itself was not geographically continuous in extent. We do feel it probable, on the basis of archaeological evidence to be presented below, that Teotihuacan trading patterns, like Aztec ones, involved institutionalized merchant systems, ports of trade, and the trade-precedes-tribute cycle of succession, in at least some areas. Additionally, this evidence suggests actual colonization of selected areas, which very probably involved militarism and conquest. There is no evidence of anything comparable on the Olmec horizon.

Our best evidence comes from Kaminaljuyu in the Guatemala Highlands. In Esperanza-Amatle I times, a massive civic complex representing a comparatively huge investment of capital and labor was built (the "Yankee Stadium"-Acropolis area), or rebuilt in pure Teotihuacan style. Elite burials in Mounds A and B are associated with Teotihuacan grave goods (Kidder, Jennings, and Shook 1946)--but this, as shall be demonstrated later, represents a different level of influence from the architectural evidence. The construction of a Mexican civic center in Guatemala is an operation involving the use of resources on a scale that imitation of foreign charisma alone cannot adequately explain:

The reasons for stressing the diffusion of architecture as evidence of expansion of states are obvious: a local group may well purchase foreign objects as exotic household furniture or even bury them with their dead but (particularly where the local society has a highly evolved religious system) such a group does not voluntarily supply the manpower required for the construction of monumental civic buildings to serve foreign gods. The introduction of large-scale ceremonial architecture of a foreign style in a local sequence, therefore, is evidence that the foreign power in some manner has secured control over the surplus labor of a local population. (Sanders and Price 1968:166).

Sanders and Price moreover consider intervention on such a scale to have been improbable without military support, particularly when the distance between Kaminaljuyu and Teotihuacan and the nature of the intervening topography are taken into account. Control by a foreign elite of the surplus resources of a given area, including labor supply, seems as good a definition as any of colonialism. A perhaps comparable situation to the postulated Classic relationship of Teotihuacan and Kaminaljuyu might be the Postclassic relationship between Tula and Chichen-Itza in Yucatan. There is, to our knowledge, nothing comparable for the Middle Formative.

During the Late Formative, Kaminaljuyu was already a large site and probably the dominant center of the Guatemala Highlands. Sanders (personal communication) has noted probable Teotihuacan influence in ceramics, pre-dating the massive rebuilding of the civic center. In other words, Kaminaljuyu was already a going concern, and already in contact with the Mexican Highlands. It may be that the pre-Esperanza-Amatle I Teotihuacan influences represent heavy, intensive, and concerted commercial relationships with later incorporation of Kaminaljuyu into the Teotihuacan empire.

Why Kaminaljuyu? Sanders and Price (1968) have postulated the existence of a Cacao Route, analogous to Coe's Middle Formative Jade Route discussed above. It may be that the Late Formative-Protoclassic dominance of Kaminaljuyu in the Guatemala Highlands may derive from its early pre-Teotihuacan control of cacao production of the Pacific Coast and adjacent piedmont--the Aztec Soconusco. Its location, controlling the major pass through the mountains, via Amatitlan and Escuintla to the Cotzumalhuapa area is suggestive. Military pressure exerted at Kaminaljuyu itself would have thus provided an efficient and economical means for Teotihuacan to control cacao production and transshipment from the area, merely by controlling what may already have been the dominant center. Teotihuacan influence is strong, significantly, along the natural trade route in the Amatitlan area (Borhegyi 1966; Price, unpublished field notes). And on the Pacific Coast, the Cotzumalhuapa sculptural style is heavily Teotihuacan influenced in its formal and iconographic characteristics (Parsons 1969).

It is not unlikely that cacao was coveted as early as Preclassic times. Thompson (1956:109) notes its role in the stimulation of trade and thus in the spread of ideas. A suggestion of the possible Preclassic importance of cacao lies in the fact that the earliest known Long Count dates (Cycle 7) come from the peripheral coastal lowland regions that are known from later times to be major cacao-producing zones. If precocity in calendrical developments is taken to indicate precocity in other aspects of culture-- and thus relative wealth--this edge may have derived from cacao export. The model proposed by Flannery and discussed above would be applicable; these local economies were permitted to expand on the basis of their control of a resource desired by others. Parsons (1969:160) suggests that the use of cacao as a means of exchange may originate, however, in the Classic, retaining the

ritual associations of earlier times but assuming a different function in the overall economic system. Certainly the ritual context of cacao is well documented. The Cotzumalhuapa style stresses an anthropomorphized-deified cacao-pod motif (Parsons 1969: Pl. 31, 43d). The Maya deity Ek Chuah, a god of trade, was also, more specifically, a god of cacao (Dockstader 1964: fig. 24). Direct evidence for the use of cacao in the Basin of Mexico in Classic times is lacking, but little else could explain the massive Teotihuacan penetration of Highland and Pacific Coastal Guatemala. While other commodities produced in this latter region--feathers, skins, other tropical products--were likely imported concomitantly into Central Mexico, it was probably cacao that was chiefly responsible for the maintenance of the system and that thus provided the principal motivation for Teotihuacan colonization. Cacao, valuable enough in small quantities to defray the considerable costs of import, was nonetheless required in regular and consistent rather than occasional fashion. By Post-classic times its general use was widespread--if it was used in market transactions it was therefore necessarily in the hands of virtually the entire Central Mexican population. Furs and feathers were, on the other hand, consumed almost entirely by a small elite class. It is this commodity, cacao, that can bridge the gap between administered (redistributive) and market trade: demand would have been greater and more constant, and the whole point is that it was in general circulation.

Kaminaljuyu is strategically located, furthermore, with reference to two other commodities discussed previously. We consider it highly probable that prior to the Teotihuacan penetration it already controlled the nearby El Chayal obsidian deposit. As by Classic times cacao was very likely in general circulation not restricted to the elite, this seems to have been the case also for obsidian from at least Olmec times on. Obsidian, like cacao, would have been passed back down through the hierarchy. Teotihuacan, by controlling Kaminaljuyu, would thus have had a monopoly of at least three of the major Mesoamerican obsidian sources: its own mines, the Pachuca deposits, and the El Chayal flow as well. Although jade, a sumptuary good, would probably not have had this kind of powerful social-integrative effect postulated for obsidian and cacao, its importance as an early trade commodity is undeniable. The pass on which Kaminaljuyu is situated extends east into the Motagua Valley and thus the Manzanal jade source previously mentioned. There would thus appear to be an almost overwhelming economic and geopolitical motivation for the Teotihuacan takeover at Kaminaljuyu.

If a hypothesis of military conquest and colonization appears to fit the Middle Classic relationship between Teotihuacan and Kaminaljuyu, it fits far less well the data of Lowland Maya sites such as Uaxactun and Tikal. In the Peten Teotihuacan influence occurs primarily in portable objects, stone sculpture, and in luxury or semi-luxury commodities. The Central Mexican presence is altogether less pervasive and was presumably very different in patterning. Even where, as at Tikal, there is some architectural evidence, this is non-comparable with the Kaminaljuyu data, suggesting a different model

from the one applicable to the Guatemala Highlands.

There is considerable evidence of trade in Classic Peten. Elite burials include, along with Maya ceramics, diagnostic Teotihuacan horizon markers. We have mentioned that such evidence could reflect relative charisma, of a Paris-fashions type, patterned by exchanges among elites. More to the point, however, is the fact that any obsidian recovered in Peten is necessarily imported. The sources of the Peten obsidian have not been analyzed or traced: it is therefore a guess that the black obsidian ultimately comes from the El Chayal deposit and the green from the Pachuca flow. (Some green obsidian, parenthetically, has been recovered from Kaminaljuyu and from the nearby Amatitlan area). The use of cacao in Peten is not extensively documented, but the presence of a cacao god suggests that the commodity was both known and valued. None of the principal luxury goods known from later times, including cacao, originates in the Peten rain forests, with the single exception of copal.

The lack of easily exportable resources in the Peten presents certain difficulties for the explanation of the observed data, and of the unquestioned Central Mexican presence especially at Tikal. One fully excavated structure (5D-43) at Tikal, probably part of a small compound, while of somewhat equivocal date, seems to us to be built in a modified Teotihuacan architectural style, with talud-tablero platform and a Tlaloc-eye decorative motif. William Coe (1965:40) considers it Early Toltec, but the latest ceramics are Ik (late Middle Classic) in date, and the structure seems closer in style to Teotihuacan and Tajn than it does to Tula. Stela 31 from Tikal, among others, bears a Mexican warrior figure with a Tlaloc shield--interesting in that the stela cult was lacking at Teotihuacan itself. Moreover, between the Tzakol and Tepeu phases at Tikal there is a temporary hiatus in the erection of dated stelae altogether.

These, then, constitute data relevant to the analysis of the relationships between Teotihuacan and Tikal. It seems to us likely that the 5D-43 structure and its associated compound represent some sort of resident foreign group, presumably of Teotihuacanos or of some other population under heavy Teotihuacan influence. While these buildings are not far from the major Tikal acropolis, they do not comprise part of the civic center itself; the latter is Peten Maya in style. This is in contrast with the situation at Kaminaljuyu and does not suggest that colonialism was involved: Teotihuacan-type buildings constitute only a small fraction of the total construction activity at Tikal at the time. That these foreigners were presumably of high status can be inferred from the proximity of this compound to the acropolis, and from both the quantities of Teotihuacan imports (or local copies) and the generally elite associations of such goods (status tombs, stelae, etc.). Probably a model of mercantile (pochteca) and/or diplomatic contact would best explain these data. But, as Sanders and Price observe (1968:169), there must have been a balance of payments problem of

no mean proportions. What were the inhabitants of Tikal using to pay for their imported goods? They suggest copal incense, and possibly also personnel--both religious-calendric specialists and also perhaps slaves--as partial answers, but the question is still open. In any case, however, we have an indication why there is less Mexican influence in Peten than we find in the contemporary Guatemala Highlands and Pacific Coast: Peten had much less of what Teotihuacan wanted. Thus there would have been little inducement to actual conquest and colonization; it would not have been economically worthwhile.

Classic Teotihuacan was a fully urban center, the largest in contemporary Mesoamerica, with an area of some 20 sq. km. and a population between 85 and 100,000. Millon (1967) presents ample evidence not only of its size and density, but of the internal differentiation of its population. This population was, according to the archaeological evidence especially in housing, highly stratified (compare, e.g. Linne's Tlamimilolpa complex with, say, the Viking Group). The more elite residences are those nearest to the civic center. There was also internal differentiation of population by occupation, with wards of potters and of obsidian workers (Millon 1967), presumably also of weavers, woodworkers, featherworkers, and other craftsmen dealing with perishable materials unlikely to leave direct archaeological evidence. In addition, there seems to have been a substantial percentage of farmers living in the city, particularly in areas away from the center; Sanders (1965) notes the paucity of contemporary rural settlement in the best agricultural zone of Teotihuacan Valley, thus supporting the conclusion that much of this land was cultivated by city residents. The internal symbiosis of this settlement is striking. Expectably, in such a socioeconomic setting, markets are of fundamental importance: full-time specialists, particularly those in non-food-producing occupations, must purchase much, if not all, of what they consume. Sanders (1956) has suggested that the size and frequency of markets constitute convenient indices of specialization and of urban life. Thus it is not surprising that a large market is located in the heart of the city as a part of the principal civic center, opposite the Ciudadela. Very probably Bernal Diaz' description of the Tlatelolco market could be plugged in here virtually unchanged.

Millon also notes the presence of what seem to be foreign barrios at Teotihuacan. Linne (1934, 1942) and Gamio (1922) had cited the occurrence of Maya artifacts, often in sizable concentrations, in various parts of the city; Millon has recently located a probable Oaxacan ward. In other words, Teotihuacan not only sent out merchant groups to other Mesoamerican centers, but accepted such foreign groups as well. It is interesting to note that at Teotihuacan these barrios are located at some remove from the center of the city, perhaps a security measure. In that long-distance administered trade was often physically separated from local market exchanges (cf. Arnold 1957a, b), such separation at Teotihuacan would serve to insulate the local population from the foreigners. Unfortunately, no comparable barrio of

Teotihuacanos has yet been identified at Monte Alban, though one very probably existed.

While for purposes of analysis it is often convenient to separate administered from market trade, especially in that there often is physical separation within the settlement of these activities and that different personnel are involved, there is clearly some overlap. Particularly if cacao constituted a means of exchange in the market, as it did in Aztec times and presumably in Classic times as well: in the Basin of Mexico any cacao in circulation is necessarily an import, since cacao will not grow here. Either long-distance trade, in the hands of the *pochteca*, or the tribute system, or a combination of both, must have been the mechanism responsible for the imports. We have previously mentioned the luxury goods for sale in the Tlatelolco market. Thus, at least some of the fruits of administered trade passed into general circulation, necessarily so in the case of cacao. The analytical "separation" is probably more apparent than real, in terms of its ultimate results. What it means is that goods obtained in administered trade would have had to pass through one or more additional transactions once they were imported, prior to their general release.

In this context, the location of the presumed Teotihuacan compound at Tikal, near the civic center, is noteworthy, and may indicate that something other than solely administered trade was perhaps involved at that site. William Coe (1967:73) notes the presence at Tikal of what he terms the "Market Place," in the East Plaza bounded by range structures 5E-32 through 36. Although he adduces little concrete evidence of its function, he considers its central location ideal for a market; it is interesting to note that it is not distant from the Teotihuacan compound. The Tikal market place measures 200 x 280 feet on its outer perimeter (ca. 70 x 90 meters). By contrast, the Great Compound at Teotihuacan measures approximately 500 x almost 700 meters on its outer perimeter: its surface area is thus some 55 times as large in total area as the Tikal "Market". This alone might be the material expression of the relative importance at the two sites, and would correlate with our prior discussion of the inhibiting effects of a relatively uniform environment upon the development of local symbiosis. Tikal and the Peten Maya generally represent a nonurban civilization, Coe's unilateral, Durkheim's mechanical solidarity type. In spite of arguments to the contrary (cf. Haviland 1969), we consider Tikal an essentially nonurban site. Sanders and Price (1968:204-206) suggest that Maya civilization may be what Fried (1960, 1967) calls a secondary state, occurring in response to pressures emanating from the earlier, more complex, fully urban states of Central Mexico. The urban vs. nonurban status of Kaminaljuyu during the Classic is thus far unclear.

Subsequent to the fall of Teotihuacan, there seems to be another period of comparative localism in Mesoamerica, without an integrating horizon style. Politically there was an interregnum in Central Mexico, with competition

among smaller local states in a feudal-like power struggle resembling Western Europe after the breakup of the Roman Empire. In much of the rest of Mesoamerica, the impression is of emphasis on local styles (Parsons 1969:164ff), often representing local syntheses of Teotihuacan influences. This Teotihuacanoid phase witnessed the persistence of interregional contacts and, presumably, exchange; but without major supra-local political structures.

In Central Mexico Tula ultimately succeeded to the mantle of Teotihuacan, while the Peten Maya collapsed entirely. The major Lowland Maya cultural centers shifted to the Yucatan Peninsula. Again, as in the Middle Classic, in the Early Postclassic we are dealing with an expansionist empire and a major horizon style. The relations between Tula and the Toltec phase at Chichen-Itza seem to parallel those we have inferred for Teotihuacan and Kaminaljuyu in the Classic. Little is concretely known for the Toltec horizon, in that the supposed "colony" at Chichen is far better known archaeologically than is the mother city in the nuclear area. Another interregnum separates the fall of Tula and the rise of Tenochtitlan. We postulate, however, the essential continuity of both state institutions and of trading networks from Teotihuacan times until the Spanish Conquest. On the Meseta Central the state, once crystallized, was never wholly lost; institutional changes throughout the Classic and Postclassic are viewed as waxings and wanings of scale rather than as changes in principle of organization. In our view, the major organizational change occurs between the Formative and the Classic.

The principal problem in the emergence of civilization is the generation of a non-egalitarian society. Under what circumstances will a population produce a surplus at all above their own consumption and replacement needs? Furthermore, under what circumstances will they voluntarily cede that surplus to others? It seems clear to us that, possibly barring massive inputs of force, this can occur only when all segments of a population concerned in some way profit from the arrangement. Wittfogel (1957) has observed that people will tolerate even an extraordinarily exploitative pattern of social stratification on the basis of the increased productivity possible with large-scale hydraulic agriculture. In other words, there is some advantage for everyone in the system (though some individuals or groups may profit more than others).

Ranking (Fried 1960, 1967) is associated with the development of systems of economic redistribution. The ranked positions derive their status as nodes, at various levels, of the process of centralized collection of local surpluses. In our view, much of the literature has emphasized this process at the expense of the complementary process: the reallocation of other goods -- local surpluses from other areas -- back down through the hierarchy. Those who contribute their surplus of Commodity X ultimately receive in return a share in Commodity Y obtained from elsewhere through reciprocal exchanges between ranked individuals (Flannery 1968, Sabloff and Tourtellot 1969).

Many of the commodities recognized archaeologically as trade items are

evidently luxury or elite goods, the distribution of which would presumably be restricted by sumptuary regulations of various kinds (cf. Service 1962). Olmec jades would fall into this category. Their occurrence in archaeological deposits is sufficiently infrequent and their style sufficiently distinctive that they immediately rivet the attention. Within a total economic system, however, their function parallels that of the coppers of the Northwest Coast, or the shell armbands and necklaces of the Trobriands. Harris (1968:562-567) notes that in at least the Melanesian example, other less spectacular commodities were regularly exchanged along with the sumptuary goods; and further, that it is goods of the former type, often neglected by investigators, that act to maintain the exchange system. This is what people receive in return. Archaeologically the distribution of the elite goods is merely the indication that we are dealing with a ranked society based economically on a system of redistributive exchanges. Such an indication cannot be analytically regarded as in any sense the cause of that system.

Similarly the literature tends to emphasize the formal separation of redistributive (=administered) trade and local trade (whether market or not). This too is misleading in that analytically it is the points of intersection between the two that seem to us to be critical. Neither is a closed system. As observed in the foregoing pages, certain commodities in Mesoamerican trade systems seem unusually significant in bridging this analytical gap. These include most especially obsidian and cacao. Obsidian, even in areas in which it constitutes an exotic import, comprises a part of the basic technology of production. It is clearly an item passed back down through the hierarchy, no matter how obtained. Cacao, probably at least by Classic times, constituted a virtually pan-Mesoamerican medium of exchange at even the local level; this implies that no matter how procured, its circulation was general in all segments of the population.

To return to the problem of the genesis of ranking, we must view nonegalitarian socioeconomic structures as adaptive. Ranking would seem to be an extremely efficient means of procuring a regular and consistent supply of certain commodities needed in a society which did not itself produce the goods in question. Particularly with local population growth, egalitarian mechanisms to obtain these items would tend to break down; they would be unable to handle the increased demand. Trade in luxuries would accompany, though not cause, this transformation. The resulting expanded economic systems of redistribution thus act as a further stimulus to local economic growth and development: as demand for specialized production, whether subsistence or luxury goods, increases, local specialization, internal socioeconomic differentiation, would be encouraged. Continued increases in overall size and complexity, in the system as a whole and in its component parts, can thus be viewed as a positive feedback, as self-reinforcing. Far from an inexplicable Great Leap Forward, the emergence of complex society in Mesoamerica is capable of intelligible explanation on the basis of specifiable demographic and economic factors, the functional implications of which are clear and analyzable.

Bibliography

Armillas, Pedro

- 1948 A sequence of cultural development in Mesoamerica. In A Reappraisal of Peruvian Archaeology, Wendell C. Bennett, ed. Society for American Archaeology, Memoir No. 4:105-112.

Arnold, Rosemary

- 1957 A port-of-trade: Whydah on the Guinea Coast. In Trade and Market in the Early Empires, Karl Polanyi, Conrad M. Arensberg, and Harry W. Pearson, eds., Glencoe, Ill.: The Free Press:154-176.
- 1957 Separation of trade and market: Great market of Whydah. In Trade and Market in the Early Empires, Karl Polanyi, Conrad M. Arensberg, and Harry W. Pearson, eds. Glencoe, Ill.: The Free Press: 177-187.

Bennett, Wendell C.

- 1948 The Peruvian co-tradition. In A Reappraisal of Peruvian Archaeology, Wendell C. Bennett, ed., Society for American Archaeology, Memoir No. 4:1-7.

Blom, Frans

- 1932 Commerce, Trade, and Monetary Units of the Maya. New Orleans: Middle American Research Series, Publication No. 4.

deBorhegyi, Stephan F.

- 1966 Shell offerings and the use of shell motifs at Lake Amatitlan, Guatemala, and Teotihuacan, Mexico. Actas del XXXVI Congreso Internacional de Americanistas (Sevilla 1964), Vol. 1:355-371.

Chapman, Anne M.

- 1957 Port of trade enclaves in Aztec and Maya civilizations. In Trade and Market in the Early Empires, Karl Polanyi, Conrad M. Arensberg, and Harry W. Pearson, eds. Glencoe, Ill.: The Free Press: 114-153.

Coe, Michael D.

- 1961 Social typology and the tropical forest civilizations. Comparative Studies in Society and History, Vol. 4, No. 1:65-85.
- 1962 Mexico. New York: Praeger, Ancient Peoples and Places Series.
- 1965a The Jaguar's Children: Pre-Classic Central Mexico. New York: The Museum of Primitive Art.
- 1965b The Olmec style and its distributions. In Handbook of Middle American Indians, Vol. 3, Robert Wauchope and Gordon R. Willey, eds. Austin, Texas: University of Texas Press:739-775.

Coe, Michael D.

- 1968 San Lorenzo and the Olmec civilization. In Dumbarton Oaks Conference on the Olmec, Elizabeth P. Benson, ed. Washington D.C.: Dumbarton Oaks Research Library and Collection: 41-78.

Coe, Michael D., and R. Cobean

- 1970 Obsidian Trade at San Lorenzo Tenochtitlan, Mexico. Paper presented at the XXV Annual Meeting of the Society for American Archaeology, Mexico, D. F.

Coe, William R.

- 1965 Tikal: Ten years of study of a Maya ruin in the lowlands of Guatemala. Expedition, Vol. 8, No. 1.

- 1967 Tikal: A Handbook of the Ancient Maya Ruins. Philadelphia: University Museum.

Diaz del Castillo, Bernal

- 1958 The Discovery and Conquest of Mexico. New York: Grove Press.

Dockstader, Frederick J.

- 1964 Indian Art in Middle America. Greenwich: New York Graphic Society.

Easby, Elizabeth K.

- 1968 Pre-Columbian Jade from Costa Rica. New York: Andrew Emmerich, Inc.

Flannery, Kent V.

- 1968 The Olmec and the Valley of Oaxaca: A model for interregional interaction in Formative times. In Dumbarton Oaks Conference on the Olmec, Elizabeth P. Benson, ed. Washington D.C.: Dumbarton Oaks Research Library and Collection: 79-117.

Flannery, Kent V., Anne V. T. Kirkby, Michael J. Kirkby, and Aubrey W.

- 1967 Williams, Jr. Farming systems and political growth in ancient Oaxaca. Science, Vol. 158, No. 3800: 445-454.

Foshag, W. F.

- 1957 Mineralogical studies on Guatemala jade. Smithsonian Miscellaneous Collections, Vol. 135, No. 5.

Fowler, Melvin L.

- 1969 A preclassic water distribution system in Amalucan, Mexico. Archaeology, Vol. 22, No. 3: 208-215.

Fried, Morton H.

1960 On the evolution of social stratification and the state. In Culture in History: Essays in Honor of Paul Radin, Stanley Diamond, ed. New York: Columbia University Press: 713-731.

1967 The Evolution of Political Society. New York: Random House.

Gamio, Manuel

1922 La Poblacion del Valle de Teotihuacan, Mexico. 3 vols. Mexico: Secretario de Agricultura y Fomento.

Grove, David C.

1968 The pre-classic Olmec in Central Mexico: Site distribution and inferences. In Dumbarton Oaks Conference on the Olmec, Elizabeth P. Benson, ed. Washington D.C.: Dumbarton Oaks Research Library and Collection: 179-185.

Harris, Marvin

1968 The Rise of Anthropological Theory. New York: Thomas Y. Crowell Co.

Haviland, William

1969 A new population estimate for Tikal, Guatemala. American Antiquity, Vol. 34, No. 4: 429-433.

Heizer, Robert F.

1961 Inferences on the nature of Olmec society based upon data from the La Venta site. Kroeber Anthropological Society Papers No. 25: 43-57. Berkeley.

Heizer, Robert F., H. Williams, and J. A. Graham

1965 Notes on Mesoamerican obsidians and their significance in archaeological sites. Contributions of the University of California Archaeological Research Facility, No. 1: 94-103. Berkeley.

Kidder, Alfred V., Jesse D. Jennings, and Edwin M. Shook

1946 Excavations at Kaminaljuyu, Guatemala. Washington D.C.: Carnegie Institution of Washington, Publication No. 561.

Leeds, Anthony

1961 The port-of-trade in pre-European India as an ecological and evolutionary type. In Proceedings of the 1961 Annual Spring Meeting of the American Ethnological Society, Viola E. Garfield, ed. Seattle: University of Washington Press: 26-48.

Linne, Sigvald

1934 Archaeological Researches at Teotihuacan, Mexico. Stockholm: Ethnographical Museum of Sweden, n.s., Publication No. 1.

- Linne, Sigvald
1942 Mexican Highland Cultures. Stockholm: Ethnographical Museum of Sweden, n.s., Publication No. 7.
- Millon, Rene
1967 Teotihuacan. Scientific American, Vol. 216, No. 6: 38-48.
- Parsons, Lee A.
1957 The nature of horizon markers in Middle American archaeology. Anthropology Tomorrow, Vol. 5, No. 2: 98-121.

1964 The Middle American Co-Tradition. Ph.D. dissertation, Harvard University.

1967- Bilbao, Guatemala: An Archaeological Study of the Pacific Coast
1969 Cotzumalhuapa Region (2 vols.) Milwaukee Public Museum, Publications in Anthropology, Nos. 11, 12.
- Parsons, Lee A., and Peter S. Jenson
1965 Boulder sculpture on the Pacific coast of Guatemala. Archaeology, Vol. 18, No. 2: 132-144.
- Polanyi, Karl
1957 The economy as instituted process. In Trade and Market in the Early Empires, Karl Polanyi, Conrad M. Arensberg, and Harry W. Pearson, eds. Glencoe, Ill.: The Free Press: 243-270.
- Price, Barbara J.
1968 Cause, Effect and the Anthropological Study of Urbanism. Paper presented at the XXXVIII International Congress of Americanists, Stuttgart, Germany (in press).

1970 Review of Dumbarton Oaks Conference on the Olmec, Elizabeth P. Benson, ed. American Antiquity, Vol. 35, No. 3: 392-394.
- Revere, Robert B.
1957 No man's coast: ports of trade in the eastern Mediterranean. In Trade and Market in the Early Empires, Karl Polanyi, Conrad M. Arensber, and Harry W. Pearson, eds. Glencoe, Ill.: The Free Press: 38-63.
- Roys, Ralph L.
1943 The Indian Background of Colonial Yucatan. Washington, D.C.: Carnegie Institution of Washington, Publication No. 548.
- Sabloff, J. A., and G. Tourtellot
1969 Systems of Exchange among the ancient Maya. Paper presented at the 68th Annual Meeting of the American Anthropological Association, New Orleans.

Sahagun, Fray Bernardino de

- 1959 General History of the Things of New Spain. Florentine Codex, translated by Charles E. Dibble and Arthur J. O. Anderson in Thirteen parts. Book 9, The Merchants. Santa Fe: School of American Research.

Sanders, William T.

- 1956 The Central Mexican symbiotic region. In Prehistoric Settlement Patterns in the New World, Gordon R. Willey, ed. New York: Viking Fund Publications in Anthropology, No. 23: 115-127.
- 1965 Cultural Ecology of the Teotihuacan Valley. Pennsylvania State University, Department of Anthropology (multilith).

Sanders, William T., and Barbara J. Price

- 1968 Mesoamerica: The Evolution of a Civilization. New York: Random House.

Scholes, France, and Ralph L. Roys

- 1948 The Maya Chontal Indians of Acalan-Tixchel. Washington D.C.: Carnegie Institution of Washington, Publication No. 560.

Service, Elman R.

- 1962 Primitive Social Organization: An Evolutionary Perspective. New York: Random House.

Stevenson, Robert F.

- 1968 Population and Political Systems in Tropical Africa. New York: Columbia University Press.

Steward, Julian H.

- 1955 Some implications of the symposium. In Irrigation Civilizations: A Comparative Study, Julian H. Steward, ed. Washington D.C.: Pan American Union, Social Science Monographs I.

Stirling, Matthew W.

- 1961 The Olmecs: artists in jade. In Essays in Pre-Columbia Art and Archaeology. Cambridge: Harvard University Press: 43-59.

Stross, F. H., et al.

- 1968 Analysis of American obsidians by X-ray fluorescence and neutron activation analysis. Contributions of the University of California Archaeological Research Facility, No. 5: 59-79. Berkeley.

Thompson, J. Eric S.

- 1956 Notes on the use of cacao in Middle America. Notes on Middle American Archaeology and Ethnology. Washington, D.C.: Carnegie Institution of Washington, No. 128.

Thompson, J. Eric S.

- 1964 Trade relations between the Maya highlands and lowlands. *Estudios de Cultura Maya*, Universidad Nacional Autonomia de Mexico: Seminario de Cultura Maya, Vol. IV, 13-49.

Williams, H. and R. F. Heizer

- 1965 Sources of rocks used in Olmec monuments. Contributions of the University of California Archaeological Research Facility No. 1: 1-39. Berkeley.

Wittfogel, Karl A.

- 1957 *Oriental Despotism: A Study in Total Power*. New Haven: Yale University Press.

ADDED REMARKS by L. Parsons

There is one compelling realm of inquiry which was touched upon, but not pursued, in the various discussions at the conference which not only relates to the present paper, but the whole concept of the definition of, and the recognition of, "the emergence of civilization" in Mesoamerica. This is the matter of ethnological parallels between known Polynesian and, to a lesser extent Northwest Coast Indian, social-religious-economic structures and archaeological inferences about Olmec culture. Superficially the parallels seem extremely close insofar as one could judge by material remains. Polynesian society in the ecologically diverse high volcanic islands, for example, had ranked non-egalitarian social structure, a "state" religion, a rigidly (and ritually) controlled redistributive system, long distance trade, "great" cohesive art style, and monumental stone architecture and stone sculpture (e.g., the ceremonial marae of the Marquesas). The last satisfies the vital criterion of a sense of permanence. Whether or not one classifies both Polynesian and Olmec culture as "chiefdoms" or as "states", the evidence seems to us to merit careful comparative analysis. Most probably both historic Polynesian culture and prehistoric Olmec culture might best be defined as truly transitional (i.e., "emergent") civilizations.

XIV. COMMENTARY ON: MESOAMERICAN TRADE AND ITS ROLE IN THE EMERGENCE OF CIVILIZATION

Anne M. Chapman

I was asked to comment on Lee Parsons' and Barbara Price's paper, and have chosen to discuss three topics which this paper and some of the others have brought into focus:

1. A diachronic aspect of trade.
2. Primitive society and civilization with particular reference to trade.
3. Problems of method with respect to the use of models.

I.

I submit that trade, in the broad meaning of exchange of objects between or among groups, is a result of ecological differentiation, that man (except under circumstances of unusual strain as for example during natural calamities, or during migrations to new sites) was never able to exist exclusively in an "economic niche" and that he was always obliged to seek economic relationships outside of his own group - that is, outside of the group composed of face-to-face cooperating individuals. And this was so because his requirements for raw materials for tools was varied and made it imperative that he be "economically exogamic". That is, he had to go beyond his specific ecological niche to seek, through exchange with some other group or groups, a certain portion of "goods" indispensable for his existence. I propose that trade in some form has always been a factor of prime importance throughout human history, from paleolithic times to the present. I am not saying anything new here nor do I mean to imply that Dr. Parsons would be in disagreement. I simply wish to establish my understanding of the phenomenon of trade.

Referring now to the second point, it might be possible to consider all human societies, from earliest times to the present, as belonging to either one or the other of two great categories:

1) Primitive Society or Primitive Societies which may be characterized as egalitarian, based on some form of kin relationships (though not necessarily descent). These would be societies in equilibrium, and in this sense non-dynamic or static, though of course change does take place.

2) Civilization or Civilized Societies as non-egalitarian. They may or may not have kinship structures basic to the society. These are societies in disequilibrium - that is, they are dynamic societies.

Going back now to the first category, Primitive Society, here the sub-

sistence base is gathering, hunting and fishing, or a combination thereof, and semi-sedentary agriculture (though not all groups having such an economic base would fit this category). The important point here is that Primitive Societies are not sedentary. They move about in their quest for food or suitable terrains for planting, though under normal conditions this movement occurs within a given area. They cannot, therefore, easily store or accumulate food or goods.

Paul Kirchhoff, I believe, originally used the term "egalitarian clan" (unilateral and exogamic as well) in contrast to a non-egalitarian or "conical clan" (ambi- or bi-lateral and non-exogamic) in a multi-evolutionary context.¹ His concepts were later taken over by anthropologists at Columbia University, namely Morton Fried and his colleagues.

Egalitarian clan societies, as well as other types of egalitarian kin structures such as bands, sometimes lineages and moieties, etc. would be typical of societies composing this category.

Now I will bring in a concept of Claude Lévi Strauss which I think is also relevant here. He postulates two poles or extreme forms of societies. For Lévi-Strauss primitive egalitarian societies are "sociétés froides" - cold societies - meaning non-dynamic societies or societies in equilibrium.² And this is where I got the concept.³

Primitive Society would be non-dynamic both with respect to the social relations and to adaptation to the environment, though, and Lévi-Strauss makes this point, such societies are not completely static. Change does take place or else man would have remained at a paleolithic level. But change takes place without fundamentally disturbing the equilibrium, except in moments of crises due, for example, to natural calamities and except when, under certain conditions "Civilization emerged."

Now, on the specific point of trade or exchange my reference is, of course, to the late Karl Polanyi. In what Polanyi also calls Primitive Society, trade relationships are described as involving reciprocity, in his sense of reciprocity as a "form (or pattern) of integration."⁴ Trade was carried on through a network of reciprocal relationships, which he otherwise refers to as a structure of symmetrical institutions.

Goods (referring again to Lévi-Strauss) as well as women were exchanged along lines that involved behavior of a reciprocal nature, either directly or indirectly. The trade relations in this context, would, in Polanyi's terms, take the form of gift trade. That is, reciprocity as a form of integration would be, so to speak, typically implemented through gift trade. At the same time, and Polanyi emphasizes this, other types of exchange such as "redistribution" co-exist with the above, for instance among hunting groups and what he calls early tribal societies. I will return to this point in a minute.

Markets also occur in some societies of this type. For the present purpose a market may be defined as a form of trade of objects where the demand and supply groups meet and exchange is carried out by means of some form of barter or of money. I am aware that markets assume a variety of forms, and not all of course would fit this definition. I will return to this question later.

Now I wish to treat equally very briefly the second great category of human societies: that which I have called Civilization, though as you can see I give this term a much broader meaning than is customary. As mentioned before, this would be a category of society whose essential characteristics would be:

- non-egalitarian structure, that is ranked or stratified in some way and,
- dynamic. I will stress this especially because it has not been mentioned so far in our conference discussions.

As for the economic base, I think that the crucial point is that it permits sedentary life, at least for the elite, and hence accumulation and storage of food and goods. It involves a variety of patterns such as hamlet, village, town, ceremonial and urban centers. The subsistence is procured by plant cultivation usually, or at least often, by means of irrigation, though the food supply may be procured by fishing, as among the cultures of the Northwest coast of America or, "to take a big leap", by factory industry.⁵

So much for the general characteristics.

To go on, I propose that we think in terms of two fundamentally different types of Civilization and define them principally in terms of dynamics.

Type I. Societies which "move" in cycles. Once the "mechanism" gets underway they achieve a certain "acceleration", a certain "velocity", a certain intensity of activity, perhaps along all lines, perhaps only along certain lines. And then they "decline" and often a re-emergence takes place, although maybe in some other locality within a certain cultural area, as for example Mesoamerica, but always in relation to what has come before, in the previous cycle or cycles. A re-emergence takes place and in this sense we are dealing with cycles.

Type II. I will mention the second type very briefly and then return to the first. The second type of Civilization refers to societies whose dynamics can perhaps best be described as lineal. Our historical gestalt, wherein what we call progress occurs, involves this type of society. These are societies which move along a continuum, although they too accelerate at certain "moments" and go through periods of decline, yet in this type of society the movement is accumulative, knowledge is accumulated and new forms of social and economic structures are created or evolve.

I propose, but without claiming that this is an original idea, that these two types of Civilization are genetically related. That is, societies which are of the cyclical type give birth, under certain conditions, to societies of the lineal type.

To return to the first type of Civilization, some examples would be:

Mesoamerica but perhaps only up to a certain period.

Cultures of the northwest coast of America.

Typical Polynesian societies.

Archaic societies of the ancient Near East.

India of caste society.

Chinese archaic societies up to a certain period (Morton Fried and Wolfram Eberhard, for example, have made important contributions in terms which can be of use for this type of analysis.)

Andean "high cultures".

Returning now to the definition of this first type of Civilization in terms of social structure and again with reference to Kirchhoff. I should say that I don't believe that either he, nor Lévi-Strauss, nor Polanyi would necessarily agree with my presentation here. Kirchhoff's second type or form of clan is characterized by him as non-egalitarian (ambi- or bi-lateral and non-exogamic with a tendency toward endogamy), whose structure may be diagrammed as a cone, or rather a series of cones. He sometimes refers to them as conical clans.

Going on from Kirchhoff I suggest that societies having this type of clan pattern are, in terms of their dynamics, of the same nature as certain non-kin societies, for example the caste societies of India. This is to say that Kirchhoff's conical clan would represent only one of the possible forms of social structures for this type of Civilization and that these forms would sometimes, but not necessarily, be kin structures. The key point with reference to the social structure of this cyclical type society is that it be stratified and that the upper echelons of the society control but do not own the basic material means of production, whether this be mainly land, raw materials or both, plus a combination of elaborate know-how techniques. The control as against ownership is what distinguishes Type I Civilization on this level from Type II, the lineal type.

With reference to the problem of the cyclical type society, the two-fold category of Lévi-Strauss, that is his "cold" and "hot" societies, does not dove-tail here, not only because he was contrasting two extreme types but also because another diagnostic trait of his dichotomy is the absence or presence of writing. So in this sense some but certainly not all of "my" cyclical civilizations could be considered "hot".

Polanyi dealt extensively with what he defined as another form of

integration which he labelled "redistribution", and which he proposed as characterizing the economies of the Ancient Near East, Peru before the Conquest, etc. This type of economy corresponds to what I have proposed here as the first type of Civilization, though not exclusively, for Polanyi also considered it typical of Feudal Europe, and in certain contexts of modern society as I will mention later. Polanyi of course did not pose the problem in the terms presented here. His redistribution form of integration involves collection, so to speak, of goods into a center and redistribution out from it and thus corresponds to institutions which he refers to as centralized or of centrality in contrast to the symmetry of the reciprocal form of integration mentioned before. But it should be pointed out, centrality does not necessarily imply hierarchy except when redistribution becomes a "form of integration."⁶ So in the context of cyclical societies goods would "flow" up to a center, they would be brought in and up the hierarchy and be "redistributed" within and sometimes down the hierarchy. In Polanyi's terms redistribution as a form of interaction involves typically administered trade. Trade was administered by a central power, by the top ranking group, clan or whatever non-kin form it might have. And it is here that we encounter the phenomenon of the Port of Trade.

Markets of course exist in such societies by they are (or usually are) separate from the administered trade, which is typically long-distance trade.

Again with reference to the second type of Civilization, whose dynamics are lineal. These are "progressive" societies though not necessarily moving sui generis toward an industrial economy; capitalistic or socialistic society. Of course the most obvious example is precisely our society. I have the impression that the cleavage took place between what I here call the first type of stratified society and the second or lineal society, in Greece, with the reforms of Solon in the sixth century B.C.

Another society of this type which gave birth to a long tradition, may have emerged in China, with the Shang dynasty, beginning 1450 B.C. At least so it seems to me from a recent re-reading of Eberhard (1950).

In Mesoamerica there is reason to postulate, as I will mention later, that during Aztec times, the society was beginning to show signs of developing from a cyclical, conical type clan society (Type I) to a lineal (Type II) Civilization.

As I suggested before, the crucial distinction between the two postulated types of Civilization is that in the first the elite controls the means of production, while in the second it owns them. On the other hand while the first may be structured along lines of kin, the second is not, for it is typically composed of hereditary feudal strata and more or less non-hereditary social classes in the Marxian sense. And although kin continues to be important

in this latter type, it is not basic to the over-all structure of the society, but rather it is reduced to various forms of the family.

Referring back to Lévi-Strauss' dichotomy our type Civilization is certainly "hot" meaning that it is in constant disequilibrium.

As with Kirchhoff's and Lévi-Strauss', again Polanyi's scheme does not fully dovetail with mine. Lineal Civilization would include, as dominant forms of integration, both redistribution, as with feudal societies for example, and "exchange" or more clearly, the price-making or self-regulating market system in Polanyi's terminology. The latter is, by and large, characteristic, as a form of integration, of capitalism since the event of the Enclosures, the Poor Laws Reform, etc., in the England of the eighteen thirties and forties.

Here perhaps I should recapitulate and explain more fully Polanyi's understanding of economics as an instituted process. As I mentioned before, his first "form of integration" is that of reciprocity, which manifests itself often as gift trade. Second is redistribution, which is typically instituted as administered trade, though certain kinds of markets co-exist in societies whose economies may be so characterized, as they might also under the sway of reciprocity. The latter form of integration takes place, so to speak, when the institutions are symmetrically patterned, while the former occurs in a context of centrality. And in both of these cases (that is in societies or communities wherein either of the two are dominant, or the main form of instituted economic processes) the economy is "embedded" in the cultural, or perhaps better, in the socio-cultural context. This is to say that, under these conditions, there is rarely behavior which is purely and exclusively economic, nor are the social processes in the large sense, dominated or determined by the economy. Consequently the economy, even for purposes of analysis, cannot be divorced from its socio-cultural "bed". But all this does happen when "exchange" becomes the dominant form of integration and the price-making, self-regulating market system emerges.

Here, that is since the last century in our own society, the economy has become the dominant force, without however (still referring to Polanyi) determining in a Marxian sense, the social dynamics.

Even with our system, the other patterns of reciprocity and redistribution persist, not however usually as the "form of integration". And I should perhaps make a particular emphasis on this point: that Polanyi never conceived of any of the three "forms"⁷ as dominating an economy to the exclusion of the others, although one would dominate as a "form of integration." Nor did he propose these three forms as a continuum or a sequence of evolutionary stages, even though reciprocity (for primitive society) comes first and redistribution (for archaic and feudal societies) comes second. He invariably insisted that in any type of society you might find either or both of the two existing as simple patterns, and that only the third, the price-making

market, is exclusive of modern society. Nor did he contend that all economic phenomena could be included under these three headings, as is evident in his treatment of non-price-making markets, money uses, etc.

Polanyi was convinced that the self-regulating or price-making market, that is "exchange" as a form of integration, would not continue to prevail as the form of integration of our industrial society. He saw what to him were very relevant signs that we are moving toward a redistribution form of integration, and had partially already done so, not only in the U.S.S.R. but also under the New Deal. Nor, might I add, did he concern himself with dynamics in the terms I have presented here.

Given the differences of viewpoint, methods and philosophical premises among the three scholars so frequently cited, I do not think the coincidence is fortuitous concerning the correspondence which exists among them in terms of Polanyi's social frame for his institutional patterns and his forms of integration; Primitive -- symmetrical and reciprocal; Archaic -- centrality and redistributive; Kirchhoff's findings relative to the Primitive -- egalitarian clan and the stratified - conical clan; and Lévi-Strauss' insight with respect to societies "without history" as egalitarian and in equilibrium as contrasted to societies "with" history as hierarchial and in disequilibrium. I might add that it would have been impossible for me to conceive of this "whole" (see below) if any one of these "parts" had been missing.

Synopsis

I. Primitive Society

1. Nature: societies in equilibrium; static or non-dynamic in the sense that change occurs without fundamentally disturbing the equilibrium.
2. Basic structure: kin-egalitarian.
- 3-1. Economy: non-sedentary hunters, gatherers or fishers and combination thereof; may also be semi-sedentary agriculturists; crafts and trade.
- 3-2. Trade: through reciprocal relations based often on the kin structure and often taking the form of gift trade, though other kinds of trade co-exist such as "redistribution", and sometimes markets.

II. Civilization

1. Nature: dynamic. Societies in dis-equilibrium: two types - cyclical and lineal (cf. II-A, II-B below).
2. Basic structure: stratified; non-egalitarian. May or may not have kin structures; here the State is invented or evolves, though it does not exist among some such societies.

- 3-1. Economy; sedentary. Usually plant cultivation; crafts and trade: certain development of industry in some such societies and eventually great development of factory industry.
- 3-2. Trade; frequently of redistribution type. Though reciprocal patterns continue to exist, they are no longer of primary importance; markets nearly always present and become dominant in industrial society (cf. II-B below).

II-A Cyclical Society

- 1. Nature: change takes place as a phase of a cycle. Although the cycles repeat themselves within a given cultural area they never do so using identical cultural material.
- 2. Basic structure: "conical" clans. Other forms of stratified kin groups and other types of stratified segments not necessarily kin based, sometimes based on an assimilation of human to divine power, etc. In some such societies the basis of the structure ceases to be kin and becomes one of territory; in any event, the diagnostic trait on this level would be that the top hierarchies, be they kin based or not, control but do not own, the means of production. The State is invented or evolves among societies of this type.
- 3-1. Economy; often plant cultivation with some sort of irrigation; subsidiary animal husbandry; may also be fishing or pastoral-nomad economies; great importance of crafts and trade.
- 3-2. Trade: typically redistribution manifested as administered trade and sometimes instituted through the Port of Trade; other types of trade co-exist such as gift trade and markets of the non-price-making kind.

II-B Lineal Society

- 1. Nature: cumulative processes wherein "progress" occurs. The movement is not necessarily wholly lineal, though it never reverts to the cyclical pattern.
- 2. Basic structure: ownership and non-ownership of the basic means of production determine the social structure insofar as it consists of feudal strata, classes or some other kind of hierarchy; usually some form of a State exists in such societies except in epochs of transition or revolution.
- 3-1. Economy: plant cultivation sometimes with irrigation; subsidiary animal husbandry; great importance of trade and craft. In one such type society craft finally develops into factory industry, thus reducing the importance of agriculture.
- 3-2. Trade: redistribution forms prevail in most such societies though

reciprocal patterns continue; markets and fairs are very important. Eventually the market took over an entire economy, thus inaugurating modern industrialized society in the last century, and such a market economy continues prevalent today, usually in capitalistic type of industrial society; redistribution is predominant in socialistic industrial society, though markets continue to exist.⁸

With reference now to the Parsons and Price paper which is under discussion. Can we agree with their statement:

"It is our view that the Postclassic pattern indeed represents continuity with the past, but that it does not crystallize until the Classic, following which it was maintained and probably expanded but without major change in principle."

"We postulate, however, the essential continuity of both state institutions and of trading networks from Teotihuacan times until the Spanish Conquest."

"We do feel it probable, on the basis of archaeological evidence . . . that Teotihuacan trading patterns, like Aztec ones, involved true *pochteca*, ports of trade, and the trade-precedes-tribute cycle of succession."

I don't believe we can assume that Aztec institutions were essentially identical to the Teotihuacan ones. Both are civilizations. Both Teotihuacan and Aztec societies may be characterized as dynamic, and while in all probability the former represents a cyclic type, there are some reasons to believe that the Aztec society was in process of being transformed, of transforming itself I should say, into a lineal type civilization.

I am sure you are all more or less acquainted with the debate which has been going on since the time of Bandelier. In his studies of Aztec social and military organization he postulated, and went to great length to demonstrate, that Aztec society was essentially democratic clan based, a Primitive Society. He saw it as comparable, or of the same type, as Iroquois society. He did this investigation in terms of L. H. Morgan's evolutionary typology and sequence.

Then Manuel Moreno came along. A lawyer by training, he wrote an important book on this subject in which he demonstrated the contrary: that Aztec society, far from being democratically clan based, already had social classes. He brought forth a certain evidence to substantiate his interpretation.

Later Paul Kirchhoff began working on this material and finally one of his students, Arturo Monzón, wrote what is probably the most significant work on the question. He refined the analysis to the effect that, while

Bandelier and Moreno were both incorrect, others had been also. Restricting his research to the nature of the clans he concluded that far from being the Iroquois democratic or egalitarian type, they were conical in Kirchhoff's terminology. With respect to Moreno's contention, Monzón esteemed that while there were no indications of social classes in the modern sense, he did see certain signs of what he calls "estamentos" (strata) in formation. And he postulated that had the Aztecs not been stopped short the society would have developed along oriental lines, comparable to societies of Egypt, India, and China.

There have been a few other works but I think these are the three principal ones concerning this problem.

Given the data brought to light by Moreno and Monzón, I don't think we can assume, without further investigation, that Aztec society was simply an extension of Teotihuacan.

And even if we were ultimately to throw aside this evidence and come to the conclusion that the indications in the documents of strata or classes among the Aztecs were in reality so unimportant that the society was not in a state of transformation, even if we were to consider it entirely comparable typologically to Teotihuacan. Even so, we could hardly project Aztec institutions back to Teotihuacan simply because they share a similar archeological tradition. The institutions which make up this sort of society go through some sort of process of ascension or expansion and ultimate decline but there is always change from one "horizon" or "cycle" to another within a given cultural area. This is not to say that certain institutions did not perpetuate themselves more or less intact from one horizon to another, but whether they seemed to have or not done so should be posed as a problem from the outset.

This is what I wanted to say in this context concerning the question of using Aztec institutions as the model for Teotihuacan. The same criticism would apply more obviously to Michael Coe's taking the Aztec Pochtecas all the way back to the Olmec horizon. Parsons and Price carefully stipulate that they do not assume the Pochteca for the Olmecs, but they do assume this for Teotihuacan, as also the Aztec Port of Trade. This is reasonable in that the Aztecs certainly shared a great many more traits with Teotihuacan than they did with the Olmec but whether these specific Aztec institutions existed in Teotihuacan times is only a matter of conjecture, at least so far.

I will now turn to the third point and briefly refer to the question of method as it is employed in the Parsons and Price paper under discussion, with respect to the use of models.

On the level of method, models may be considered problem solving devices. For the present purpose I will deal with models in only two meanings:

A model may be a construct which employs all or most of the essential data of a given set.

Or, a model may be a construct used when only some of the necessary data appears to be available and/or when the problem is not seen clearly at the onset of the investigation and where, therefore, it is convenient to use a guide model. The purpose of models on this second level is to permit the researcher to "see" pertinent data which otherwise might escape his attention or be sub-esteemed and eventually to enable him to organize and handle the data for purposes of further analysis or comparisons.

Let me comment further on these two types of models. One, inspired by what Lévi-Strauss calls a mechanical model in this context could be called a descriptive model. It would be a construct which represents the essential characteristics of a "set", that is, a category, phenomenon, institution, pattern, complex, etc. You use it when you have reason to assume that all or most of the characteristic or essential data is given. No special attention is paid to the logic of the model because it is simply descriptive. In the case under discussion the Pochteca would be a descriptive model.

The other I propose to call a logical model. Lacking in what the investigator judges to be essential data, it compensates this lack by logical deductions, that is, it reconstructs the missing parts through logic. Or, it might be constructed of data from another cultural area which has logical consistency. That is to say that although it is descriptive, it is not purely descriptive. It is a logical construct and therefore it can be used as a guide model. In this sense the Port of Trade would be a logical model.

There may be any number of variants of either type of model, which may represent the same phenomenon in different, or historically or culturally unrelated contexts, as too it may represent phases in the historical development of a given phenomenon or institution, or again diffusion outward from a center, etc. Taking a descriptive model, a case in point would be the Pochteca with respect to the Tamkarum, the long distance trade of Mesopotamia.

With these two different types of models and Parsons and Price's paper in mind, I will enumerate some of the essential characteristics of the Pochteca:

They formed a hereditary status, perhaps a "conical clan" or perhaps a non-kin group. In any event the group was internally ranked from the lord Pochtecas to the "traveling salesmen", and the top ranks (which may have been an elder sub-group were closely associated with the so-called nobles, the pillis who, although they were not of full noble status, were certainly not "middle class."

The Pochteca inhabited special barrios or quarters of their own. Names of six or seven are known for eighteen different towns throughout the Aztec empire.

They had their own deity and hence special rituals and feast days. They also worshipped the state god, Huitzilopochtli.

They had a moral code of their own and courts to judge their own members.

The top ranking Pochteca also presided over the court in the great market place of Tlatelolco.

They were commissioned by the "king" to carry out their trading expeditions. Although they were mainly involved in state trade, at least on occasion the sovereign permitted them to trade on their own and for their private benefit.

With reference now to the Port of Trade, as a logical model. This institution was brought to light by Polanyi primarily through his research in the Ancient Near East and was subsequently found to exist, in variant forms, in Africa, India and Mesoamerica. Conceived as a logical model, using Ancient Near Eastern data, some of its main characteristics are:

It is an enclave in neutral, politically weak, territory, or unconquered territory. It is a "neutrality device" in Polanyi's terminology. Therefore it is beyond the frontiers of the trading "metropolitan centers." As a result it offers military security to both the trading powers and the local inhabitants. (This is true for the Aztecs except in the case of Xoconusco which continued as a port of trade after its incorporation into the Aztec empire. Although the Aztec and Maya "ports" were independent, in certain of these ports they had their "factors" or agents, who were apparently permanent inhabitants, and in some cases the traders ruled the "ports" rather than the Pochteca).

As the Port of Trade is an institution of a "function" of administered trade, it involves treaty trade between two or more metropolitan centers. (This is clearly implied for the Aztec and Maya.)

As it is treaty trade, transactions are carried out at given equivalents, or set prices if some form of money was used. (This is true in our case as far as the data goes, except that cacao was apparently not used in long distance transactions, but in the market place and by the Pochteca during their journeys).

Because it is administered trade the commodities are for elite or state-community consumption, the raw materials used in their manufacture and state monopoly "goods". (This is true especially for the Aztecs who also imported raw materials and exported articles manufactured of the same raw materials. The Maya and Aztecs both exported slaves whose commerce was state regulated. The Mayas however exported some everyday wares, at least cloth, flint subsistence items, salt, and honey).

There are warehouses in the ports because of the necessity for storing

goods until the arrival of the other party and/or for transactions over long terms. (This conforms to our data for many of the ports.)

Trade from the metropolitan centers is carried on by professionals in their function of official traders in the service of the ruling hierarchy. (This is certainly the case for the Pochteca but it is less apparent for the Maya long distance trade, the Ppolom who was a noble, probably higher rank than the Pochteca and perhaps less specialized though the Ppolom in all likelihood were constituted in a group, as they had their special deity and the organization and knowledge which their very specific tasks required.)

Given its role as an element of administrative trade and the specificity of its functions, the Port of Trade is independent of the market or market place. There is quite abundant testimony concerning Aztec and Maya transactions in the ports of trade but there is no mention of them trading in markets there; though the Pochteca did carry on certain transactions in home markets.

I should point out here that I am only referring to two institutions, as translated into models, of long distance trade and not to the phenomenon of long distance trade as a whole.

I feel that we cannot indiscriminately project Aztec "models" backwards in time. Thanks to the historical sources it has been possible to define these institutions with some precision. Blurring these "images" by calling for example anything which seems to indicate a long distance trade, a Pochteca, would seem to lessen our possibilities for correct understanding or interpretation of the archeological data. It would seem more exact to confine the use of the term Pochteca to its specific model and to use a neutral term such as "long distance trader" to refer to a context about which in reality, we know very little. As for the other model, the Port of Trade, we saw that it is defined as being located in a neutral, politically independent area, and involves trade between two centers (urban and ceremonial). I therefore don't see how it is possible to employ it for Kamin-aljuyu (pre-Esperanza-Amatle I). Long distance trade would not necessarily or always involve ports of trade and even if it did we are not free to assume on the basis of documents written almost a thousand years later and most especially when as is the case cited, the specific archeological data do not justify proposing it even as a working hypothesis. Historical-ethnographic research is difficult enough and when we are able to produce some concrete results in the reconstruction of institutions through the use of models, these results are in danger of being nullified when the terminology is not respected, when it is deprived of its specific meanings and reduced to everyday vernacular.

I might say something about other models which are used in the paper under discussion and which M. Coe also uses and which I think are not too

clear either. I refer to what M. Coe calls "organic" and Parsons and Price "urban", and what Coe calls "unilateral" and Sanders and Price "non-urban." I won't define them because you are all much more familiar with this terminology than I. I simply thought to comment on, for example, the assumption that in the unilateral or non-urban type of society which is found in a lowland ecology by definition and carries the assumption of "weak markets" given ecological considerations, homogenous environment and so forth. With reference to the historical documents I don't feel that we can assume for instance that the Yucatan Mayas had weak markets. It seems that the institution of "long distance traders" was not as fully developed among them as it was among the Aztecs, but as we have mentioned, long distance trade is not related to the prevalence or the importance of local markets in the home territory. It is however also true that for the Conquest period there apparently did not exist markets of the importance in terms of quantity and variety of goods, etc. as in Central Mexico. Nevertheless markets did exist in Yucatan. The chroniclers called Ecab the Great Cairo and two other towns, Katochi and Cahuacha on the East coast were mentioned as having large markets. Another point which may be commented upon with reference to this lowland model, is highland Kaminaljuyu. It seems to me that such exceptions should be explained.

I am still on the subject of method. In terms of the manipulation of models, it seems to me that Parsons and Price introduce the models too early in their analysis. They wrap up the package too soon. They assume or imply the existence of a number of factors and determining ecological situations which may or may not stand up to closer examination, but which are tempting because they appear to make sense.

I want to say too that I am not making a blanket criticism of the article. I entirely agree with the fruitfulness of attempting to reconstruct trade routes in detail and in seeking concrete explanations for pan-Mesoamerican horizons or influences between contemporary centers. I also think with them that Flannery's insistence on extra-Olmec centers very much to the point. For these and other reasons I found the paper extremely stimulating.⁸

End Notes

- 1 Kirchhoff (1959) stipulates that there are also other forms of types of clans, for example that of the Australian groups, but he does not describe or analyze them in the article cited.
- 2 Kirchhoff (op. cit., p. 264) in different terms expresses an analogous idea with reference to the egalitarian clan: "This type of clan makes possible a kind of economic and general cultural cooperation which in its way seems perfect..."

- 3 I should make it clear that I am not summarizing Lévi-Strauss' concept on this subject and that he is not proposing a typology for all societies. He does however suggest that a "cleavage" between these extreme forms occurred during the IV or III millenium B.C. with the advent of the invention of writing. In this context "cold societies" are societies without writing and in a certain sense "without history."
- 4 Polanyi (1968, p. 255): "Dominance of a form of integration is here identified with the degree to which it comprises land and labor in society."
- 5 Theoretically I would have to include in this category certain pastoral-nomad groups of the Old World. They pose a particular problem which may have to do with the semantics of the word sedentary. In the sense that they move with their means of subsistence, relatively speaking, they are sedentary.
- 6 Fundamental to Polanyi's framework is his notion of form or pattern of integration as contrasted to a pattern not involving integration. Sometimes his vocabulary is not very explicit with respect to reciprocity and redistribution. With the market phenomenon the distinction is very clear for when it is only a pattern or an institution among others, it is of the non-price making type and when it becomes a "form of integration" the market becomes the price-making market.
- 7 I did not refer to Polanyi's treatment of the "self sufficient household" which in his terms, makes use of the pattern of autarchy, sometimes referred to as another "form of integration", because it is not too clear to me as a concept. It seems to me that here he shifted to another level and was dealing more with phenomena of exchange within the face-to-face group and of the sexual division of labor.
- 8 I should perhaps add that this evolutionary sequence does not imply a process from simple to complex, except in the domain of accumulated technical-scientific knowledge. My understanding is that Primitive Society is otherwise as complex (or as simple) as Modern Society. The latter gives the impression of being more complex because of its disequilibrium, its incomparably greater density of population, etc., and because we are participants in it. This entire section will be taken up again from the point of view of social structure in an article being written for the volume in honor of Paul Kirchhoff to be published in Mexico.
- 9 This version of my commentary was revised after the conference. I arrived at Burg Wartenstein just after returning to Paris from an extended period of fieldwork in Tierra del Fuego and did not have time to think out my commentary fully in the time available.

Bibliography

Eberhard, Wolfram

- 1950 A History of China from the earliest times to the present day.
University of California Press.

Kirchhoff, Paul

- 1959 The Principles of Clanship in Human Society. In Readings
in Cultural Anthropology, Morton Fried, ed., pp. 259-270.

Lévi-Strauss, Claude

- 1961 Entretiens avec Claude Lévi-Strauss par Georges Charbonnier.
Paris.

Monzón, Arturo

- 1949 El Calpulli en la Organización Social de los Tenocha, Mexico.
(cf. for references to A. Bandelier and M. Moreno).

Polanyi, Karl

- 1957 Trade and Market in the Early Empires. Editor with Conrad M.
Arensberg and Harry W. Pearson. Glencoe, Illinois.
- 1968 Archaic and Modern Economies: Essays of Karl Polanyi.
Edited by George Dalton. Garden City, New York.

XV. THE CIVILIZATIONAL CONSEQUENCES OF VARYING DEGREES OF AGRICULTURAL AND CERAMIC DEPENDENCY WITHIN THE BASIC ECOSYSTEMS OF MESOAMERICA

Gareth W. Lowe

An appraisal of the origins, form, diffusion, and role of both ceramics and agriculture in the emergence of Mesoamerican civilization is a large order, to which we must add some remarks about parallel developments in the Old World. Farming systems and pottery appeared at different times in separate regions of Mesoamerica, and their traditions subsequently also developed unequally. Both technologies must have very complex and as yet very little known diffusion histories.

As in many other parts of the world, human subsistence in Mesoamerica was always partly based upon wild plant and animal foods which were absolutely necessary supplements to the domesticated crops. In any given ecological situation furthermore, the relative degree of dependency upon (or freedom from) hunting and gathering affected the development of local socio-political and religious controls. In an attempt to evaluate the role of pottery use and crop domestication as modifiers of the more ancient regionally varied hunting and gathering economies in the emergence of Mesoamerican civilization, I will compare here the early spread of agriculture (farming systems rather than individual plants) with the evidence at hand for the origins and diffusion of some of the earliest distinctive ceramic complexes.

Should any significant patterns emerge from a study such as this, they could be referred to as "agro-ceramic", one supposes, but that point will not be reached in the present paper.

BELATED BEGINNINGS

The appearance of a ceramic complex in any archaeological sequence usually indicates a degree of sedentariness and presumably an agricultural or at least partly agricultural way of life. It is noteworthy that both farming villages and pottery making appear relatively late in Mesoamerica in comparison to much of the Old World:

. . . the formation of settled village communities relying mainly on agriculture probably had taken place by 7,000 B.C. in the Near East and then, essentially independently, by 2,000 B.C. in Middle America. While the process of selecting suitable domesticates and developing the techniques for their cultivation and consumption had extended over several thousand years in both

cases, the consequences of the new mode of subsistence were immediate and profound. . . With the introduction of storage facilities for agricultural products (here the invention of pottery played a vital role), it also gave far greater assurance of secure, continuous occupation than was possible with the fluctuating returns from hunting and collecting. (Adams 1964:127).

As far as is known at the present time, there was no well developed ceramic complex anywhere in Mesoamerica until about 2,000 B.C. or somewhat later. A fully agricultural people are actually not clearly discernible in the area until some centuries after this. In contrast, there was in Iran, for instance, a "basic 'barley and sheep' economy by 4,000 B.C.," which had been preceded by over 2,000 years of agricultural and painted ceramic traditions (Hole and Flannery 1967: 179, 197). The unusually late, uneven, and often incomplete dependence upon domesticated crops and animals even in the core areas of Mesoamerica requires an explanation. It is true that many regions of our area are inadequately known archaeologically, so that some surprises may yet await us, but the outline for at least one gradually developed basic subsistence pattern now seems clear enough (see Figure 1, column 5, page 215).

Hunting and gathering people in early Mesoamerica, as probably everywhere, began farming only when they had to, and they made and used pottery only when it was economically or socially essential to their survival in increasingly competitive situations. This generalization appears to explain in part the relatively tardy development of civilization in Mesoamerica (and other tropical regions) as compared to seemingly more precocious Old World nuclear areas. It simply was easier to survive with acceptable comfort (if not to grow or expand much) within some ecosystems than within others without resorting to the trouble of planting crops and making pots.

The not always appreciated but apparently real advantages of the hunting and gathering way of life, particularly in tropical climes, have been explained in detail by Lee, Sahlins and others (in Lee and Devore 1968:33-43, 85-95). Tropical Middle America with its unusually varied vegetation and large numbers of humid and subhumid valleys, moist forests, wooded seacoasts, small rivers, and warm climates, must have been a true promised land for bands of non-agriculturists.

Hunting and Gathering Villages

Viewing the situation in world-wide terms, it might be supposed that the delayed necessity for relying upon domesticated plants and animals in Mesoamerica could be explained better by the relatively late populating of the American continent. The earliest arrival of Asiatic hunters and gatherers to America is speculated to have taken place between 40,000 and 20,000 years ago, with the earliest evidence for true hunting bands coming in only at the

end of the Wisconsin glaciation, about 10,000 to 7,000 B.C. (see discussion by Willey, 1966:29-37). Notwithstanding this late arrival, by 3,500 B.C. Middle America apparently was widely populated by small groups of people methodically hunting and collecting back and forth across definite territories; this activity supplied their needs with very little cultivation, if any, and without ceramic vessels (MacNeish 1967a: 308; Flannery and others 1967:450). After this date, some of these people were already sedentary at least for certain periods of the year (MacNeish and others 1967b:11).

A few especially favored hunting and gathering as well as some coastal fishing localities may have been occupied the year around as well as seasonally prior to 2000 B.C. There possibly were, then, both temporary and permanent villages functioning in early Mesoamerica with either very little or no need for either farming or pottery (MacNeish 1967b:311).

Uneven Regional Domestication Rates

Apparently it is safe to conclude that the relatively late dependence upon domesticated plants in America is due not only to a lack of early heavy population pressure but also to a natural bounty provided by unusually varied landscapes within small areas whose wild products were available and interchangeable long after agricultural possibilities were known:

The pre-ceramic levels found by Charles Brush at Puerto Marquez, Guerrero, had many shellfish and fish and animal bones, and no mortars, manos, or metates . . . The bones and shell suggest that the people of these cultures were predominantly hunters, fishermen, and gatherers of shellfood, and perhaps did some plant collecting . . .

This suggestion that some of the lowland cultures of the period before 2,300 B.C. did not have corn agriculture is bolstered by the absence of corn in the pollen profile of Santa Marta Cave [Chiapas] with a slightly different environment. It must be added, however, that the late Santa Marta remains reveal a still different subsistence pattern, one of plant collecting and animal hunting and collecting. (MacNeish 1967a: 308).

As in North America to a much later date, so for a long time was it also most economical in ancient Mesoamerica to fish and collect in the streams and lagoons, gather food plants across the valleys and hills, hunt in the nearby mountains and forests, and to trade with the next vale in a different ecological niche. There was little incentive to devote much time and work to the selection and cultivation of specific species or to the manufacture of pottery. (It is perhaps true that most plant domestication has been gradual and "accidental", but even thus the Middle Americans were at a disadvantage in that they had no herds to care for across extensive topographic

extremes which in the Old World subjected gathered and transported seed crops to repeatedly selective situations.) The hunting and gathering situation, idyllic or not, seems to have prevailed free of planting seasons only as long as population densities remained very low. The balance between subsistence methods and perishable containers apparently reached a state of non-equilibrium very quickly once reliance was placed upon cultivated crops.

To demonstrate the uneven regional record for the beginning adaptations of ceramics and agriculture in Mesoamerica, I have prepared the chart included as Figure 1. This chart includes a suggested ecological division of Mesoamerica into six basic ecosystems (described below on pages 232-235) and shows the estimated chronological positions for a representative selection of early site phases and some of the earliest ceramic and subsistence traits within those ecosystems. It is notable that pottery had spread across most of subhumid-to-arid highland and estuarine-riverine Mesoamerica within a few centuries of its first known appearance in Mexico, and that we do not see subsistence farming anywhere before this time. By about 1500 B.C. only the peninsular tropical forest (or "Lowland Maya") and the humid Guatemala highland regions seem to have still lacked ceramic complexes; these same humid zones probably lacked maize or other cultigens as well until much later times, a point dramatized by the chart.

The most favored explanation for the relatively late appearance of agriculture in the more humid ecosystems is the longer time needed for maize (and possibly bean) varieties to develop which would survive disease-prone humid conditions and successfully compete with newly cleared forest regrowth. Maize as we know it today is perhaps the most remarkable domesticated plant in the world in terms of its ability to resist disease, insect, bird, and animal enemies. But these characteristics, as well as adaptation (via area-specific varieties) to a uniquely wide range of climate and soil differences, were acquired by maize only after a long history of hybridization and selection which must have included a great deal of human trial and error as less naturally favored latitudes and environments were populated by greater numbers of people. An exciting hunting-and-gathering equilibrium (or "forest efficiency") in the humid ecosystems may also have delayed domestication there (see below and Figure 2). It must be admitted, also, that we do not know whether preceramic peoples in humid Mesoamerican regions had maize or other cultigens or not, for we have judged it to be present only when and where metates for grinding the dry grain have been found. A non-stone-ground and non-pottery utilization of maize (or other cultivated or gathered crops) remains a possibility, again only in relation to a very small population: seed-grinding in hard-wood "tree-trunk" mortars is a normal forest practice.

The Figure 1 chart, as indicated, is a trial outline of regional developments, showing horizontal relationships and their possible chronological overlappings. In no sense is the chart intended to be complete in its coverage. Most of the included phases have appeared elsewhere (compare, for instance,

SIX MAJOR ECOSYSTEMS OF MESOAMERICA, ORDERED BY PAN MESOAMERICAN CULTURAL HORIZONS
(A Trial Chart)

| Comments | HORIZONS | | ECOSYSTEMS | | | | | |
|---|---|--|---|---|--|--|--|--|
| | A possible dynamic type of ordering for seramically aligned Pan Mesoamerican Cultural Horizons, characterizing the active (leadership) components of the society together with the obvious architectural associations, etc. | | Ecological divisions according to principal "areal-technological efficiencies" and/or distinctive "agro-ceramic" characteristics: | | | | | |
| | MARITIME-ESTUARINE AND PENEPLANE | ISTHMIAN RIVERINE | PENINSULAR TROPICAL FOREST | HUMID GUATEMALA HIGHLAND VALLEYS | DRY AND SUBHUMID INTERMED. VALLEYS | SUBHUMID HIGH BASIN OF MEXICO | | |
| Examples of Culture-Historical Horizon Labels | 1500 | | | | | | | |
| | 650 | | | | | | | |
| | 500 | TEOTIHUACAN OR IMPERIALISTIC ("Mid-Classic") Metropolitan Zealots and Imperialist Adventurers | Loros Kato | Laguna MISSIONIZED STYLES | Ik Tzakol 3 Manik Tzakol 2 | Esperanza CONQUEST PATTERNS; TRIBUTE-SUPPLEMENTED DIET | M.A. III | Kolalpan |
| | 400 | | | | | | | |
| | 300 | REGIONAL STATES (Early Classic) Competing Territorialists and Local Consolidators | Jaritos | Jiquipilas | Tzakol 1 Muluk | | M.A. II-III | Tlamiki. Miccaotli |
| | 200 | | | | | | | |
| | A.D. 100 | TZACUALLI-HOIMUL-M.A. II (Incipient Classic) Inspired builders and Expansive Culture-bearers B.C.-A.D. | Isapa Hato | Istmo | Gimi Floral Park | Aurora ARENAL | MARKETS AND URBANISM M.A. II | Tzacualli COMMERCIAL CROPS & CRAFTS?? Patla-chique |
| | 250 B.C. | | | | | | | |
| | 300 B.C. | CHICANEL-TICOMAN-M.A. Ic (Early Climax) Ritualist Temple-tomb Builders and Traders | Crucero Guillen | Horcones RITUAL POTTERY Guana-caste Remplas | Cuac Chicanel IMPROVED MAIZE-CHUEN | Miraflores INTERCHANGE M.A. Ic Providencia | Early Palo Blanco INTENSIFIED FARMING | Tezoyuca Ticomán |
| | Horizons here labeled by Typical Identifying Phases pending culture-historical characterization (with some suggestions in parenthesis) | 550 | | | | | | |
| 600 | | MAMOM-CUICUILCO-PUEBLA-M.A. Ib (Initial Mayzamec) Intensified Farmer-Townsmen and Stone Temple Builders | Frontera Conchas 2 | Francesca | Mamom Eb | Las Charcas | M.A. Ib | Cuicuilco Totimbanacan |
| 550 | | | | | | | | |
| 650 | | | | | | | | |
| 750 | | XE-LA VENTA-TOTOLICA-M.A. Ia (Modified Olmec) Tropical Forest Pioneers; Pyramid Builders. | Escalon | Palangana SLASH AND BURN BEGINS HERE?? Escalera | Zacnicte Xe | Arevalo | M.A. Ia Late S. Maria | Totolica |
| 600 | | | | | | | | |
| 900 | | DILI-GUADALUPE-IGLESIA (Later Olmec) Reformist Supersettlers, Irrigators, Adobe Experts | Duende Conchas 1 Jocotal | Macaste Vista Hermosa Chicharras Dili | FIRST PYRAMID CONSTRUCTIONS | Guadalupe Santa Maria | Early Santa Maria | Iglesia San Pablo |
| 950 | | | | | | | | |
| 1100 | | SAN LORENZO-IXTAPALUCA (Early Olmec) Riverine-lake Ritualists, Pot-Irrigators, Traders | Quadros | B San Lorenzo A Cotorra | RIVER LEVEE TOWNS | | San Jose Late Ajalpan | Ayotla IRRIGATION Puebla sites |
| 1200 | | | | | | | | |
| 1300 | CHICHARRAS-AJALPAN (Proto-Olmec) Elite Floodplain Maize Farmers and Expert Craftsmen | | INCREASING TRADE MAIZE Chicharras Bajio | | | Middle Ajalpan SPECIALIZATION | | |
| 1350 | | | | | | | | |
| 1450 | Ocos-TIERRAS LARGAS (Ocos) Riparian Village-Town Farmers-Gatherers & Colonists | ROOTS AND Ocos FISHING | COTTON? Ojochi | | | COTTON ADDED Tierras Largas SUBSISTENCE FARMING | | |
| 1500 | | | | | | | | |
| 1650 | BARRA (Barra) Village Colonists, Potters, Fishermen, and Farmers. | SKILLED POTTERY Barra SEA TRAVEL?? MANIQU?? | | | | ? Early Ajalpan ? | ? | |
| 2000 | POX-PURRON (Purron) Enigmatic Village Potters, Fishermen, and Farmers. | POX CRUDE POTTERY | | | | Purron CRUDE POTTERY | Tlalpan?? | |
| 2300 | | | | | | | | |
| 3500 | ABEJAS (Abejas) Effective Food Producers and Pit-house Villagers | | | | | River Terrace Villages, Domestic Dog; 20% Agriculture. | | |
| 4000 | | | | | | | | |
| 5000 | COXCATLAN (Coxcatlan) (Late Archaic) Incipient Horticulturists and Expert Collectors | | | | | MAIZE, Beans, Squash, Chile. | | |
| 6000 | | | | | | | | |
| 7000 | EL RIEGO (Early Archaic) Hunting, Trapping, and Collecting Ritualists | | Santa Marta Cave | | | Wet and dry season camps; first hints of plant cultivation. | | |
| 7500 | | | | | | | | |
| | AJUEREADO (Paleo-Indian) Early Hunters and Gatherers | | | | | Hunting, Trapping, Plant Collecting. | | |

Fig. 1. TRIAL CHART PROPOSING PAN MESOAMERICAN CULTURAL HORIZONS AND RELATING THESE TO SIX MAJOR PROPOSED ECOSYSTEMS.

papers by Bennyhoff and Bernal at this conference); the phases Escalon to Loros in Column 1 are from an unpublished Izapa sequence (Lowe, Lee, and Martinez, in preparation).

CERAMIC DIFFUSION AND ITS ANTECEDENTS

Mesoamericanists have noted the earlier appearance of pottery in other areas of the New World (by 3000 B.C. in northern South America), and generally believe that the earliest known ceramic complexes in Mexico and Guatemala developed from a borrowing of ideas rather than from any independent local invention or outright intrusion of an intact cultural complex. Present evidence does seem to indicate such a conservative application of ceramic techniques to already existing container traditions in central Mexico. If this is true, it implies that pottery making in that area was gradually adapted to local circumstances and that its introduction was not associated with any noticeably disruptive cultural diffusion. Such a gradual developmental supposition, however, will not be acceptable for all of Mesoamerica if ceramic vessels were first introduced in some regions by immigrant people as functioning or traded objects, a probability for the Isthmian lowlands discussed below. In that region a dominant trait was the frequent use of the restricted pottery bowl or "neckless" olla or jar which copies the form of the tecomate gourd or pumpkin, thus raising questions of both developmental and regional character, as will be seen below. The possibility of stone vessel antecedents to pottery has also been suggested and needs to be considered, though such labor-expensive containers probably were always much less common than the natural cucurbit receptacles.

Early Non-ceramic Vessel Traditions

The long-persistent lack of ceramics in Mesoamerica may perhaps be explained in part by the fact that gourds, tree calabashes, and the thick rinds of squashes and pumpkins were widely available in a variety of shapes from at least 5000 B.C. (Cutler and Whitaker 1967: 212-219). The tree gourd or calabash (Crescentia Cujete, but called jicara in Mexico) was not found in the early levels of excavations at either Tehuacan or in Tamaulipas (MacNeish 1967a: 294), but as it is a rather common wild and rarely a planted tree, it undoubtedly was available from earliest times. Many of the squashes were cultivated and others collected wild. The bottle gourd (Lagenaria siceraria) was apparently a cultivated crop, inasmuch as this most useful of the gourds has a long record of use in both the New and Old Worlds beginning many thousands of years B.C. The bottle gourd and the jicara have ritually prescribed ceremonial importance for various Maya and other indigenous groups in Mexico and Guatemala to this day, with little question perpetuating traditions whose roots go back many thousands of years.

Gourds and baskets probably filled Mesoamerican container needs very adequately until bean boiling, for instance, began to create problems. Both

beans and early maize were plants at first restricted to the drier intermediate valleys apparently due to narrow disease and temperature tolerance limits; their seeds originally may have been masticated raw or were ground or roasted, but the effects of soaking must have been at once apparent, with logical extensions to the advantages of boiling. It is not surprising, therefore, that the first known manufactured vessels capable of being used for boiling directly over the fire come from the dry intermediate Tehuacan valley and similar Tamaulipas regions and that they are deepened stone mortars. These early stone containers are called "tecomate" mortars, only just possibly made to simulate the function of deep gourds (MacNeish and others 1967b: Fig. 96). The eventual cultivation of improved corn and beans in the lowland regions, on the other hand, seems not to have occurred until pottery was already introduced there, and no provenly preceramic stone bowls have been identified in such zones.

With regard to early cooking practices, it is worth noting here that archaeological evidence is lacking in Mesoamerica for boiling by dropping hot stones into water in gourds or tightly woven baskets, a technique employed by numerous primitive societies. There is suggestive evidence for such a practice in Mesoamerica only in the ethnological literature, to my limited knowledge. At Chan Kom in eastern Yucatan, for instance, hot stones were placed in a vessel with squash seeds and the mixture was stirred in a toasting operation (Redfield and Villa Rojas 1962: 40). This custom, noted in 1934, may be a surviving old tradition and, if so, it would be only one step from that to stone boiling in pots and another step back to stone boiling in perishable containers. The latter practice might have delayed the adoption or development of ceramic vessels, particularly if it was part of an only semi-sedentary subsistence pattern.

A number of authors have noted the similarity between the stone vessel shapes from the Tehuacan caves and the earliest pottery forms from the same region, suggesting that there may have been, there and elsewhere, a ceramic development influenced by stone prototypes (MacNeish and others 1967b:11; Coe and Flannery 1967:105; Green and Lowe 1967:63). This now appears to be an exaggerated possibility, just as is the supposed developmental significance of the crude "Purron" pottery itself (see below). The Tehuacan "stone-bowl tecomates" (4 excavated) have been explained above as elaborated "tecomate mortars," possibly inspired by the utility of gourd vessels; there is no reason to suppose that they in turn would have inspired pottery vessels, including at Tehuacan necked jars which were closer in form to common bottle gourd or calabash containers.

The more distinctive Tehuacan flat-bottomed stone bowl fragments appear to be identical to those represented by a few stone bowl rims and bases found at Altamira mainly during the Barra phase (Green and Lowe 1967, Fig. 98) and elsewhere in the Early Preclassic, but the only illustrated Tehuacan example is from the surface! The one example, said to be of this type, that was

recovered from the Abejas phase at Tehuacan is unillustrated and is not individually described. None of the 5 excavated Tehuacan hemispherical stone bowls (3 from preceramic levels) are illustrated, and their shape is in any case too general to be of any significance for our problem. I think it highly unlikely that Tehuacan stone bowls had any influence whatsoever upon pottery manufacture. On the contrary, it is most probable that the one excavated flat-based example from Tehuacan (if it actually does approach the ceramic norm) and the one from the surface that is illustrated, as well as an illustrated stone effigy bowl (MacNeish and others 1967b:118, Fig. 97) are all copies of ceramic prototypes, and therefore not likely to pre-date Purron.

As indicated above, it also seems probable that the very small Purron pottery sample is overrated as a cultural forebear. MacNeish and others summarize the phase as follows:

The next phase, Purron, probably falls between 2300 and 1500 B.C. It is the least clearly understood phase in the sequence and is represented by only two excavated floors. The excavated materials include a few plant remains, . . . and a number of very crude, crumbly pieces of broken pottery. The pottery, the earliest so far found in Mesoamerica, has the same vessel forms as the stone bowls of the previous period. (MacNeish and others 1967b:11, underscoring mine).

It would seem much more to the point to emphasize that these Purron vessel forms are the same as those of the Early Ajalpan phase which follows. If we move these few pieces of pottery toward the late end of this tremendously long phase (they can hardly span all 800 years of it!), then there seems little need to project any meaningful gap between them and the beginning of the Early Ajalpan subphase. Additional Purron-like material is clearly needed, as the Tehuacan excavators readily agree; MacNeish favors the view that Purron pottery was a local adaptation of ceramic techniques developed elsewhere, possibly via the Gulf Coast, and such a diffusion process may have been very gradual.

Earlier ceramic horizons may yet appear in one or more regions of Mesoamerica, though the obvious anxiety to discover pre-1500 B.C. pottery is one that requires caution. I have taken this approach in my own interpretation of the Barra phase at Altamira. With reasonably comprehensive decorated ceramic and stone artifact complexes found below Ocos horizon materials, the Barra phase stands as a good candidate for being an original site-intrusion in Mesoamerica (Green and Lowe 1967:55-60, 85-86, 97-104, 130). It is to be supposed, nevertheless, that there exist somewhere more extensive and perhaps earlier and simpler Barra-like occupations than that found beneath Mound 19 at Altamira. A questioning attitude should be taken also toward the Pox pottery of Puerto Marquez, Guerrerro, where a few apparently mainly non-rim sherds are dated to ca. 2400 B.C. by a single radiocarbon date (Brush 1965); only more adequate samples and dates will justify conjectures about the role of this intriguing site complex in the development and diffusion of New World pottery.

Cultural Borrowing and Migrations:
The Early Necked and Neckless Jar Traditions

Outstanding regional differences in the typical form of the common cooking, storage, or water jar on the earliest discovered ceramic horizons in Mexico support the idea of at least two rather separate pottery geneses in Mesoamerica. Except for the "Pox" pottery found on the coast of Guerrero as just noted above, the earliest known Mesoamerican lowlands pottery occurs in the Central Chiapas and Isthmian Gulf Coast regions (isthmian riverine ecosystem) and, more abundantly, along the southern Pacific Coast (maritime-estuarine-peneplane ecosystem); as previously noted, much of this Barra and Ocos horizon pottery, to all appearances, was modeled closely after neckless gourd and squash prototypes despite its sudden appearance and rapid spread. The beginning highland (dry and subhumid intermediate valley ecosystem) ceramic tradition, on the other hand, relates most closely to the bottle gourd, with the basic pottery forms for the Tierras Largas (Oaxaca), Purrón and Ajalpan (Tehuacan) phases being the necked jar and the deep or shallow but open round-side bowl. The deeply buried Tlalpan complex at Cuicuilco (subhumid high basin of Mexico ecosystem) also fits this mainly necked olla or water jar tradition (Bennyhoff, personal communication).

The initial southern Mesoamerican ceramic horizons lacked the necked jar form and emphasized large and small neckless jars or "tecomates" which have restricted mouths and, on the smaller and finer examples, often fluted, lobed, or grooved walls; these shape preferences might reflect a customary contemporary or even more ancient use of calabash and squash-rind containers. The tecomate tradition appears in the Barra phase at Altamira on the Pacific Coast plain of Chiapas and continues only slightly modified in the Ocos horizon over an extensive area; the tecomate form is dominant in both horizons. The Ocos horizon ceramic complexes are best known at Altamira, Izapa, and Aquiles Serdan in Chiapas and at La Victoria in Guatemala, with a similar horizon occupation (Ojochi phase) identified at San Lorenzo in the Isthmian region of southern Veracruz (Green and Lowe 1967; Ekholm 1969; Navarrete, in preparation; Coe 1961, 1970). Before reviewing the distribution of the Ocos horizon sites and its consequences, something needs to be said about the apparent overseas connections of this horizon style which was unknown to archaeology until a dozen years ago.

It has been noted elsewhere that the grooved and incised Barra phase tecomates generally resemble the constricted orifice jars and bowls of the late Machalilla phase of the Ecuador coast as well as those of Barlovento and Puerto Hormiga on the north coast of Colombia (Green and Lowe 1967:60-61, 98-100). It was not supposed that South America was the immediate source for the Chiapas ceramic complex or its makers, but only that the two areas seem to have shared a related incised neckless jar or tecomate tradition which appears to be older on the south. A postulated intermediary region of

diffusion in Honduras (Green and Lowe 1967:61-62) continues to merit exhaustive investigation in this regard, as do the coastal zones of Central America in general. In a differing direction, the recent discovery (see below) of deep "pre-Olmec" deposits, with some Ocos-like traits, in the Chontalpa region of Tabasco (Sisson 1970:44) indicates that overseas contact may have been made on the southern Gulf coast at this early time (if Barra and Ocos are indeed not indigenous cultures).

Diffusion via the Gulf Coast is a particularly attractive possibility in view of the resemblances noted between traits of the Barra phase ceramics and the Tick Island and Orange Incised ceramic complexes of Florida (Green and Lowe 1967:100-102); Ford compares the latter tradition with the Barlovento ceramics on the Caribbean coast of Colombia (1966:786-794; see also Ford 1969 for his unrivalled discussion of this diffusion problem). Of perhaps equal importance is the fact that the Florida complexes include flat-bottom "pans" as early as 1600 B.C. (Ford 1969:101), which is as early as they are thought to have appeared anywhere if we favor the late option for dating some rare Purron fragments, as suggested above (flat bottom bowls are common to Purron, Barra, and Ocos phases). Additional evidences of Gulf-Caribbean movements undoubtedly will be found eventually, a research aim that Ford hoped in vain to see realized in his lifetime.

On the Pacific coast, there are similarities between Ocos pottery at La Victoria, Guatemala, and Chorrera phase ceramics in Ecuador of so striking a nature that some sort of direct contact (assumedly seaborne) between the two widely separated cultures is required as an explanation (Coe 1960). Neither this nor previously cited overseas resemblances to the Barra and Ocos ceramics however, require an immigration of groups of people to explain them. Diffusion may have been slower and less direct than our presently very spotty archaeological investigations indicate, or it may have resulted from objects quickly passed along by visitors or traders who returned to their point of origin, or conceivably from the ideas alone that were purveyed by such persons, or from traveling craftsmen. At the same time, the possibility that small groups did indeed migrate need not be discarded and remains a subject for investigation. Chronicled history, certainly, is replete with allusions to migrations across Mesoamerica in the centuries preceding the Spanish Conquest, so that an extending of the observed pattern farther back in time appears logical where seemingly justified. Sanders (1965:185) stresses the importance of small-group migration.

The consistent distribution pattern presently known for the earliest Mesoamerican ceramic complexes at least supports a supposition that early highland and lowland Mexican civilizations resulted from somewhat different developmental histories, assuredly benefiting very early from regional cross-fertilization. The apparent identification of a slightly Ocos-like ceramic complex at San Blas, Nayarit, may complicate our picture (Mountjoy 1970), just as does already the varied character of known Ocos horizon complexes nearer the center (for instance: a wide variety of Ocos vessel supports found

only on the Pacific coast; early bottles known only on the Gulf coast; shared Ecuadorian Chorrera phase traits well identified only at La Victoria in Guatemala). Clearly there is still much to learn about the earliest ceramic horizons in southern lowland Mesoamerica.

We have neglected a consideration of function in this discussion of apparently disparate ceramic origins in Mesoamerica, which would involve a period of postulated dependence of the early coastal cultures upon root crops (manioc principally?) while maize and beans were undergoing perfected domestication in the highlands and intermediate zones. Previously I have speculated that it was the wholesale adoption of maize-growing ways (made possible by improved maize varieties) which allowed the rapid termination of all known Ocos horizon settlements and their eventual reoccupation by people or peoples utilizing a basically Olmec pottery complex (in Green and Lowe 1967:65-71). When we know more about the disrupted period of transition from Ocos to Olmec, to oversimplify, we may have a better base for determining whether maize farming had anything to do with it. We may likewise learn whether the so-called "Olmec intrusions" involved an outside people or only an acculturating and shifting local population, perhaps responding to the different needs of the maize plant and beans vs. their old seafood-aided horticulture. Newly located Ocos-horizon sites widen the population base for this culture and make it less likely that it was ever "replaced" by a separate Olmec-related people. Marked differences in the facial features of Ocos and Olmec figurines on the Pacific Coast, nevertheless, indicate that such an ethnic turnover should continue to be considered (Navarrete, in preparation). Local population displacements are normal events in the course of history.

Whatever the processes at work, the remaining fact is that the lowland Olmecs had achieved civilization (San Lorenzo phase) in less than 500 years from the appearance of the first ceramic stage (Barra phase) in the Isthmian regions. This is a rarely equalled rags-to-riches career in the history of the world's civilizations and implies that something more than ceramics diffused to the area.

The Probable Ocos Horizon Origins of the Basic Lowland Olmec Ceramic Tradition

Whether there was important subsequent diffusion into the isthmian lowlands region or not, the Barra-Ocos socioeconomic structure must have been well developed; there can be little doubt that it formed much of the foundation underlying development of the Olmec society. Present ceramic evidence plus total carved stone monument distribution data suggest that southern Veracruz, western Tabasco, southeastern Oaxaca, and southern (and possibly central) Chiapas constituted a Lowland Olmec unit in both geographic and cultural terms. I have elsewhere called this unit "The Olmec Isthmian Block", (Green and Lowe 1967:71); more recently I have termed it the "Greater Isthmus Area" (Lowe in preparation), a designation that is more adequate. A similar geographic and cultural unity has been discussed by others (see

Parsons and Price contribution in this conference).

The relative cultural uniformity characterizing the Greater Isthmus Area is first seen in the pattern of Ocos horizon sites which underlie most of it, though we can not yet speak very knowledgeably of regional variations on this level. Four Ocos horizon sites have been identified recently on the Upper Grijalva River in Central Chiapas; these inland riverine locations modify the strictly estuarine-to-piedmont orientation of the Ocos culture as previously known at 12 Pacific Coast sites in Chiapas and Guatemala and at an additional site near Juchitan in the Tehuantepec Isthmus region. The Grijalva sites also complement the riverine position of the Ojochi phase at San Lorenzo in southern Veracruz. The river-levee Ocos-like sites in Tabasco are more problematical, inasmuch as Sisson (1970:44) says of these "Molina phase" (equivalent to the "Proto-Olmec" Bajio and Chicharras phases at San Lorenzo) sites only that "A few sherds from surface collections resemble Ocos types. . ." Without question, many more Ocos horizon sites will be found, with the probability that chronological and regional distinctions will be made.

Ocos pottery even as presently known is already so sophisticated in form and so well made that there can be no doubt that it is the product of full-time specialized craftsmen. One can well ask what these lagoon fishermen, peneplane farmers, and piedmont pioneers were doing with such excellent pottery; certainly it indicates that known groups are only segments of a more complex society.

The Ocos horizon pottery tradition seems to have spread very rapidly across the Greater Isthmus Area between about 1500 and 1400 B.C. Coe considers the Ojochi contemporaries of Ocos at San Lorenzo to be "colonizers" (1970:21), but we can not pretend to know from what point or centers the colonizing was being carried out if we agree that the Barra complex in Chiapas will prove to be only one of a number of pre-Ocos occupations awaiting discovery. Whatever the origins of the Ojochi culture, it obviously represented an intelligent and enterprising population once established. The prompt and steady development from this base of the Bajio and Chicharras phase people who undertook major platform and terrace leveling and began the stone sculpture tradition at San Lorenzo between about 1350 and 1150 B.C. indicates a high order of social organization accompanying a constant buildup of population pressure (Coe 1970:18-20). The general situation suggests that the expanding Ocos populace very quickly sought out both the wetter forestlands and tree fruits of the piedmont slopes, including cacao (as at Izapa), and the annually flooded alluvium along the great river systems of the Isthmus (the Grijalva, Coatzacoalcos, Tonala, lower Usumacinta) and their tributaries. Family possession of these key commodities--cacao orchards and constantly humid fertile croplands--conceivably led to the high-status lineages and social stratification which would result in stimulating the rise of the civili-

zation we have come to call Olmec (Flannery and Coe 1968:281-282; Coe 1969; Rands 1969:10).

Following the Ocos horizon there was developed a "domestic Olmec" ceramic style whose transitional Bajio-Chicharras stages have been well identified at San Lorenzo and less positively so in the Chontalpa region of western Tabasco and in western Chiapas at San Isidro on the Middle Grijalva River (Coe 1970; Sisson 1969; Lowe in preparation). The stylistic and technological limitations of a basic Olmec pottery inventory became well crystallized over a wide area throughout the San Lorenzo-Nacaste, Cuadros-Jocotal, Cotorra-Dili, earliest La Venta Complex A phases, and in the Chiuuan complex at Trinidad, eastern Tabasco (see respectively Coe 1970; Coe and Flannery 1967; Green and Lowe 1967; and Ekholm 1969; Dixon 1959; and Lowe and Mason 1965; Heizer, Graham, and Napton 1968 including the Appendix 1 by Hallinan and others 1968; Rands 1969:6, 10-11). These lowland manifestations of the Early and Later Olmec horizons were practically restricted to the Greater Isthmus Area, where more than 80 sites of these periods have been identified exclusive of Guatemala. Similarly Olmec-related sites are known in southwestern Guatemala; Coe and Flannery (1967) indicate ten Cuadros-Jocotal sites in the Pacific Coast region adjacent to Chiapas (including the original type site of Salinas La Blanca), and many others no doubt exist following along the Guatemalan coast to the southeast. In El Salvador a strong Cuadros-like component has been identified at Chalchuapa (Sharer 1969; Sharer and Gifford 1970:445), and comparable traits appear in a less conclusive context in northern Honduras (C. Baudez in this conference).

It is not yet known how closely the more southerly early site-complexes will conform to the standard Olmec inventory of the San Lorenzo phase (intact ceramic complexes must be compared and not mere horizon-style markers). Also still awaiting clarification is the nature of the Olmec period ceramic complexes in the vicinity of Tres Zapotes and the Tuxtlas mountains of southern Veracruz, which must be numerous (R. Squier, personal communication). The same may be said for related highland Mexico site-complexes, although present evidence indicates that both central Mexico, Puebla, and Oaxaca show more divergence from San Lorenzo norms in Veracruz than do Tabasco and Chiapas; this apparent situation is an expectable result of the distinctive regional differences existing in the earlier horizons, as discussed above. Many perplexities remain in the picture of the lowland Olmec ceramic development, not the least of which is the genesis of the peculiarly Olmec excised art style itself. Not until more is known of southern Veracruz (and perhaps of Guerrero, Morelos, Puebla, and Oaxaca as well) will these developmental lacunae be filled; the known sequences in Chiapas do not seem to contribute the needed "Proto-Olmec" horizon data.

Planned research on the Pacific Coast of Chiapas is expected to shed light on the problem of ceramic beginnings and elaboration in that region (M. Coe and K. Flannery, personal communication). At present it appears that at least some of the Pacific Coast shell middens were made by a people

who exhausted the most easily obtained estuarine resources before pottery use arrived, and who left the area. Research on the Oaxaca coast in recent years has discovered no good evidence of Early Formative or preceramic settlements in that region (D. Brockington, personal communication) though the possibility is not rejected and investigations continue. The delayed appearance and ultimately irregular survival of pottery in the Maya Lowlands is a separate problem (see pages 231-232 and Addendum), but its fate there seems irrevocably tied to the peculiar ecological exigencies of forest agriculture and the rarely adequate (for civilization) human responses made in these circumstances.

DIETARY DEFICIENCIES AND HUMAN DEMOGRAPHY

Whether due ultimately to diffusion or local causes, population and social pressures even in the "tropical paradise" of Middle America eventually forced man to take increasingly artificial measures to insure dependable plant harvests. Here as elsewhere, a consequent intensification of sedentariness and improved or stabilized foodstuff supplies seems to have required or facilitated the use of ceramic vessels for storage, preparation, and serving:

The more advanced modes of cooking which became at first necessary and later desirable in the preparation of the diet available to the first agriculturists inevitably affected material culture, and the development of pottery-making techniques must have a primary relationship to the preparation, storage and service of forms of food and drink not hitherto exploited. Archaeologists on occasion get hooked on pots and take ceramic trips, forgetting that one should not rate the container above the contents, the stew-pot over the stew. (Piggott 1969:559).

Increased dependence upon agriculture not only created more uses for pottery but presumably also freed more time for their manufacture by specialists. Staple crops harvested during relatively brief seasons, along with subsistence drawn increasingly from storage (rather than from daily foraging and hunting), released not only individual but mass labor forces for longer periods; this situation favored intensified task specialization, status ramifications, advanced social organization, and public works. Improved farming techniques, increasing population, and cultural complexity are thought normally to go hand in hand, though not necessarily in that order; thus, it appears that

. . . With more efficient technology and a more specialized deployment of members of his community, man, like any animal component of an ecosystem, could attain a higher population density and a higher level of organization. . . Whenever human groups, by technological or sociopolitical means, significantly increased their ratio of energy consumption to energy expenditure, they made possible increasing organizational complexity. And just as often, this

higher degree of organization made possible more efficient use of the environment. (Hole and Flannery 1967:197-198);

but, on the other hand,

Esther Boserup (1965). . . has marshalled impressive evidence from around the world to show that agricultural systems are elastic and highly responsive to changes in population. In other words, demography would be the independent variable, and agricultural systems dependent. The "new demography" can demonstrate that population growth in a given area is a response to a number of factors which may be social, cultural, or ceremonial, religious, and perhaps not even subsistence or consumption-oriented (Wrigley 1967) . . . the response to such population pressures might be the stepping up of labor input and only secondarily the adoption of new techniques of production. The eventual result is that as total production rises, because of rising population per capita income may actually be falling, and the amount of free time away from agricultural pursuits becomes negligible. This "agricultural involution", as Geertz calls it leads to a very definite lowering in the qualities that make a farmer's life worth living (Coe 1969:20).

It is possible that the Late Classic Maya populace was experiencing "agricultural involution" at the time that the Mexican intrusions upset their hierarchy, and that a thorough popular reaction to this situation is what prevented any surviving elite from re-establishing significant leadership. Discussion of the nearly permanent Classic Maya collapse is beyond the intended scope of this paper (see Addendum), but similar cultural breakdown may have occurred earlier or elsewhere in Mesoamerica and its ecological significance should be watched for. The more complex social patterns which suggest variations in the intensity of agriculture are difficult to recognize archaeologically, though some clues are provided by the type of studies which relate tillable space to other community elements, for instance (Puleston 1968). In general, however, the subsistence evidence provided by potsherd and structural distributions needs to be buttressed by other classes of information, especially those more directly related to the procurement, preparation, and consumption of food (cf. Heizer 1960). Such evidence is hard to come by in the tropics, though a few recent projects in the drier regions of Mesoamerica with this deliberate emphasis upon subsistence have been remarkably successful (Flannery and others 1967; MacNeish and others 1967a, 1967b).

The recent adoption by anthropology of the longstanding biological emphasis upon ecology has resulted in an increased recovery of plant and

animal remains from ancient sites, together with increased study of existing environments. A great many aids to ecological interpretation were summarized by Meighan and others in 1958 with the expressed hope that more biological remains would be collected and studied by archaeologists and their collaborating scientists; the Ucko and Dimbleby volume (1969) bears remarkable testimony to the progress made in this regard within a decade. Nevertheless, a recent review of the latter work (Isaac 1970) notes the helplessness of ecology to explain why domestication did occur when it did rather than when it could have. This review also faults the volume for "the omission of culture-historical or ethnological approaches to the problem of domestication. . ." and for not considering possible Old World/New World relationships. In the conclusion to the Ucko and Dimbleby volume, we are offered a final warning as to the possible social selectivity manifest in the recoverable fragments from past diets (Piggott 1969:558):

. . . food refuse is the product of meals, and cooking, eating and drinking are essentially social activities with complex rules, conventions, tabus and prohibitions unrelated to nutrition as such. Religious dictates take no account of a nice balance of proteins and carbohydrates; Custom, not Calory is King.

The final remark above has its application in Mesoamerica (Aguirre Beltran 1956) where calories were, and are, destroyed or ignored with some frequency. A recent study of the deficient dietary customs in Sudzal, Yucatan, revealed the following (Bonfil 1962:129, 134): "The masa loses approximately 30% of its nutrients because the nixtamal is washed from 8 to 10 times." (Washing of the corn dough is done to remove all traces of lime and produces a white color.) And ". . . the consumption [of beans] in Sudzal is not sufficient to cover the necessities. . . of essential aminoacids." Daily average consumption of corn in Sudzal was 419 grams, and that of beans only 55 grams. That this reluctance to eat beans is not restricted to the henequen zone is shown by a quotation from the Redfield and Villa Rojas 1934 Chan Kom study (p.38): ". . . in some houses beans may not be cooked even if beans are available in abundance." The same authors list the 1931 Chan Kom bean production as only 31 cargas (there are about 42 kilos per carga) for a total of 54 farmers (only 9 of whom planted beans), as opposed to a corn production of 2,962 cargas. It is interesting to note that harvested squash seeds comprised 27 cargas, almost equalling the beans (squash seeds are the traditional and almost exclusive part of the squash to be eaten; they contain about as much protein as beans and have over 15 times the fat content but lack the aminoacids).

Inadequate consumption of beans (in terms of a balanced diet based on maize and little or no meat) may be typical of much of present-day Mesoamerica where European influence has made socially unacceptable the eating of pozole agrio (soured corn gruel), insects, frogs, snails and many other molluscan foods all of which formally filled needs for proteins and aminoacids (Aguirre Beltran 1956:229, 239-240). Beans themselves are also difficult for many

people to digest, particularly children (mothers in some indigenous groups pre-masticated food for their babies until this practice also became socially unpopular in a European-influenced society - Aguirre Beltran 1956:231, 239-241). It is claimed by some that the enzymes in squash make a favorable reaction when consumed together with beans, but we have noted the general failure to eat much of either food in many areas; bean and squash consumption in the Maya region appears to be particularly sporadic. Beans are also difficult to grow under many circumstances, notably those in northern Yucatan, a state which imports many of its beans today and which anciently relied heavily upon seafood for part of its protein needs (Andrews 1969:57-61).

Problems such as the preceding, which may not be entirely modern and which in any event can be as much social as ecological, explain a persistent need in Mesoamerica for animal protein, in spite of a much-vaunted theoretic maize-bean-squash-and-chile nutrient balance:

The principal elements of the Mixtec diet corresponded to the typical Mesoamerican dietary complex of maize, beans, chili, salt, and squash. . . The 1580 Relaciones and Herrera indicate that the native diet was supplemented to considerable degree by wild berries, fruits, herbs, roots, leaves, nuts, and various plants collected from the countryside. In addition, the meat of rodents, snakes, lizards, and other small animals was consumed. The more important domesticated or game animals such as the turkey, edible dog, deer, and wild fowl were reserved for the nobility and the ruling caste. (Spores 1967:7-8)

The Mixtec situation seems to have been typical for Mesoamerica as a whole and in many respects represents a world-wide tendency to always supplement cultivated crops with some of whatever wild resources are available.

The Unusual Persistence and Importance Of Hunting and Gathering in Mesoamerica

It is clear that the intensive, rather than casual, exploitation of local wild resources was a complementary way of life in Mesoamerica long after it had ceased to be important (apart from fishing) in nuclear sectors of the Old World. Hunters and gatherers occupied a center-stage position in most of Mesoamerica until well after 2000 B.C.--not until 1500 B.C. does MacNeish (1967b: 314) believe that anyone in Mesoamerica obtained even as much as 40% of his sustenance from agriculture!

Apparently for lack of adequate animal domesticates, the elite of all Mesoamerican civilizations were provided with meat from game animals as a matter of course. In many regions the Mesoamerican common folk never gave up much of their hunting, fishing, and gathering ways; Middle Americans not

only depended upon this wild protein source throughout pre-Hispanic times, no matter how civilized they were, but in many instances continue to do so up until the present, or near-present:

. . . "In my milpa," said a milpero, "we have a good area. There is water to attract animals, and we use our dogs to catch tepesquints (similar to the suckling pig), tusa (a bird), puerco de monte (a wild pig), pheasant, and deer. My family likes to be here with me spending a temporada; there is a great deal of meat"

In historical times San Joseños faced periods of near starvation, times when only the Ramon seed, obtained from a jungle tree, was available for tortilla making....

Many of the older informants remembered this period and indicated that some families had migrated at that time to British Honduras; others tried only to purchase corn there, but the trip was painful; and the rest collected Ramon seed and used it in the making of tortillas. Hunting, gathering, and fishing barely supported the population." (Reina 1967:17, 20n)

The latter instance cited by Reina was said to be aggravated by cattle in the milpas, but whether the famine around Lake Peten Itza was due to this as much as to drought is irrelevant to the demonstration of the milperos' continuing ability to fall back upon hunting and gathering alternatives.

A persisting reliance on game is also typical of Yucatan, as described for Chan Kom in 1934 (Redfield and Villa Rojas 1962:38, 48): "So far as meat enters into the diet, it is chiefly the product of the hunt. The average inhabitant eats venison, wild pig, or agouti about once a week." The close relationship between Yucatan deer herds and their milpa clearings has been remarked upon by many authors; the Maya appear to have typically treated their territory as a game preserve, hunting for food only and almost at will. Even in 1950, Redfield could write of Chan Kom revisited: "Deer are growing scarce, and meat is hard to come by" (1962:60). With numerous cattle and hogs overrunning the town plaza and their milpas, these recent Maya still thought of meat as coming from the bush. Domestic, introduced, animals were valued property and to be sold, not eaten; meat was something that the forest and milpa clearings provided.

It may be argued that it was the persistent natural availability of desirable game animals in the extensive forested lowlands of Middle America which made relatively unnecessary more animal domestication. Whether this be true, or whether there simply were no Mesoamerican animals capable of domesti-

cation beyond the dog and turkey, the vast tropical forest habitat surely did play an important role in the dissimilar directions of cultural development taken by the highlands and lowlands, on the one hand, and by Mesoamerica and the Near East on the other. The great variety of natural vegetation found in Mesoamerica, particularly in the lowlands after partial clearing, also probably worked against a greater degree of dependence upon agriculture; the forest dweller was always but a step removed from the possibility of a hunting and gathering subsistence, no matter how much corn he was accustomed to planting. Only sheer denudation of vast areas would have changed this situation, or will change it now (see Addendum).

Environmental Destruction And Human Response

The really quite different role of agriculture in the tropical forest will be more sharply contrasted if we compare it with the Basin of Mexico, or with the Near East where the consequences of farming are summarized by Flannery (1969:95) as follows:

The real consequence of domestication was (1) to change the means of production in society, (2) make possible divisions of labour not usually characteristic of hunter-gatherers, and (3) lay the foundations for social stratification by continually reducing the zone of "optimum" productivity while allowing the population to expand at a geometric rate. It also (4) increased man's potential for environmental destruction, so that eventually it would have been impossible for him to return to his former means of subsistence, had he wanted to.

The consequences of domestication as seen in the Near East seem equally visible in parts of Mesoamerica. Consequence No. 4 seems to have occurred fully only in the central highlands of Mexico and to lesser degrees in the subhumid valleys of Oaxaca and Puebla and elsewhere. Certainly in the tropical forest lowlands the population densities and land clearance were never of a degree that would prevent large numbers of people from surviving by any "former means of subsistence."

At the 7000-foot elevation of the Basin of Mexico, a combination of widespread subsistence farming, friable erodable soils, light rainfall, and cool climate had probably brought about almost complete despoilation of the most readily accessible natural vegetation and the wild life its shelters by 1 A.D. or very soon after, at the hands of an increasingly dense population. The early settlers, who then as now found the Valley a pleasant, healthful, productive and invigorating place in which to live and exploit a wide variety of resources, were faced very soon with problems resulting from the slow or non-existent natural ability of the region to recuperate itself in their

presence. The compensatory human responses to this situation are those which Sanders--probably quite rightly--feels led to the peculiarly (for Mesoamerica) centripetal urbanistic Central Highlands civilization: regional agricultural specializations and intensification (including plant selection, irrigation, terracing, fertilization, crop rotation, drainage, and eventually, chinampas and commercialized craft and trade patterns (1968:94-101). We are familiar with the civilizational results of these measures and may not have to be reminded that increasing socio-economic interdependence as well as competition inevitably lead to complex social systems and centralized political organizations, both of which have a direct relationship to population expansion and a decreasing dependence upon hunting and gathering (see especially Harner 1970, "Population Pressure and the Social Evolution of Agriculturists").

The higher natural game and plant recuperation rates in most other regions of Mesoamerica (where swidden farming maintained semi-wilderness conditions) may have been more influential in retarding the evolution there of urban civilization than were missing "symbiotic" opportunities as a result of the lack of a more diversified regional geography (Sanders 1968:105). Population densities in the less healthy forested lowlands never reached a stage wherein the rather low-intensity cultivation practices necessary to maintain them were any real threat to the forest habitat; second growth forest may provide even better hunting and gathering conditions than does virgin forest. Some authors have noted that normal slash-and-burn milpa activity seems to encourage game increase, and many plant products normally available in the milpa system (firewood, cordage, bark, thatch, timber, edibles) have to be replaced by domesticates or by trade where no forest is maintained. The result is that the more forest there is, the less need there is for domestication and trade and the less ecological pressure there is for the responses leading to civilization. This situation was described by Sanders (1963:239) as follows:

Carniero (1961) has recently demonstrated that slash-and-burn farmers in large, almost limitless areas of forest, tend to have "fronteristic" attitudes toward land use, and population density tends to be low and the growth of civilization is, therefore, retarded. In circumscribed areas the situation is different and the exhaustion of these smaller regions is quick, so that a filling-in demographic process occurs with increasingly more efficient and more intensive patterns . . .

In other words, agriculture in the warmer and wetter regions which were extensively forested apparently had a relatively minor role in "forcing" the emergence of civilization, and highly advanced societies did, in fact, develop in other ecosystems long before they appear in the moist peninsular forest lowlands. Social equilibrium, furthermore, was always maintained at a less urban level in the forest ecosystem than in others. One is impelled to see almost strictly human and non-ecological explanations for the rise and maintenance of the Maya civilization in its forest environment, remembering, of

course, that it was the presence of the forest, at least, which permitted a civilization of this type to exist. Non-subsistence-related factors, at any rate, do seem to have been more important in this area, and we have many clues as to what these were. Inasmuch as Preclassic Maya sites appear repeatedly to have had sudden and near-simultaneous beginnings as well organized communities, we can assume them to be the product of competitive, if pioneering, feudal and/or religious leadership and, in their early stages, dependent almost entirely upon cultural borrowing rather than upon local inventions. Successive expansion apparently was the result of such equally non-ecological factors as the development of architecture, engineering, pharmacology and other sciences, paving and drainage or water storage projects, status warfare, and so forth. Admittedly, these are responses to environmental limitations, but they do not always appear, and, in fact, have only rarely done so in lowland American forests.

Beginning in the "Early Climax" or Late Preclassic horizon, the peninsular tropical forest communities tended to replace the forest in certain localities, and from this point forward it was the maintenance of these larger and larger centers, with their many stone structures, pavements, reservoirs, causeways, and elegant (by present forest standards) housing platform-patios, that was the response-creating mechanism largely responsible for the long-lasting success of the Maya society. It is unlikely that devotion to the corn agricultural cycle and/or Maya religion per se were nearly as effective in keeping the Maya farmer-townsman in equilibrium as was his dedication to the "bricks and mortar" of his complex society. We can not omit the spiritual factor in this situation either, as modern society continues to demonstrate (see Addendum).

ECOSYSTEMS AND CULTURE HISTORY

Two foremost proponents of an "ecoystem" explanation of cultural development are Hole and Flannery (1967:197) who have argued that

. . . An approach dealing with man's use of his environment concentrates on production and distribution--and relegates, to the secondary position of symptoms, such clues as the spread of pottery styles, the building of shrines, and the migration of human groups.

A recent trend in archaeology and ethnology has been the adoption of an ecosystem approach, which focuses on the reciprocal relationship between man and the various other species involved with him through time. . .

. . . it is oversimplified to view this as "man's struggle against nature". Man is not in competition with his environment, nor is it likely that prehistoric man viewed nature as something to be conquered or subdued. He worked, within the context of the ecosystem,

to extract more energy from certain species of plants and animals than he expended in obtaining them.

In the above context, then, we have to recognize that agriculture is part of a more complex production and distribution system, and that ceramics are a symptom (and witness) of that (and other) systems. Furthermore, in Mesoamerica it is necessary to consider not one or two but several basic ecosystems. Within the confines of this paper it has been possible only to outline the ecosystem divisions seen to be desirable for such an ecological analysis (Figure 1). Before discussing further the rationale of the Figure 1 chart, it is convenient to review a recent beginning effort in a similar theoretical direction which will demonstrate the need for a more discerning multi-ecosystem approach to Mesoamerican culture history.

The Favored Highland-Lowland Interaction Theory of Civilization

In a brief appraisal of the relative contributions of "highlands" and "lowlands" to the development of the agricultural village and ceremonial center pattern in Mesoamerica, MacNeish (1966:184-185) adopted Sanders' widely known cultural use of the biological term "symbiosis" to form an admittedly speculative hypothesis. MacNeish envisioned five steps or stages, which may be paraphrased as follows:

- 1) After 7000 B.C.: Highlands emphasized plant gathering subsistence and wet-season macroband, dry-season microband existence. Lowland coastal dwellers gathered sea resources and formed macrobands in relatively permanent communities.
- 2) From 5000 to 3000 B.C.: Highland plant collectors began to domesticate more and more plants, with a more sedentary way of life as somewhat larger macrobands. Lowlanders utilized more efficient techniques exploiting sea resources and small coastal habitations became permanent stable villages.
- 3) From 3000 to 2000 B.C.: The Highlands use of more domesticated plants resulted in an agriculture-based subsistence and small semi-sedentary pit-house villages. The Lowlands began to receive a diffusion of highland subsistence techniques so that the addition of agriculture to an already existing village life based upon a stable food supply from the sea meant acquisition of food surpluses; this may have resulted in a rather explosive development of ceremonial or religious activities among the lowland villages. [Although MacNeish does not say so, it may have been the continuing dependence upon the increasingly difficult hunting of game and gathering of diminished marine-riverine resources combined with the uncertainties of early moist-land farming (all activities very much "in the hands of the gods")

which led to any increase in religious activity in the lowlands; the scheduling made possible by storable surpluses did not contribute to exaggerated ceremonial activities, to our knowledge, until almost a thousand years later.]

- 4) From 2000 to 500 B.C.: Highlands people with improved agricultural economies began to accept the religious ceremonial aspects of the Lowlands culture as the latter reached a climax in terms of the population concentration and economic potential attainable from their food collecting and slash-and-burn and/or flood plain agricultural techniques.
- 5) From 500 B.C. to 1500 A.D.: The Highlands cultures continued to change as their agricultural potential was expanded by irrigation use, so that ceremonial centers formerly peripheral to the lowlands gradually developed into larger centers and eventually [a few] became true cities. In the Lowlands there were no more fundamental changes in the way of life achieved already in Stage 4, though new and different ceremonial centers rose and fell; the lowlands throughout this period were on the receiving end of the major developments being made in the highlands.

MacNeish concludes the above speculation with a statement that, for as far as it goes, may now be universally acceptable:

If this speculative outline of the rise of Mesoamerican agricultural villages and even of civilization itself is correct, then there was no such thing as a unilinear cultural evolution in all parts of all ancient Meso-America. Rather there were two fundamentally different developments which stemmed from the exploitation of two different ecological zones. One was a lowland marine or riverine ecological zone and the other was a relatively dry highland ecological zone, and these in turn inter-stimulated each other, in a sort of symbiotic relation, through all stages leading to village agriculture, and even into civilization itself.

. . . In fact, was there not a symbiotic highland lowland development of village life and civilization not only in Meso-America, but also in Peru and Near East?

The most obvious shortcoming of MacNeish's conclusions for Mesoamerica, insofar as "civilization itself" is concerned (and apart from the fact that

we really do not know what was going on anywhere at 2000 B.C.'), is that it seems to ignore a major and certainly fundamental Mesoamerican civilization involving a third "ecological zone" which was neither marine-riverine nor dry highland, namely the tropical forest and mainly water-hole ecosystem of the peninsular Maya Lowlands. This relatively large cultural area was a quite uniform environment which held the New World's most intellectually advanced (and most populous?) Classic period civilization; failure of the Maya area to participate in the earlier stages of Mesoamerica's cultural development is a problem demanding more detailed consideration (see Addendum). The Preclassic Maya settlements may in fact have resulted from a geographical expansion influenced by highland-lowland inter-stimulation, but the subsequent rise of the unique Maya civilization can hardly be attributed to a position "on the receiving end of the major developments being made in the highlands". An oversimplified subdivision of the complex cultural ecology of Mesoamerica obviously will not do justice to a complicated culture history, a fact which simply strengthens MacNeish's arguments against a unilineal theory of development.

The Basic Ecosystems of Mesoamerica And Their Unifying Ceramic Horizons

The subdivision of central and southern Mesoamerica into six principal ecosystems (Figure 1) is a trial effort. The great diversity of land forms, climates, soils, vegetation, and plant life typifying Mesoamerica have been discussed and classified at too great length by too numerous authors to allow summarizing here (see especially Palerm and Wolf 1957 and the articles in West 1964). I have tried to make a realistic selection of key areas, drawing freely upon the general framework provided by Sanders and Price for their "Ecological Types" and "Typical Areas" (1968:104), combined with the important riverine and estuarine orientations provided by Coe (1969) and Coe and Flannery (1967). The unique recovered hunting and trapping-to-irrigation agriculture sequences in the Tehuacan and Oaxaca Valleys (dry and subhumid intermediate valleys ecosystem) are of course the work of MacNeish and others (1967a, 1967b, Flannery and others (1967), and Flannery 1968.

Each of the proposed basic ecosystems merits study as a meaningful unit within Mesoamerica. The participation of each ecosystem in the general Mesoamerican interaction sphere is most clearly indicated by ceramic style similarities--if not always trade or tribute objects--identifiable over most of the ecosystems within each of the suggested Pan Mesoamerican cultural horizons, which have chronological limits of varying depth. The useful, if not perfect, ability of pottery for gauging interregional relationships is obvious, just as are its qualities for showing internal culture change. Our knowledge of the diffusion between, and relative civilizational consequences of agriculture within, each of the ecosystems, on the other hand, is much too imperfect to justify attaching more than very general regional culture-historical importance to specific subsistence practices.

Conclusions

It is apparent that once ceramics were developed or (more commonly) adopted in Mesoamerica they had little further direct affect upon the course of civilization and are most useful as instruments of cultural diffusion and style change. The varying consequences of ecologically determined agricultural practices were more important, if not all-important, cultural determinants. Ecology became an intensified factor to the degree that agriculture upset nature's balance; this disequilibrium was always more severe in the drier, cooler regions than it was in the wetter and warmer localities. From this standpoint, the "response to challenge" theory (Sanders 1968:89) works well to explain the rise of a more urbanized, highly commercial, and imperialistic irrigation civilization in the Mexican highlands where subsistence had to depend upon intensified agriculture supplemented by imported foodstuffs and many other trade goods.

Most ancient Mesoamericans were part-time farmers who relied to varying degrees upon never-eradicated hunting, collecting, and gathering possibilities throughout their history; the wild resources available varied in direct relationship to the amount of forest land at hand, either virgin or second growth. Only where this forest products reliance did not persist (because of thorough environmental transformation by heavy population densities and intensive cultivation), did truly urban civilization result; such instances were few in number and always associated with a cool and relatively arid climatic zone.

In the lowland ecosystems the degree of dependency upon agriculture and trade was much lower, with consequently less intensification and specialization needed. The great number of elaborate ceremonial centers in the moist forest regions probably did not require the extremely complex social, commercial, and political organizations developed to build and maintain a few somewhat similar large centers in the highlands. We may suppose that both the Lowland Maya and humid Highland Maya centers depended more upon relatively simple politico-religious domination of a closely knit local farm population by an aristocratic power structure. As a result, the Mesoamerican tropical forest civilization, when controlled by the Maya hierarchy, was both more pervasive and apparently more stable than any other known in the New World, but it was never truly urban, as it had little need to be.

ADDENDUM

The comments made at this conference have favored the human approach to culture--some have called it "considering the spiritual factor." There is apparent here an unwillingness to credit ecological factors, ecosystems, or materialistic considerations generally, for the emergence pattern of civilization in Mesoamerica. Nevertheless, if it be acknowledged that unique

historical events and persistent great idea systems can determine many aspects and even the eventual outcome of particular culture developments, it is also evident that there are some distinctive response-producing environmental factors for human society in any given ecosystem. The result is that differences within and between individual ecosystems do assume explanatory value for both culture history and culture process, as many investigators have tried to demonstrate. In sum, human response probabilities to certain circumstances can be predicted, but the ultimate role of the human will, never.

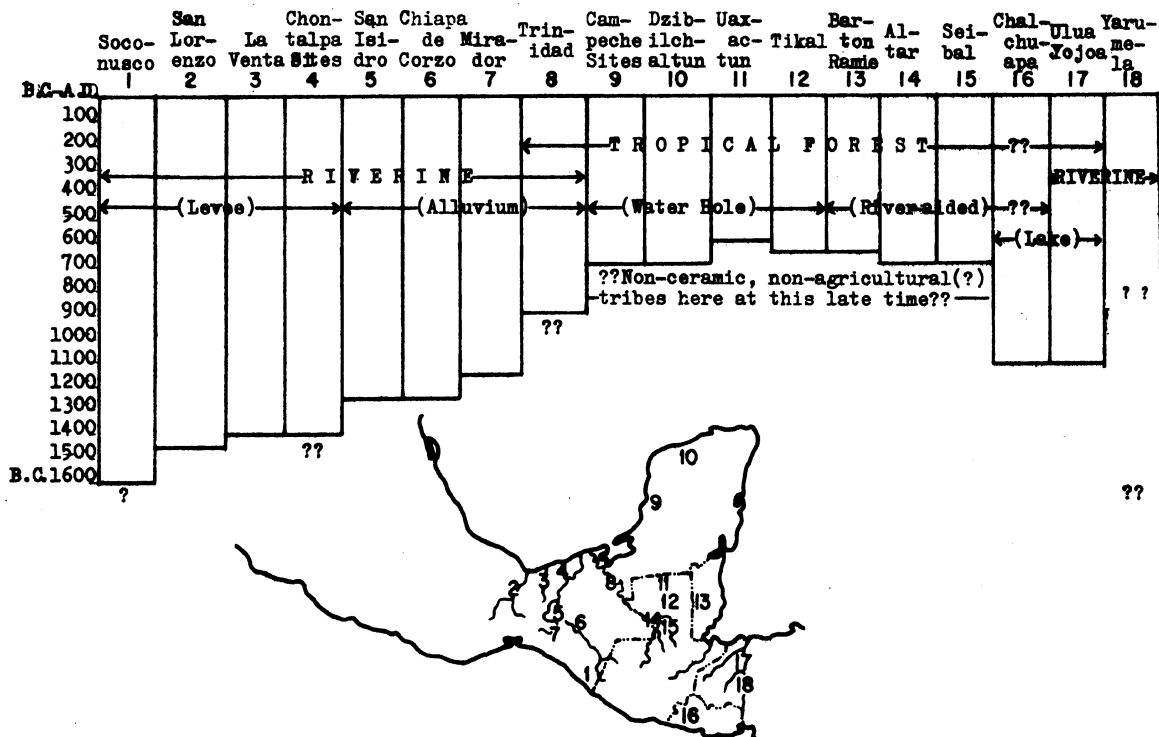
Some civilizational consequences of human versus non-human ecological factors can perhaps best be demonstrated through a summary appraisal of settlement history in the largest, most uniform, and most enigmatic of our proposed ecosystems, the peninsular tropical forest. This area, loosely known as the Maya Lowlands, includes northeastern Chiapas, the Peten, western British Honduras, Campeche, Quintana Roo, and Yucatan. With little doubt this is the least desirable environment for human occupation in Mesoamerica; most of the southern and more humid two-thirds of the area is practically unpopulated today. These same forest regions, nevertheless, "produced" a most remarkable Late Preclassic and Classic period civilization which endured for a millenium and was characterized by unique intellectual and technological attainments, despite a puzzling late start dramatized in Figure 2 on the following page. Acceptable reasons for the unusual developmental history in the Lowlands, from much-delayed beginnings to unequalled civilization have not been made plain, in spite of their obvious importance.

In his admirable summary of "Hydraulic agriculture, economic symbiosis, and the evolution of states in Central Mexico," Sanders (1968:89) declares as the 4th and 5th postulates of the ecologist that:

4. Responses to environmental challenges may be technological, social, or ideational . . .
5. . . . certain kinds of responses are more likely to occur than others and to be repeated throughout the culture history of a given area.

It appears in the Lowland Maya area that the civilizationally important responses were first and foremost those of an "ideational" nature, and only secondarily those that were social and technological. This reversal of the order of human progress, if correctly perceived, was the one least "likely to occur" in most ecosystems, and is one that seems not to have been "repeated" ever in the southern two-thirds of the peninsular tropical forests, though it may yet do so, as explained below. As has often been observed, the wet tropical forest areas form an ecosystem which man normally prefers not to enter in large numbers (Meggers 1954). Apparently only under remarkable leadership will this ecosystem undergo an intensive human population buildup and maintain it.

It has been emphasized in this conference that we do not know whether part or all of the peninsular tropical forest ever had a preceramic occupation,



KNOWN AGROCERAMIC BEGINNINGS IN THE OLMEC AND PRECLASSIC MAYA LOWLANDS

FIG. 2

one assumedly based upon hunting and the gathering of roots and tree crops, but I have indicated the possibility on the Figure 2 chart. If it did exist, such a forest efficiency might have been a deterrent to the development of a more advanced culture, as has been pointed out previously. Regardless of this possible situation, the appearance of pottery is sudden, associated with a rather sophisticated culture which was established at a number of approximately coeval sites across the breadth of the peninsular forests by about 750 B.C. These communities appear to be the product of an enlightend immigrant population coming in from adjacent ecosystems. Presumably these people brought with them both improved lowland maize varieties and competent swidden techniques. It is only for their remarkable progression from this already advanced pioneering threshold in an unfriendly environment that we can give exceptional credit to Maya spiritual leadership; location of the first pioneering communities seems to have been determined by the ecological prerequisites of water transportation, drinking water, and the availability of a shellfood protein supplement to their simple agriculture.

Progress of the Preclassic Maya communities was not constant, and their archaeology records a falling away at some sites prior to the "cultural surge" which began about the time of Christ and resulted in the Maya civilization. We do not know if there were ecological reasons for the decline of certain sites while others progressed, but they offer the most plausible explanations. In the fronteristic and uncircumscribed tropical forest it would seem to have been always too easy for groups of village farmers to melt farther back into the forest, intensifying many of their normal hunting and gathering ways, whenever the going got too tough locally (too many neighbors, bad crops or scarce wild resources, or domineering rulers). This facility to find unexploited resources and homesites worked against the development of a high dependence upon domesticates, the concentration of population and power, and the rise of urbanized centers. Anyone who wanted to maintain a tight regional or even community organization in this ecosystem clearly had his work cut out; the presence of a slave class, warriors, and eventually tight community sustaining area boundaries are probable responses to this difficult situation in the Lowland forests in Classic times (Puleston and Callender 1967; Rands 1952; 1967:145-150; 1969:10).

Apparently there are three good but overlapping ways to establish and maintain a civilization (with relatively high population densities) in a natural forest region: (1) destroy the forest; (2) destroy the forest dwellers' basic hunting and gathering culture, substituting an immigrant culture and people if necessary; and (3) convert or subjugate all citizens to a fanatically ethnocentric and highly sophisticated ritualistic belief system. The Classic Maya made some progress in all three of these directions, and were spectacularly successful in the third regard. The "Mexican" invader-immigrants into the area after 850 A.D. and the later Spanish conquerors seem to have failed miserably in all three respects insofar as the wetter forest regions are concerned, just as have modern governments.

It seems that we must attribute to the organized Lowland Maya of Classic and Preclassic times a spiritually effective leadership far superior to any visible in their area during historic times, even in northern Yucatan at the time of the Conquest; no one has put forth purely environmental explanations for the rise (and fall) of Classic and Postclassic Maya civilization that are acceptable. When functioning, the ancient Maya leadership, whether religious or secular, logically might have put some science and discipline into agriculture as well as into architecture, astronomy-astrology, art, genealogy, and religion. Nevertheless, we see no evidence of advanced agricultural techniques among the Lowland Maya. They seem to have added no new domesticated animals or plants, nor to have developed irrigation systems nor terracing. I think, however, that a tightly structured and numerous Classic Maya nobility dependent upon locally contributed foodstuffs surely commanded the necessary respect to have lands worked more intensively than is commonly done today (Haviland 1968; Reina 1968:568).

Some conjectured Classic Maya intensifications of their agricultural system would include participation of the entire family for the constant hand pulling of both grasses and breadleaf weeds, the hand-picking of insects, and hand-watering from stored reserves when necessary in difficult times. Present-day Maya do not do these things as a rule, and probably never did them willingly. Other farm practices expectable from the record-keeping Classic Maya, and sporadically encountered today, would include close seasonal observations, seed selection including specific seed-to-soil type matching, crop as well as land rotation, composting, and the studied use of a wide variety of native crops other than maize combined with dooryard cultivation and fertilization. The arguments which Puleston (1968) makes for the garden orchard production of the breadnut or Ramon tree seed and its storage in chultuns, for instance, can, of course, also be made for the storage of dry maize grains continuously harvested from patio lots perpetually fertilized by their human, canine, and avian occupants. More farsighted regional administrative duress and more dense demographic conditions would also overcome the modern tendency of self-centered forest farmers to avoid weedy ground and to plant nothing at all anywhere whenever there is abundant stored corn already on hand despite the favorable conditions which may exist for additional production.

Projecting our viewpoint forward, the re-establishment in the lowland Mesoamerican forests even now of productive farmlands and sizable communities may need nothing more miraculous and technologically meaningful than an inspired leadership with a devoted following. Today, for example, there is an unprecedented movement of highland Tzotzil and Tzeltal Maya Indians recently converted to Protestantism down into the unpopulated forests of lowland northern Chiapas. Lands are being occupied which were abandoned by the Classic Maya perhaps a thousand years ago. Hardscrabble villages, one after another, are being founded in this region, as much from land hunger as from spiritual motivations. Whether these communities survive and prosper or not, however, may be more dependent upon the leadership, unity, and inspiration provided by

the religious element in the populace than upon the eventual ability of the soil to produce a dependable livelihood. Offhand, it would appear that the belief system of these new but humble immigrants is neither sufficiently sophisticated nor ritualistically demanding enough to make any outstanding new civilizational imprint in the region. Neither can we be certain that the much-bewailed destruction of the forest will be sufficiently thorough so as to precipitate the intensifying mechanisms characteristic of civilized status. It is, perhaps, significant that the Mexican government is beginning to promote the building of terraces on the abundant hill slopes around northern Chiapas communities as the one most direct method of stabilizing both the soil and the population. And, perhaps more significantly for the future, the development of cattle pastures, tree crops, and crop rotation on these fixed communal lands is also being encouraged.

The more probably successful modern alternative to the small-farm, often communal, type of response to the peninsular tropical forest challenge will be land clearing on a tremendous scale with bulldozers, followed by improved pasture grasses and imported disease-resistant cattle. This increasingly favored course of action will be a typical human response to environmental challenge in which improved technology does overcome ecological limitations in predictable order. If such a modified land use pattern is to result in increased population densities, however, it will be because of man-dictated factors of a religious or sociopolitical nature rather than because of environmental determinants; the normal direction of intensified livestock ranching is toward low-density human participation.

There appears to be little that is "inevitable" about the progress of any ecosystem in which man participates. It may be supposed in the present instance that only time, and not theory, can tell whether the efforts of dispassionate missionaries, government agents, or cattle barons will in any way match the exploits of those remarkable Preclassic elite who captured the strategic waterholes and imagination of another tropical forest populace over 2500 years ago in the Maya Lowlands.

We may venture to say that many of the vital civilizing factors identified in this conference are still missing in most of the peninsular tropical forest today. "Great ideas," a "sense of history and continuity, a sense of horizons," and "knowledge, a feeling for history, expansion, permanence, and continuity" are all spiritual qualities which, to the casual observer, appear to be rather much in absence. The lack of such elements, if in fact true, does not portend an immediately great society, but neither does it preclude the development or arrival of a more forceful ideology at some moment in the future.

Bibliography

Adams, Robert M.

- 1964 The Origins of Agriculture. In Horizons of Anthropology, ed. Sol Tax, pp. 120-131. Aldine, Chicago.

Aguirre Beltran, Gonzala

- 1956 Cultura y Nutricion. In Estudios Antropologicos publicados en homenaje al doctor Manuel Gamio, pp. 227-249. Sociedad Mexicana de Antropologia, Universidad Nacional Autonoma de Mexico, Mexico, D. F.

Andrews, E. Wyllys IV

- 1969 The Archaeological Use and Distribution of Mollusca in the Maya Lowlands. Publication 34, Middle American Research Institute, Tulane University, New Orleans.

Bonfil, Guillermo

- 1962 Diagnostico sobre el hambre en Rudzal, Yucatan. Departamento de Investigaciones Antropologicas, Instituto Nacional de Antropologia e Historia. Mexico, D. F.

Boserup, Ester

- 1965 The Conditions of Agricultural Growth: The Economics of Agrarian Change under Population Pressure. Aldine, Chicago.

Brush, Charles F.

- 1965 Pox Pottery: Earliest Identified Mexican Ceramic. Science, Vol. 149, pp. 194-195. Washington D.C.

Carneiro, Robert

- 1961 Slash and burn cultivation among the Kuikuru and its implications for cultural development in the Amazon Basin. Antropológica, No.10.

Coe, Michael D.

- 1960 Archaeological linkages with North and South America at La Victoria, Guatemala. American Anthropologist, Vol. 62, pp. 363-393.
- 1961 La Victoria, an early site on the Pacific coast of Guatemala. Papers of the Peabody Museum of Archaeology and Ethnology, Harvard University, Vol. 53. Cambridge.
- 1969 Photogrammetry and the Ecology of Olmec Civilization. Paper read at Working Conference on Aerial Photography and Anthropology, Yale University. Cambridge, Mass.

Coe, Michael D.

- 1970 The Archaeological Sequence at San Lorenzo Tenochtitlan, Veracruz, Mexico. Contributions of the University of California Archaeological Research Facility, No. 8, pp. 21-34. Berkeley.

Coe, Michael D. and Kent V. Flannery

- 1967 Early Cultures and Human Ecology in South Coastal Guatemala. Smithsonian Contributions to Anthropology, Vol. 3. Washington D.C.

Cutler, Hugh C. and Thomas W. Whitaker

- 1967 Cucurbits from the Tehuacan Caves. In Prehistory of the Tehuacan Valley, Vol. 1: Environment and Subsistence, ed. Douglas S. Byers, pp. 212-219. Robert S. Peabody Foundation. University of Texas Press. Austin.

Dixon, Keith A.

- 1959 Ceramics from Two Preclassic Periods at Chiapa de Corzo, Chiapas, Mexico. Papers of the New World Archaeological Foundation, No. 5. Orinda.

Eckholm, Susanna M.

- 1969 Mound 30a and the Early Preclassic Ceramic Sequence of Izapa, Chiapas, Mexico. Papers of the New World Archaeological Foundation, No. 25. Provo.

Flannery, Kent V.

- 1968 The Olmec and the Valley of Oaxaca: a Model for Inter-regional Interaction in Formative Times. In Dumbarton Oaks Conference on the Olmec, ed., Elizabeth P. Benson, pp. 143-178. Washington D.C.
- 1969 Origins and ecological effects of early domestication in Iran and the Near East. In The Domestication and Exploitation of Plants and Animals, eds., Peter J. Ucko and G. W. Dimbleby, pp. 73-100.

Flannery, Kent V. and Michael D. Coe

- 1968 Social and Economic Systems in Formative Mesoamerica. In New Perspectives in Archaeology, eds., Sally R. Binford and Lewis R. Binford, pp. 267-283. Aldine, Chicago.

Flannery, Kent V., Anne V. T. Kirkby, Michael J. Kirkby, and Aubrey W. Williams, Jr.

- 1967 Farming Systems and Political Growth in Ancient Oaxaca. Science, Vol. 158, pp. 445-454. Washington D.C.

Ford, James A.

- 1966 Early Formative Cultures in Georgia and Florida. American Antiquity, Vol. 31, pp. 781-799. Salt Lake City.

Ford, James A.

- 1969 A Comparison of Formative Cultures in the Americas. Smithsonian Contributions to Anthropology, Vol. 11. Washington D.C.

Geertz, Clifford

- 1963 Agricultural Involution. The Processes of Ecological Change in Indonesia. University of California Press, Berkeley and Los Angeles.

Green, Dee F. and Gareth W. Lowe

- 1967 Altamira and Padre Piedra, Early Preclassic Sites in Chiapas, Mexico. Papers of the New World Archaeological Foundation, No. 20. Provo.

Hallinan, P. S., R. D. Ambro, and J. F. O'Connell

- 1968 La Venta Ceramics, 1968. Appendix I of "The 1968 Investigations at La Venta" by R. F. Heizer, J. A. Graham, and L. K. Napton. Contributions of the University of California Archaeological Research Facility, No. 5, pp. 155-170. Berkeley.

Harner, Michael J.

- 1970 Population Pressure and the Social Evolution of Agriculturists. Southwestern Journal of Anthropology, Vol. 26, No. 1, pp. 67-86. Albuquerque.

Haviland, William A.

- 1968 Comment on "Milpas and Milperos." Review of article by Ruben E. Reina (1967) in Brief Communications, American Anthropologist, Vol. 70, No. 3, pp. 564-565. Washington D.C.

Heizer, Robert F.

- 1960 Physical Analysis of Habitation Residues. Viking Fund Publications in Anthropology, No. 28, pp. 93-142.

Heizer, Robert F., John A. Graham and Lewis K. Napton

- 1968 The 1968 Investigations at La Venta. Contributions of the University of California Archaeological Research Facility, No. 5, pp. 127-154. Berkeley.

Hole, Frank and Kent V. Flannery

- 1967 The Prehistory of Southwestern Iran: A Preliminary Report. Proceedings of the Prehistoric Society, Vol. 33, No. 9, pp. 147-206. Cambridge.

Isaac, Erich

- 1970 On the Origins of Agriculture. Review of "The Domestication and Exploitation of Plants and Animals" eds., Peter J. Ucko and J. W. Dibbleby. Science, Vol. 168, pp. 706-707. Washington D.C.

Lee, Richard B.

- 1968 What Hunters Do for a Living, or, How to Make Out on Scarce Resources. In *Man the Hunter*, eds., Richard B. Lee and Irvin DeVore, pp. 30-48. Aldine, Chicago.

Lee, Richard B. and Irven De Vore (eds.)

- 1968 *Man the Hunter*. Aldine, Chicago.

Lowe, Gareth W. and J. Alden Mason

- 1965 Archaeological Survey of the Chiapas Coast, Highlands, and Upper Grijalva Basin. *Handbook of Middle American Indians*, Vol. 2, pp. 195-235. University of Texas Press, Austin.

MacNeish, Richard S.

- 1965 The Origins of American Agriculture. *Antiquity*, Vol. 39, pp. 87-94. Cambridge.
- 1966 Speculations about the beginnings of village agriculture in Meso-America. XXXVI Congreso Internacional de Americanistas, *Actas y Memorias*, Vol. 1, pp. 181-185. Sevilla.
- 1967a A Summary of the Subsistence. In *The Prehistory of the Tehuacan Valley*, ed., Douglas S. Byers, Vol. 1, pp. 290-310. University of Texas Press, Austin.
- 1967b Mesoamerican Archaeology. In *Biennial Review of Anthropology*, 1967, pp. 306-331. Stanford University Press, Stanford.

MacNeish, Richard S. and others

- 1967a *The Prehistory of the Tehuacan Valley*. Vol. 1, Environment and Subsistence, ed., Douglas S. Byers. University of Texas Press, Austin.
- 1967b *The Prehistory of the Tehuacan Valley*, Vol. 2, Non-Ceramic Artifacts, ed., Douglas S. Byers. University of Texas Press, Austin.

Meggers, Betty J.

- 1954 Environmental limitation in the development of culture. *American Anthropologist*, Vol. 56, No. 5.

Meighan, Clement W., David M. Pendergast, Benjamin K. Swartz and M. D. Wissler

- 1958 Ecological Interpretation in Archaeology: Part I. *American Antiquity*, Vol. 24, No. 1, pp. 1-23. Salt Lake City.

Mountjoy, Joseph B.

- 1970 San Blas Complex Ecology. Paper presented at the 35th Annual Meeting of the Society for American Archaeology, Mexico City.

- Palerm, Angel and Eric R. Wolf
 1957 Ecological Potential and Cultural Development in Mesoamerica.
 Pan American Union Social Science Monograph No. 3. Washington D.C.
- Piggott, Stuart
 1969 Conclusion. In The Domestication and Exploitation of Plants and
 Animals, eds., Peter J. Ucko and G. W. Dimbleby, pp. 555-560.
 Aldine, Chicago.
- Puleston, Dennis E.
 1968 New Data on Classic Maya Subsistence. Paper presented at the 33rd
 Annual Meeting of the Society for American Archaeology, Santa Fe.
- Puleston, Dennis E. and Donald W. Callendar, Jr.
 1967 Defensive Earthworks at Tikal. Expedition, Vol. 9, No. 3,
 pp. 40-48. Philadelphia.
- Rands, Robert L.
 1952 Some Evidences of Warfare in Classic Maya Art. University Micro-
 films, Publ. No. 4233 (Doctoral Dissertation, Columbia University).
- 1967 Ceramic Technology and Trade in the Palenque Region, Mexico.
In American Historical Anthropology, eds., C. L. Riley and
 W. W. Taylor, pp. 137-151. Southern Illinois University Press,
 Carbondale.
- 1969 Mayan Ecology and Trade: 1967-1968. Mesoamerican Studies,
 Research Records, University Museum, Southern Illinois University,
 Series '69M(2)A. Carbondale.
- Redfield, Robert
 1950 A Village That Chose Progress - Chan Kom Revisited. University
 of Chicago Press. Chicago.
- 1962 A Village That Chose Progress - Chan Kom Revisited. Paperback
 edition, Phoenix Books, University of Chicago Press, Chicago.
- Redfield, Robert and Alfonso Villa Rojas
 1934 Chan Kom: A Maya Village. Carnegie Institution of Washington
 Publication 509. Washington, D.C.
- 1962 Chan Kom: A Maya Village. Paperback edition, Phoenix Books,
 University of Chicago Press, Chicago.
- Reina, Ruben E.
 1967 Milpas and Milperos: Implications for Prehistoric Times.
 American Anthropologist, Vol. 69, No. 1, pp. 1-20. Washington D.C.

Reina, Ruben E.

- 1968 Reflections On William Haviland's Comments. Reply to review of Reina 1967 by Haviland 1968. *American Anthropologist*, Vol. 70, No. 3, pp. 565-568. Washington D. C.

Sanders, William T.

- 1963 Cultural Ecology of the Maya Lowlands (Part 2). *Estudios de Cultura Maya*, Vol. 3, pp. 203-241. Universidad Nacional Autónoma de Mexico.
- 1965 The Cultural Ecology of the Teotihuacan Valley. Department of Sociology and Anthropology, Pennsylvania State University.
- 1968 Hydraulic Agriculture, Economic Symbiosis and the Evolution of the States in Central Mexico. *In Anthropological Archaeology in the Americas*, pp. 88-107. The Anthropological Society of Washington, Washington, D. C.

Sanders, William T. and Barbara J. Price

- 1968 *Mesoamerica, The Evolution of a Civilization*. Random House, N.Y.

Sharer, Robert J.

- 1969 A Preliminary Report of the 1969 Archaeological Research Program at Chalchuapa, El Salvador. The University Museum. Philadelphia.

Sharer, Robert J. and James C. Gifford

- 1970 Preclassic Ceramics from Chalchuapa, El Salvador, and their Relationships with the Maya Lowlands. *American Antiquity*, Vol. 35, No. 4, pp. 441-462. Washington, D.C.

Sisson, Edward B.

- 1970 Settlement Patterns and Land Use in the Northwestern Chontalpa, Tabasco, Mexico: A Progress Report. *Ceramica de Cultura Maya et al*, No. 6. Temple University, Philadelphia.

Spores, Ronald

- 1967 *The Mixtec Kings and Their People*. University of Oklahoma Press, Norman.

Ucko, Peter J. and G. W. Dimbleby (eds.)

- 1969 *The Domestication and Exploitation of Plants and Animals*. Aldine, Chicago.

West, Robert C. (ed.)

- 1964 *Natural Environment and Early Cultures*. Handbook of Middle American Indians, Vol. 1 (Robert Wauchope, general editor). University of Texas Press, Austin.

Willey, Gordon R.

1966 An Introduction to American Archaeology, Vol. 1, North and Middle America. Prentice-Hall, Englewood Cliffs.

Wrigley, E. A.

1968 Demographic Models and Geography. In Socio-Economic Models in Geography, eds., R. J. Chorley and P. Haggett, pp. 189-215. University Paperbacks, London.

XVI. COMMENTARY ON: THE CIVILIZATIONAL CONSEQUENCES OF VARYING DEGREES OF AGRICULTURAL AND CERAMIC DEPENDENCY WITHIN THE BASIC ECOSYSTEMS OF MESOAMERICA

Geoffrey Bushnell

I want to say at the outset that this struck me as a very good paper, and that I found myself in agreement with most of it.

It falls into four sections:

(1) the Introduction. Lowe stresses the advantages of hunting and gathering in the very varied and favorable conditions in Mesoamerica, and suggests that this is one reason why dependence on agriculture came about so late there. This is perhaps underlined by the fact that the idea of cultivation was very much older. I would add that a modern hunting and gathering people, the Hadza of East Africa, found this a very satisfactory way of life compared with that of their agricultural neighbors until recent (and disastrous) government interference. They got on very well, to borrow a phrase from Lowe, without the trouble of planting crops and making pots. Leading on from this, MacNeish is quoted on the subject of specially favored hunting and gathering, and fishing, localities which allowed early settlement, perhaps the year round (the Archaic shell mounds in Kentucky may be an instance), but I feel that the idea should be treated with caution. Being suspicious of MacNeish's pit house villages in the Abejas Phase at Tehuacan, 3000 B.C., I asked Flannery, who replied "Half a pit house". Lowe goes on to point out that there comes a time in the second millenium B.C. (1500-1200) when development accelerates, and agriculture and settlement spread rapidly. This is demonstrated by the rapid spread of ceramics, acting as an index. Incidentally, if one looks at this stage and not at the whole slow build-up of cultivation from the beginning, there may be more to Childe's idea of a neolithic revolution than I have been accustomed to believe, as applied to Mesoamerica.

(2) The Appearance of Pottery. It is suggested that the availability of abundant natural containers, e.g. calabashes, retarded the adoption of pottery until beans began to be boiled rather than roasted and maize to be soaked, which could have been true of upland valleys like Tehuacan but not of lowland areas where pottery seems to have preceded the cultivation of corn and beans. The suggestion that the conservative way in which the shapes of the earliest pottery followed natural forms, indicates that its introduction did not produce cultural upheaval, seems to be a good one. I am not convinced by the suggestion that deepened stone mortars were the first manufactured vessels capable of boiling use over the fire. I doubt if they

would long survive such use. I agree that it is highly unlikely that the Tehuacan stone bowls had any influence on pottery manufacture, although both could have been inspired by gourd vessels. It is not very profitable to speculate on this, because very few bowls were found.

There is a discussion of possible routes for the introduction of pottery from a southern source, with a preference for the Gulf Coast with hints of connections as far away as Florida. As to the actual source, Honduras is mentioned as worthy of investigation, but I believe that the north coast of Colombia is as good a candidate in spite of Lowe's unwillingness to claim Puerto Hormiga as the source (of the Barra Phase pottery). The Chiapas pottery at least shares many shapes with Puerto Hormiga, which is the oldest pottery so far known in America, and apparently gives rise to a long succession with similar forms in the same area (Canapote followed by Barlovento), so there would be a possibility of a site intrusion at various times over a long period. Lowe suggests that the Barra Phase pottery of Chiapas can be as early as any in Mesoamerica, since there is no reason why the sparse and crude pottery of the Purron Phase in Tehuacan should not have appeared towards the end of the phase, so a reasonable date for both would be about 1600 B.C. After that comes the critical period, less than 500 years in length, when there is a rapid growth of population and the development of the San Lorenzo Phase of the Olmec Culture, which many of us would regard as a civilization.

A word on the appearance of pottery in Peru. At Kotosh there are substantial buildings before pottery appears (a pyramid some 8 m. high). On the coast there are large centres of population and substantial buildings, for instance at Culebras and Chuquitanta. In both cases they are before 1800 B.C. We know nothing of the population size at Kotosh or of the sources of food, but on the coast there was a considerable reliance on sea food, guinea pigs, and, in some places, plant cultivation. Can these buildings, both secular and ceremonial, be regarded as indices of civilization in a preceramic context? It may be that it is safer to stick to the criteria suggested by Willey earlier in this conference, namely, large population size and density, social complexity, elaborate internal communications, and ideas.

(3) The Role of Ceramics and Agriculture. The suggestion is made that population and social pressures forced man to take measures to ensure dependable harvests, and that increased dependence on agriculture created uses for pottery and freed some time for its manufacture by specialists, in other words demography is the independent variable, with agricultural systems dependent on it, and pottery to some extent following them. Lowe goes on to suggest that the rise in population in late Classic Maya times may have overtaken production from agriculture and resulted in "agricultural involution", and that this, coupled with Mexican intrusions which upset the hierarchy, brought about the collapse of Classic Maya civilization, a model which might well apply to part of the area but I do not feel that it provides a full explanation. This, however, is jumping ahead from the emergence of civilization to its downfall,

and I do not propose to discuss it further except as regards the suggestion that the failure of the hierarchy to recover is undoubtedly due to the same factors as the late conquest of their habitat by the, presumably lowland, Maya before about 700 B.C., namely a lack of aggressive leadership. Aggressiveness is not something which I would have expected in general from the character of the Maya, but if it ever did arise I would expect it in late Classic times, when there is evidence of dynasties to which some ascribe extreme militancy. The personal leadership factor is bound to be difficult to detect archaeologically, in fact it is probably impossible to do so anywhere before the 16th century, when there can be little doubt that it was important in the rise of the Incas.

There follows a discussion of diet, in which I would call attention to two points. One is the effect of non-material considerations; Piggott's remark "Custom not calory is King" is shown to have "particular application to Mesoamerica, where calories are destroyed or ignored right and left." The other is the continued importance of wild resources, particularly from hunting, in some parts of Mesoamerica even to the present day, and a milpa may be valued as a source of animal food. I am glad that Lowe has drawn attention to an essential difference between the Old and the New World in the development of farming by mentioning the basic barley and sheep economy practiced in Iran by 4000 B.C., although it is possible that the fewness of domestic animals may be balanced to some extent by the unparalleled improvement of maize once its domestication has begun. Lowe makes the point that the abundance of game animals in the lowlands of Mesoamerica made more domestication relatively unnecessary, on which I would only comment that it was probably impossible for lack of suitable animals.

Developments in highland Mexico and the tropical forest are sharply contrasted, Lowe endorses that the destructiveness of man removed the natural resources of the Valley of Mexico about 2000 years ago, setting in motion a whole series of reactions which Sanders, in particular, has regarded as leading inevitably to the urbanistic civilization of that region. On the other hand, the slash-and-burn cultivation of the lowland Maya maintains natural resources, so much so that human and non-ecological explanations must be sought for their civilization. In spite of this most of us would regard the two as facets of one civilization, which raises the question whether there was something more at the back of both facets. This seems to bring us to what in their various ways John Graham, at this conference, and Gordon Willey, many years ago ("The Early Great Styles and the Rise of Pre-Columbia Civilizations", *American Anthropologist*, Vol. 64, No. 1, Part 1, p. 1, 1962) have indicated as spiritual factors. Perhaps they might also be described as human factors, as Lowe suggests for the lowland Maya. At any rate I am sometimes weary and sometimes dissatisfied with the unrestrained materialism of the ecological approach, and wonder whether spiritual factors can not have had their influence in other regions than the tropical forest. Lowe's final remarks about the unity of people from Honduras to Hidalgo suggest that they did.