

VII. THE EMERGENCE OF CIVILIZATION IN THE MAYA LOWLANDS

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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.

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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 Usumacinta 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.