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WHAT IS LOWER CENTRAL AMERICAN ARCHAEOLOGY?

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INTRODUCTION

The archaeology of Lower Central America is just beginning to emerge from decades of scientific neglect and antiquated research. Large tracts of hinterland between eastern Honduras and eastern Panama still remain unexplored. Much of the literature has been concerned almost exclusively with ceramic sequences, tribal ascriptions, influences from nuclear America, and impressionistic site surveys. The assumption that Lower Central America served only as a corridor through which ideas, objects, and even people moved back and forth between Mesoamerica and the Andean region colors much of the writing. So much so that one is justified in asking if Lower Central America will ever constitute a viable study unit. Is it an area with historic depth, where groups sharing common roots underwent similar adaptive processes? Are there important problems to be studied here?

By shifting research priorities from the definition of culture areas to the investigation of cultural processes, younger colleagues are just beginning to find affirmative answers to these questions. But this is a very recent development. If I am forced by the nature of much of the previous literature to be somewhat critical, it is with the hope of moving the field toward more scientific methodologies and broader theoretical considerations. For the new generation I hope this essay provides further encouragement and possibly some new insights.

ARE FRONTIERS NECESSARILY UNSTABLE?

The Lower Central American archaeological area has been defined negatively as the region below and beyond the boundaries of the Mesoamerican culture area to the north. Much confusion still remains as to where Mesoamerican cultures leave off and Lower Central America begins. (For location of places mentioned in the text, see Figure 1.)

The Southeastern Mesoamerican Frontier

No less than in the past, Mayanists are still puzzling over the problem of how far south the Maya wandered from their presumed homeland. One of the first to take up this problem seriously was Lothrop (94), who placed the farthest limit of Maya settlement in Honduras, east of Lake Ulua-Yojoa, and in El Salvador along the Lempa river. Because so little was known of the time-depth of Maya developments, his approach was essentially ahistorical, linking sixteenth century accounts of Maya peoples with what he conceived of as Maya pottery. While taking Lothrop to task for making these connections, Longyear (91) accepted the equally doubtful proposition that linguistic groups formed distinct archaeological cultures. Arguing that there is very little that was Maya in the Ulua-Yojoa archaeological complexes, he put the Maya frontier during Classic times further to the west in Honduras, roughly where the Maya met the Lenca peoples.

Other archaeologists have generally accepted the Lenca line as the Maya frontier, but not without making assumptions of their own concerning the linguistic affiliations of this now extinct group: that the Lenca were not Maya though they were definitely Mesoamerican (129); that they were neither Mayan nor Mesoamerican but South American (139); that the proto-Lencas were macro-Mayanas who in Late Preclassic times brought Usulután pottery to eastern Salvador and Honduras (2, 3). In all these arguments a strange logic prevails. While it is considered speculative to infer shifts in social organization from marked changes in community patterns at a site (3), archaeologists show little hesitation when it comes to tying in ceramic traditions with specific languages 3000 years ago. And whereas great ethnic and linguistic complexity is accepted for Spanish contact times (139), the tendency has been to simplify the prehistoric picture.

Not surprisingly, recent efforts by qualified linguists to define language groupings in the southeastern Maya frontier (14, 16, 54, 59, 90) reveals a situation every bit as complex as indicated by both the archaeology and the ethnohistory. As Holt & Bright (54) point out, at least six genetically different language families co-existed in the Honduran, Salvadorean region alone. These families fall into two broad phonological clusters—the Mayoid

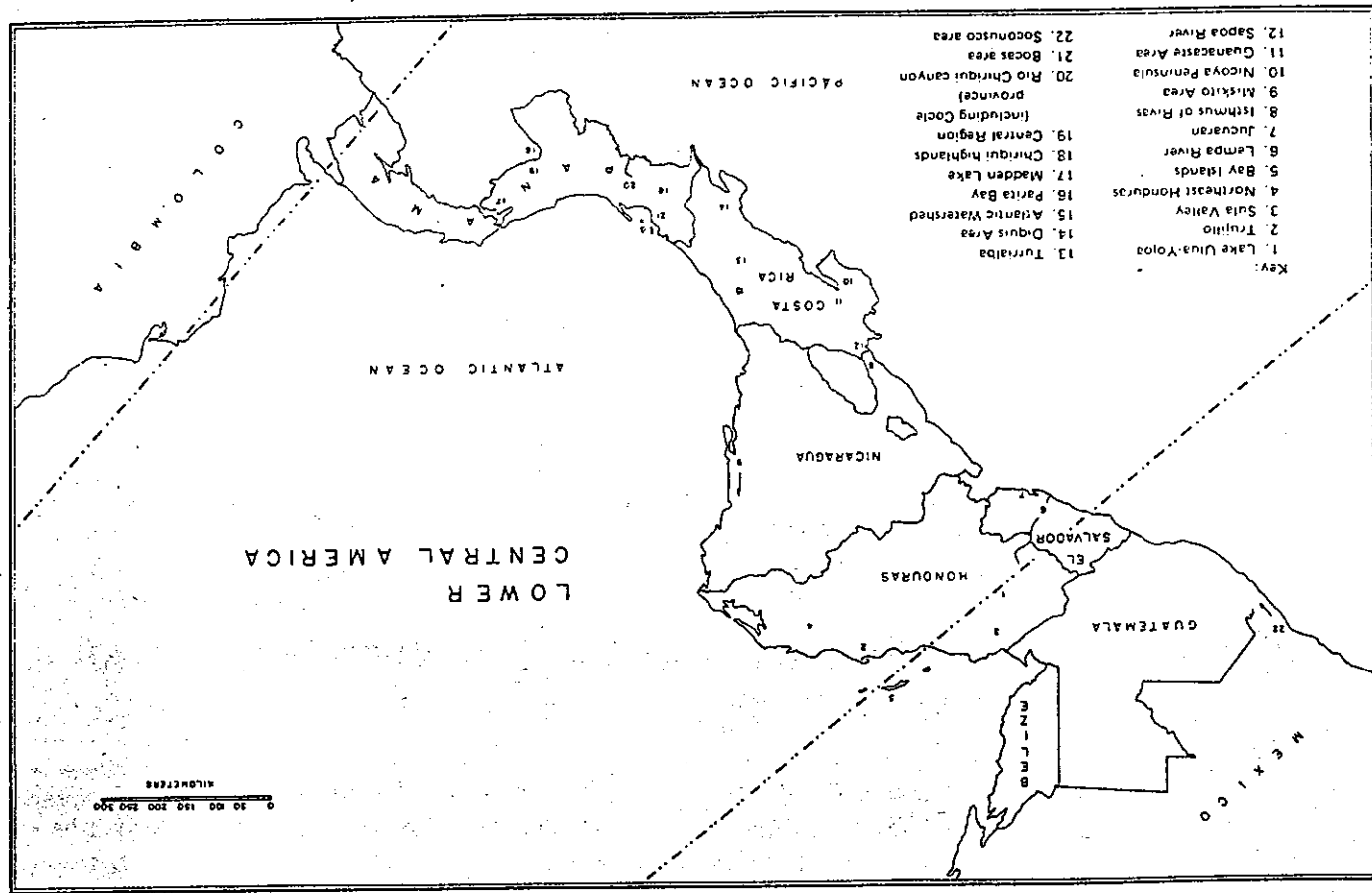


Figure 1 Map of Lower Central America showing location of places mentioned in text.

versus the Central American cluster—with the line between them extending from Trujillo in Honduras to Jucuarán on the Pacific coast of El Salvador. The same authors are careful to point out that several languages, among them Jicaque and Lenca, exhibit traits of both clusters, which they interpret as evidence for a gradual transition from one cluster to the other. There are further disagreements among specialists. Thus, while Longacre (90) puts the Chorotega-Mangue of the Nicoya peninsula in Costa Rica in the Mesoamerican camp, Holt & Bright (54) put them in the Central American camp; and while Campbell (15) lists Lenca not as one but two languages and refers to them as non-Maya, Holt & Bright (54) rather hesitantly align Lenca with the Mayoid group, and Kaufman (58, 60) points out that the connection of Xincan-Lencan with any other group, Mayan, Chibchan or Uto-Aztecan, has not been demonstrated. Finally, while Campbell (14) favors putting the Misumalpan languages (Cacaopera, Matagalpa, Misquito, and Sumu), which once occupied parts of Salvador and Nicaragua, with the Macro-Chibchan group of Central and South America, Kaufman (59) places them with the Mesoamerican languages.

Leaving the question of possible Olmec linguistic affiliations to specialists (17), archaeologists have paid more attention to other problems: how to recognize Olmec influences (93), when in the Preclassic were these influences felt in the southeastern peripheries (143), and what social factors were behind the spread of the Olmec style. Answers to the last question have been diverse. It has been suggested that Olmec objects were disseminated by itinerant male sculptors (93); that trade was facilitated by contact between elites for the acquisition of prestige goods (31); that the Olmec set up trade control stations among autochthonous groups (117, 118), and so forth. While inferences of this kind seem perfectly justified and necessary, in some instances they have been carried too far. Culture-historical schemes have been built upon an insufficient data base by using concepts such as acculturation, diffusions, migrations, and trade (117, 118) as if their meanings were generally agreed upon among ethnographers.

Fortunately, some of the traditional criteria used to define the southeastern Mesoamerican frontiers are now being queried by recent scholars. Emphasizing the fact that a great deal of ethnic complexity underlies all culture-contact situations, Henderson (51-53) and other members of the Cornell University project in western Honduras have begun to investigate synchronic variation within a region. They point out that it may be impossible to define external relations at a site such as Naco (an important Postclassic center) without first determining its economic and political role within the Valley (51). Their conception of frontiers as multiethnic situations, where resident groups and foreign enclaves maintained symbiotic relations grounded on ecological differences and economic necessities, seems well

taken. Lange (68, 71) has also emphasized that frontiers are dynamic, changing through time. Although the emphasis on ceramic similarities has not been abandoned, it is now a commonplace that they may mean different things, not just a common ethnic origin or a common language (53). Incidentally, some of the old monographs (133) are much more sophisticated on this score than more recent ones (128).

Given present realities, an awareness of the need to understand how a site functioned before assessing its external relations may have come too late. Whereas archaeologists in the past wasted unique opportunities to study sites while they were still accessible and relatively undisturbed, the present generation has to make do with partial salvage programs (119).

The Outlying Areas: Gran Nicoya and Eastern Honduras

There is no doubt that most of western Honduras (7, 92) and western Salvador (117, 118) were part of real Mesoamerica. Pacific coastal Nicaragua and Costa Rica, the so-called Gran Nicoya (4, 6, 9, 19, 20, 102, 144), was also supposed to have been strongly influenced by Mesoamerica. More recent workers, however, are arguing for more southerly influences, in Nicoya and even eastern Honduras.

In the Sula Valley of Honduras, N. C. Kennedy (61) sees ties between the famous Playa de los Muertos and South American complexes during the Early and Middle Formative periods. In the Bay Islands of Honduras, several investigators (29, 140) note connections with Lower Central America after A.D. 1000, a position not unlike that taken earlier (28, 132). Disagreeing with earlier conclusions (20), Sweeney (136, 137) argues for the total exclusion of the Guanacaste section of Gran Nicoya from the Mesoamerican sphere of influence. Finally, in two overlapping publications, Lange (64, 65) suggests that the societies of Gran Nicoya, and perhaps even the Maya themselves, were Circum-Caribbean in type. He argues that Maya subsistence and social organization were closer to those of Circum-Caribbean chiefdoms than to those of the central Mexican highland states. To this reviewer his idea that the Maya did not develop complex civilizations, however loosely this term is defined, seems, to say the least, to overstate the case. Nevertheless, Lange (65) does provide a healthy reminder that the Maya economy, with a great deal of dependence among the Yucatecan Maya on marine resources (66), was more diversified than had been previously assumed. Freidel (36) has documented the same point more extensively.

Frontiers and Outliers Reconsidered

Actually it may be misleading to place too much emphasis on outside connections and foreign influences. Frontiers may be stable or unstable

according to circumstances. Within the Mesoamerican frontier area, a great deal of linguistic diversity probably antedated 1500 B.C. by which time most of the important language families had long been in the region (58). We are reminded by Kaufman (58) that the distribution of most languages suggests few large-scale migrations of peoples, and that cultural patterns and complexes move more often than nations, though individuals may move about as contact men. The obvious exception in the area under consideration may have been the Uto-Aztecs, represented by the Pipil latecomers, who by the time the Spanish arrived had taken over western Salvador and penetrated into Honduras (91). It seems likely, in fact, that most artifacts from Middle America found here and there within the frontier area (33, 47, 67, 148) may be attributed to individual traders or perhaps to trading enclaves (51). The rest of the population by and large probably stayed put most of the time.

In my opinion, the difficulty that linguists have in deciding whether to place the Chorotega-Mangue and Misumalpan languages in the Mesoamerican or Central American camps may reflect a long-term stability and coherence of the northern frontier. Since Salvador and Honduras probably were settled as early as the Maya area, the local populations may have made many innovations on their own. At any rate, there is little justification for conceiving of these groups as "poor relations" (7), even though some of their pottery was at times under heavy Mayan or Mesoamerican influences. In reality, the groups in the so-called Mesoamerican frontier exhibited a gradual, in situ, and successful adaptation to coastal conditions for at least 3000 years.

Beyond the frontier, a single language phylum, Macro-Chibchan, dominates the area from Nicaragua through Panama to coastal Colombia and Venezuela and onto northern Ecuador (135, 141). It may be useful to consider how far this whole enormous region, the so-called Intermediate area, can be considered to be divided into separate cultural subregions. We can begin by reviewing the latest literature on the Lower Central American section.

UPDATING PREVIOUS SYNTHESSES

Within this decade we have seen the publication of two different summary volumes (7, 130). I have already commented upon them elsewhere (79, 80); they are very different in organization, conception, and even content. Baudéz is strict in his coverage of the area. Stone, on the other hand, includes long sections on Chiapas, Guatemala, and central Mexico. Well-known sites in the Maya heartland are discussed at some length, and many Maya objects are included for illustration. Middle American groups are

seen as penetrating, influencing, overriding, or otherwise making their presence felt everywhere except for the Panamanian Isthmus. How much can be gained from this kind of approach is a matter for conjecture. In any case, such things as "influences," even if they were subject to proof, do not take us very far in thinking about developments in an area. Neither does the strictly chronological approach (7), but it is preferable. By presenting a sketch for each subarea in terms of five periods (see also 5), Baudéz allows us to follow with ease the regional chronologies. His presentation is, however, marred by his division of Lower Central America into a zone of Mesoamerican and a zone of South American tradition. In keeping with Baudéz's own interests, the first zone is covered in 30 pages, the latter in about 14. This makes for a thin and sketchy manual, but I found it useful as a starting point for this review of the post-1970 literature.

Special Works

Much new work has appeared on the northern sector which can only be mentioned here: reports on western Salvador (117, 118), eastern Salvador (1), central Honduras (8), northwest Honduras including the upper Sula Valley (45), the Bay Islands (29), the Naco Valley (51, 52), and the site of Travesía (119, 120). In addition, Healey (48, 49) has done research on the long-neglected area of northeast Honduras (see section below on coastal adaptations).

For the southern sector of Gran Nicoya, three new dissertations have substantially changed our views of developments in this area. Two of them, both still unpublished (46, 136), use second-hand materials that were left largely unanalyzed by the original excavators. The other work (64) summarizes the author's own investigations and presents an excellent description of the Nicoya macroecology (see also 67, 69). Lange's reporting of the Sapoa River survey and ceramic analysis are particularly useful, as he manages to reduce Baudéz's (6) 41 pottery types to 21—a service to mankind. In a more speculative section, he suggests that maize agriculture was very late in the Sapoa River, an idea that has not gone without comments (89) and counter-clarifications (70). His general conclusions, repeated elsewhere (65), raise important queries as to the presumed Mesoamericanization of the Nicoya area.

Sweeney's work on the archaeology of the Guanacaste part of Nicoya (136) presents the full material collected by Coc (20). She offers an exhaustive pottery classification, backed up by a number of consistent radiocarbon dates (134), and discusses trading networks during the last centuries of the Zoned Bichrome period. The area may have been too poorly endowed in natural resources to participate in the later trading spheres of developing civilizations further north. But to the south, the local people were in contact

with the Panamanian groups of Parita Bay, and possibly with those of Ecuador in the Santa Elena Peninsula. The supposed Nicoya-Ecuadorian connections are perhaps debatable. Since there does not seem to have been much reciprocal trade between areas within Nicoya itself, according to both Lange and Sweeney, I find it difficult to believe in significant exchanges with very distant groups. Be that as it may, Sweeney's remark that Nicoya never divorced itself from its Chibchan origin, and never became part of Greater Mesoamerica, seems well supported by the settlement pattern and linguistic evidence.

Healey's (46) analysis of the materials collected by Norweb and Willey in 1959-1961 in the Nicaraguan Nicoya, on the Isthmus of Rivas, includes excellent summaries of the ecology, ethnohistory, and archeology of this area, but it is essentially another ceramic report, with the emphasis placed on the time-space ordering of the data. Referring to the connections between Rivas and the Nicoya peninsula itself (*sensu stricto*), Healey suggests that ties between the two areas were closer during the earlier periods than during Late Polychrome times (A.D. 1200). His inclusion of the Rivas area in the Mesoamerican camp may have been influenced by Longacre's (90) classification of the Chorotega languages (see above). Of course, if influences are to be deduced mostly from ceramics, then it may be appropriate to include Rivas in the Mesoamerican sphere. If other aspects such as ecological adaptations are considered, an inclusion within the Circum-Caribbean or Intermediate Area seems more justified.

Proceeding to the south and east, i.e. to Baudéz's supposed zone of South American tradition, and to the earlier of the five periods he proposes, we learn that new Paleo-Indian points have been reported from Turrialba in Costa Rica (125) and from Madden Lake in Panama (12, 13). Although the points were found on the surface, they contribute to our understanding of the arrival of early man in South America. Since the technique of pressure flaking was discontinued by 5000 B.C. (13), the points must be earlier. Much of the extinct Panamanian megafauna (39) was South American in origin; hence it is not surprising to learn that the Madden Lake points resemble those from Fell's cave in Chile, where they were found associated with extinct sloth and the native horse at a radiocarbon age of 11,000 years (10).

In the next preceramic period, Baudéz (7) lists only the site of Cerro Mangote in Parita Bay (100). Since 1970, however, six more preceramic sites have been found in Panama, in noncoastal locations. The significance of these sites was touched upon in the Puerto Rican symposium by me (81) and by Ranere (108); I will also discuss them later. Here it may be sufficient to note that these new preceramic sites indicate a greater variety of subsistence adaptations than the presumed shellfish-gathering pattern ascribed to Cerro Mangote.

With respect to developments during the first half of the first millennium B.C., there is still a gap in our knowledge. The archaeological complexes which may belong to this period (41, 64, 123) have not been securely dated.

After 300 B.C. to A.D. 500, corresponding to Baudéz's (5, 7) periods III and IV, we have new information from the highlands of Chiriquí in Panama (87-89). The colonization of these cold and wet highlands seems to have been late because they were unsuitable for both hunting-gathering and root crop agriculture. They were finally occupied only as a result of demographic pressures subsequent to the introduction of expansive seed culture in the plains (88).

The innovative research of Cooke (22-24) is essential to the understanding of the prehistory of the Central Region of Panama. His work has demonstrated the unity of this area and the uselessness of previously recognized subdivisions (95, 96). His studies of human adaptations in the provinces bordering Parita Bay have transformed a bare ceramic chronology (63) into a real developmental cultural-ecological sequence. This work has provided the basis for a reinterpretation (84) of the function and iconography of the art objects of the famous Sitio Conte site.

General Works

Recent syntheses of the archaeology of the whole of Lower Central America have not taken into account any of the new approaches mentioned above. They still tend to emphasize comparisons within one country only, or within one aspect of the prehistoric record, usually ceramics, or within spatiotemporal correlations. The narrow focus of these works contrasts with Willey's (142, 144) broad perspectives on developments in the whole of the Intermediate Area.

If we ignore some passages in purple prose, and misleading simplifications, the book on Costa Rica by Stone (131) is useful in providing a clear and orderly discussion of each of the three areas into which Costa Rican archaeology is usually divided, namely Nicoya, Diquis, and the Atlantic watershed. This work is easier to consult than her more general volume (130), and it is a beautifully produced guide to museum collections. But it suffers from the lack of any sense of problem, or of the need for methodology. Ferrero's revised edition (30) provides a more basic understanding of men-environment interactions, and a more up-to-date account of archaeological work in Costa Rica. He is also one of the editors of *Vínculos*, a new bilingual journal which publishes articles on any part of Central America. A special issue of this journal [Volume 2(1), 1976] considers ceramic sequences in 11 different areas, from Lake Yojoa in Honduras to central Panama. Seven out of the 11 articles report the conclusions of unpublished dissertations. The rest discuss work in progress or old work that was never fully published.

The subject of ceramic sequences seems to absorb much of the Central American synthesizer's time. Haberland's article (41) on the chronologies of Lower Central America is a case in point. Although published only very recently, it was written in 1973 and never revised. It is, therefore, seriously out of date, as the bulk of publications has increased dramatically in the last 5 years. His efforts are not without merit, for he presents an excellent resumé of the history of archaeological work and does much to reconcile disparities in Greater Nicoya, central Costa Rica, and greater Chiriquí. But he is a firm believer in having chronological and distributional problems settled first, before turning to "fancy questions" about settlement patterns, ecological adaptations, the nature of culture contact, and the like. There is, of course, an obvious reason why chronological and ecological interpretations have not been more closely associated, to their mutual enrichment. Because of the preoccupation with ceramics, little attention is paid to the recovery of organic remains, the reconstruction of utility areas, the functional study of lithic artifacts, and so forth. The result is what I call diachronic ecology: deducing broad shifts in adaptations, between periods of many centuries, without adequate quantitative data. The unconscious assumption that spatiotemporal correlations are prior to, and not simultaneous with, the study of cultural processes has produced pottery descriptions, including some of my own (78), of unjustified length. Ecological interpretations, based on skimpy evidence, poorly recovered, and incompletely analyzed, are still being appended to these descriptive works without any prior hypothesis. To say that these chronological works are "essentially factual and narrowly historic" (145, p. 513) seems a gentle comment indeed.

SUBSISTENCE AND SETTLEMENT SYSTEMS DURING THE PRECERAMIC AND FORMATIVE PERIODS

The new generation of archaeologists working in Lower Central America are beginning to seek answers to such problems as the nature of preceramic hunting-gathering adaptations, the transition from vegetation to seed culture, marine versus riverine lifeways along both coasts, and the basis for chiefdom formation. Their work is going in the direction of broader theories and more fundamental processes. Thus, they are following in the footsteps of Willey and Reichel-Dolmatoff, while sharing the same concerns of Flannery, Harris, Lathrap, and others.

Adaptive Variability During the Preceramic and Formative Periods (5000 B.C. to 500 B.C.)

The assumption that the hunting-gathering way of life in the tropics was fairly uniform finds little support in recent work in Panama. Not only were

preagricultural peoples of the interior different from those of the coast, but even the coastal groups differed among themselves.

The inhabitants of Cerro Mangote (4800 B.C.), the first preceramic site reported in Central America, were thought to have been shellfish gatherers (100). A similar adaptation was attributed to the pottery-using peoples of the nearby Monagrillo site at 2100 B.C. (146). New radiocarbon dates (A. J. Ranere, personal communication) have apparently extended the history of Monagrillo back to the middle of the fourth millennium B.C. If correct, these dates would make Monagrillo pottery among the oldest in the New World. The first groups intermittently camped at the site when it was still an active beach. Reexcavation of the site using fine-screening techniques (110) point to a heavy reliance upon fish and crustaceans as well as shellfish.

Two additional types of adaptations have recently been documented in the plains and interior lands away from the Parita Bay shoreline. At the Aguadulce shelter, about 18 kilometers from the present coastline, a preceramic broad-spectrum plant-collecting and hunting pattern, with some emphasis on fishing and catching freshwater turtles, lasted from the fifth millennium B.C. to the middle of the third millennium B.C. (110, 111). Further inland, in the foothills of the continental divide in the province of Coclé, at an altitude of 400 meters above sea level, a pure hunting camp was discovered at Cueva de los Ladrones (11). Even more recently, Cooke (personal communication) has found another preceramic site which is neither a rockshelter nor a cave, but a small open camp in the Chiriquí highlands.

In the early 1970s, Ranere's (106) pioneering excavations of four preceramic rockshelters and one open campsite in the canyon of the Rio Chiriquí, at elevations between 600 and 900 meters, produced thousands of flakes and stone tools which he analyzed using experimental procedures (107). By combining replication experiments with wear-pattern analysis, he concludes that during the Talamancan phase (4800 B.C. to 2300 B.C.) most chipped stone tools were used as grinding, pounding, or mashing instruments to process wild plants or to work wood. In a subsequent paper (109), he proposes the intriguing idea that the simplicity of tropical forest lithic assemblages may be due to the fact that these were tools to make tools; that is, that stone tools were manufactured, not as ends in themselves, but probably as instruments in the production of more sophisticated implements of wood such as projectile points. Incidentally, this may mark the beginning of man's alteration of the tropical forest. By removing trees for his use, for tools as well as shelter, man must have changed the species composition and structure of the forest, opening it to accelerated invasion by sun-loving herbaceous plants. Among these were probably the ancestors of many cultivated species. By hunting, he also affected predator-prey interactions, removing animals such as the agouti (*Dasyprocta punctata*) on

which several tree species are dependent for the dispersal of their seeds (122). Modifications of tropical environments at the hunting-gathering stage must be seen in terms of subtle processes such as these and not only in the dramatic use of fire in the hunt (43).

Ranere's suggestion that the pounding-mashing tools he recovered from the Río Chiriquí shelters were used to process wild plant foods finds support in the carbonized plant remains he recovered. These have been identified by Smith (121) as belonging to two species of seasonally flowering trees (*Hymenaea courbaril* and *Byrsonima* sp.) and two species of nut-bearing palms (*Acrocomia vinifera* and *Scheelea zonerensis*). The predominance of trees is suggestive. Lathrap's argument (76) about the antiquity of the bottle gourd in the New World should be interpreted as pointing to the importance of aboriginality in the tropics. Harris (43) proposes that the harvesting of nuts, as among the ancient California Indians, was one of the specialized systems of food procurement that did *not* lead to agriculture. He points out that trees are cross-pollinated and take a long time to yield, while herbs are fast growing and tend to be self-pollinating, which facilitates selection by man. "As a system of food procurement tree nut harvesting is an efficient use of available wild resources, but in terms of the development of food production it is a cul de sac" (43, p. 208). As Harris and many others have pointed out, this is especially true if the collection of patchily distributed forest resources involves maximum movement, which in itself discourages population growth, retards sedentarization, and delays agriculture.

To sum up, the total number of excavated preceramic sites in the western half of the Isthmus of Panama is seven. They show a variety of slightly different settlement-subsistence patterns: a woodworking, forest adaptation in the rockshelters and open sites at midaltitudes in the Chiriquí highlands; a hunting and plant-gathering inland adaptation in the coastal savannas of the central provinces; a shoreline adaptation of fishing and collecting crustaceans and shellfish in Parita Bay; a pure hunting camp in the foothills of the central provinces. This variability in the preceramic record has been attributed (84, 110) to a probable pattern of movement by peoples with a plant-gathering base in search of protein resources.

From Hunting-Gathering to Root Crop Cultivation

Whether plants were domesticated in a single (18, 75) or in multiple centers (32, 105, 127) in the New World, most scholars would agree that Lower Central America is not likely to have been one of the earliest hearths. Incipient cultivation began in Mesoamerica and South America by at least 7000 B.C.-5000 B.C. (112). Manioc agriculture was intensive in the eastern Amazonian lowlands by 3000 B.C. (76) and in northwest Colombia and Venezuela by 2500 B.C. (35, 116) (see also 114). Lower Central America seems to have been late all along the line.

Ranere (106) suggests that the first important shift in subsistence patterns in Chiriquí occurred around 2300 B.C. The sudden appearance of such implements as adzes, chisels, and a stone axe indicate increased clearance of the forest, probably for extensive (as opposed to intensive) manioc cultivation. Snarskis (126) has found *budares* or clay griddles perhaps associated with manioc (see below) in Costa Rica at 1500 B.C. In the Soconusco area of coastal Chiapas and Guatemala (97) during the Early Formative Barras phase (1500 B.C.), the presence of manioc is inferred from thousands of obsidian chips shown by replication experiments (25) to have been used in processing a soft substance.

None of the archaeological evidence for manioc cultivation is conclusive, however. In an exhaustive comparison of the artifacts classified in museums as manioc griddles (*budares*) or as maize-cooking griddles (*comales*), De Boer (26) concludes that it is not possible to distinguish between these two categories on any criteria such as shape, size, or form. Such differences as there are seem to be purely geographical. If the objects were found in Mesoamerica, they have been called *comales*; if in South America, *budares*. De Boer also mentions a study by Barricklo to the effect that manioc grater teeth used ethnographically were much smaller than those ascribed to the same purpose in archeological deposits in Colombia (114). We should keep in mind that griddles can be used to cook other products besides manioc, and that grater teeth can be made of many products besides stone. Because the soft parts of tubers do not preserve well, final proof of manioc cultivation in early times is going to have to rest on the analysis of pollen and phytoliths. And even if and when these are found in datable deposits, it would not settle the problem of one vs several independent centers of manioc domestication. Not only the archaeologists, but also the botanists have different thoughts on this matter. While Spath (127) suggests at least four centers of domestication for the varieties now subsumed under *Manihot esculenta* Crantz, other experts favor the idea of only one wild progenitor, the Colombian *M. cartagenensis*. On archaeological grounds I tend to favor the idea of several centers of domestication, including Mesoamerica (where more than 100 species of *Manihot* are found at the present time).

While on the subject of manioc, I would suggest that the great phenotypic variation in this plant (127) made it possible for man to select against, as well as for, the more toxic strains. Lathrap (73) has emphasized human selection in favor of the "bitter" (i.e. poisonous) forms which store better and are richer in starch. He argues that in the eastern South American lowlands the nontoxic, less productive strains were the earlier forms. Toxicity itself is an antipredator device in many "wild" plants (56). Thus, it is quite conceivable that many of the ancestral forms were highly toxic. They may have become less so under cultivation in areas where population densities were low and there was comparatively little premium on maximum

starch production with maximum effort. The use of "sweet" manioc as a pot vegetable, in association with many other crops, may have been characteristic of past as it is of present groups in Lower Central America.

In the interior valleys of the Panamanian Isthmus, where the fishing potential of most rivers was reduced by their rapid and rocky course, a pattern based on the cultivation of root crops and the hunting of terrestrial mammals may have lasted well into the first millennium B.C., until the introduction of maize (89). As Harris (42) has convincingly argued, root-crop or vegetable is a stable system in contrast to seed-crop agriculture which tends to cause ecological degradation and to force people to expand into new areas.

Early Maize in Lower Central America

In the levels of the Aguadulce shelter containing Monagrillo-like ceramics and dated to slightly after 1680 ± 95 B.C., Piperno (personal communication) has recently isolated cross-shaped phytoliths [silica structures in the epidermal cells of some plants (104)] of a grass that may in fact be maize. She used the same techniques as Pearsall (104) did in identifying phytoliths of maize at 2450 B.C. from Real Alto, a Valdivia-phase site in the Santa Elena peninsula of coastal Ecuador (77, 99). In neither case, however, is this data relevant to the origins of maize domestication, which go back in Mesoamerica to much earlier periods (112; see also above). As Galinat (37) points out, the oldest maize cobs found in the Tehuacáan valley of south central Mexico at about 7000 B.C. are in the early cultivated rather than in the wild category. According to Pickersgill & Heiser (105), the absence of a suitable ancestor for *Zea mays* in South America and the fact that the earliest maize dates only to 3000 B.C. in the Peruvian highlands and to 2500 B.C. in the Peruvian coast rules out, at least for the moment, a possible hearth of *Zea* domestication in South America. These same authors also suggest that a Nal-Tel-like race of maize spread from Mexico to Peru between 5000 B.C. and 3000 B.C. Two very distinct races—a large-kernel, eight-rowed corn, and a smaller-kernel popcorn—occur in the Valdivia deposits (150). These Ecuadorean strains may represent the first movement south of the cultivar. The later Monagrillo-phase maize could have come to Panama from either north or south.

There has been some confusion surrounding the status of the so-called *Pollo* race of maize of presumed Colombian derivation and its diffusion to Lower Central America. Snarskis (123, 124) mentions the possibility that the one corn cob of this race found in highland Costa Rica at the time (more have been found since) should be interpreted as evidence of connections with Colombia. The same corn cob has been cited elsewhere (70) as suggesting a possible South American origin for maize farming in the Nicoya peninsula. Dunn (27) warns against the overinterpretation of a single speci-

men, especially of a cultivar which is botanically so ill defined (see also 32). Recently we have found more than 40 or so cobs of a *Pollo*-like maize on living floors and hearths in the Chiriquí highlands where they have been dated by numerous radiocarbon dates to A.D. 300–A.D. 600 (87). Galinat (38), who has analyzed this collection, suggests that the characteristics of smallness and hardness in the *Pollo* race may be an adaptation to wet and cold conditions and not necessarily a proof of primitiveness or of great antiquity.

Formative Period Interaction Spheres

The idea that during the Formative period (3000 B.C. to 300 B.C.) a whole series of material traits and religious ideas were transmitted from Middle America to the Andean area has a long history in New World studies and will not be reviewed here (see 34). Debate still continues as to whether these presumed contacts took place directly by sea, bypassing southern Central America, or whether they took place by land, through the Isthmian area. In one instance, an earlier argument for direct sea contacts has been revived (103) long after the original proponent has begun to have his doubts (21).

The whole concept of two centers of New World civilization, Mesoamerica and Andean South America, from which everything else was derived, has been questioned recently by Myers (101). Following Lathrap (74), he emphasizes the role played by the tropics in early Formative period developments, and suggests that contacts between the centers of civilization took place by land, through the Intermediate area, and was in the hands of traders. His argument rests on ceramic similarities. I have always been skeptical (81) of the use of simple ceramics in tracing connections at this time level. Peoples living in similar coastal environments would have at their disposal similar "tools" (reeds, shell, spines) to decorate their pottery, and would need the same simple vessel shapes to fulfill their everyday needs. In any case, Myers's conclusion that long-distance sea-contacts need not be invoked to account for widespread similarities in material culture anywhere in the New World tropics is well taken. This caution applies to the spread of plants as well as pots. If Spath (127) is correct in suggesting several centers of manioc domestication in the Americas, then it may not be necessary to call upon ceramic connections as corollary proof for the early diffusion of manioc cultivation directly from coastal Ecuador to coastal Guatemala (25, 40, 97). Incidentally, sea contacts must be high on the list of things that are not subject to proof.

Even if I doubt that simple ceramics can be used to document long-distance trade or significant movements, this does not mean that such contacts did not take place and could not have been important. Lathrap's essay (74) is highly relevant. He shows that existing trade networks in the

eastern South American lowlands cover thousands of miles. This trade includes perishable materials such as manioc flour.

On several occasions I have expressed misgivings as to the explanatory value of terms such as diffusion, contact, influence, and so forth. These concepts are diversionary and may discourage us from searching for interaction models of greater generality and resolving power. For instance, "gravity models" of several kinds may be useful (57). Another promising line of investigation might be the role played by trade in the growth of regional centers (149). Much of the trade among tropical forest groups in South America seems to have been subsistence related, or related to the communal ceremonial life, and to have been relatively "democratic." By contrast, much of the Mesoamerican or Andean South American trade may have been status related and controlled by elites in regional centers (31). The growth of comparable centers in lowland tropical South America and the Intermediate area may have been discouraged by the widespread dispersion of the resources traded and by the relatively slow demographic increase. Models that take into account the size and proximity of resource areas, the methods of exploiting and distributing these resources, the uses to which they were put, and their possible effects on demographic increase are likely to be more satisfactory than unicausal explanations.

What I believe should be stressed is that small group size, dispersion of populations, flexibility in resource use, and so forth, is a pan-tropical strategy of great adaptive value.

COASTAL VERSUS INLAND ADAPTATIONS

If any single factor characterizes the ecology of Lower Central America, it is the relative amount of land that is coastal rather than inland. Not surprisingly, coastal adaptations were diverse and important. The mountains of Lower Central America are also relatively narrow, with only small valleys and poorly developed river systems. Nowhere in the region do we find the wide expanses of fertile soils of such areas as the Cauca in Colombia or Oaxaca in southern Mexico. Neither do we encounter floodplains on the immense scale of the Orinoco and Magdalena, not to mention the Amazon. The contrast between highlands and lowlands may also be less pronounced in southern Central America than elsewhere (71). Such as they are, the highlands may be considered first.

Sites with extensive mound complexes, carved monuments, elaborate pottery and the like were described from moderately high elevations in Costa Rica at the beginning of this century (44). They would seem to have been produced by minimally ranked societies, roughly equivalent to the "chiefdoms" of Colombia (113, 115). Recent research confirms the initial impression that these complexes were late in the archaeological record,

dating from a few centuries before the Christian era (72) to a few centuries after (62). It may be a general rule that wet and cold highland environments were colonized late, after the introduction of maize (see above). A complete survey of all the sites occurring in two highland valleys of Chiriquí in Panama has revealed a site distributional pattern which relates both to natural and to social factors (89). The larger and apparently more ranked villages occurred in the drier, more seasonal of the two valleys. Despite the availability of good cultivable land, the area between the two valleys was sparsely settled, a phenomenon we have attributed to territorial boundary maintenance rather than to environmental causes.

All the other areas of Lower Central America that have been studied in recent years are on or near the coast. Within this decade, three studies have pointed out the great diversity of prehistoric adaptations on the Atlantic coast. Healey (48-50), working on northeast Honduras with a quantifiable faunal collection, provides an excellent discussion of the prehistoric use by one group of three different ecological zones: a freshwater lagoon, the mangrove coast, and the lowland forest. The prosperous groups he describes are very different from the societies of the Bocas area on the Atlantic coast of Panama. This area was a backwater because of its wet, nonseasonal climate and distance from any river. The local peoples had to rely on certain particular techniques. I have applied the term "garden-hunting" to a technique for taking animals from cultivated plots (82). This strategy in effect increased the numbers and biomass of terrestrial mammals, permitting the cropping of the animals as well as of the plants. In a more recent article, Wing (147) has emphasized that this technique was complementary to the use of marine resources.

Magnus (98) has developed an interesting model for the Miskito area of coastal Nicaragua, comparing archaeological remains with modern ethnographic data. In the prehistoric past, there were inland permanent villages and coastal fishing camps; the reverse situation holds today. This is a good reminder of the fact that very different adaptations can coexist within relatively small areas, and that drastic changes can occur, especially in the tropics where many settlement alternatives are possible.

Two studies of Gran Nicoya have an ecological bias. Lange (70) gives a general summary of subsistence through 3000 years. Sweeney's discussion (138) of the Guanacaste area is based on an actual but incomplete faunal sample that includes marine and terrestrial forms. Her reconstruction of hunting and fishing practices is convincing, despite the deficiencies in the materials left to her.

We have attempted controlled comparisons of cultural developments on both coasts of Panama (83, 86, 147) and between different parts of the Pacific coast (85). These comparisons seem to indicate that systems based on high species diversity but low biomass tend to stay generalized and stable

for longer periods of time than systems based on more abundant but less diverse resources permitting intensive cropping. The most populated area, where the more "developed" chiefdoms appeared, was the central region of Panama bordering on Parita Bay (22, 23, 55). This is the area of most abundant resources, and it has the longest record of changes in subsistence patterns. I have also discussed the process of chiefdom formation in the central Panamanian provinces using published evidence from archaeology, ecology, ethnohistory, and iconography (84). My suggestion that the so-called Conte style of pottery and gold decoration reflected a ranked society is being tested further by P. Briggs (personal communication).

It is not enough to ask when or where the Circum-Caribbean type chiefdoms arose in Lower Central America (62). It is more important to consider how and why they did so. A proper approach to these problems should combine a knowledge of ecology with an appreciation for the dynamics of social and religious organization.

CONCLUSIONS

The archaeology of Lower Central America so far has not produced many interesting ideas or novel approaches. There has been too much miscellaneous description and not enough analytic thought. Too often the ancient peoples of the region have been regarded as "backward," pale country cousins of their more "civilized" Mesoamerican contemporaries. As any anthropologist should know, these are meaningless labels. Lower Central American societies evolved their own successful and complex systems. The resources of the region supported peoples in considerable abundance. Future work will need to be focused carefully on testable hypotheses of some real theoretical import. There are already encouraging signs of progress in this direction.

The whole stretch from El Salvador to Panama resembles northwest South America. Similar ecological adaptations and a single language family, Macro-Chibchan, were dominant throughout. Other common features were: an ancient coastal-inland symbiosis, combined root and seed crop systems, developed ceramic and metallurgical crafts, small nonhereditary chiefs whose power was ritual and consensual rather than "coercive," and contingent political alliances. It would seem best to abandon parochial distinctions and talk about the Intermediate Area as a whole. (I hope this is the last paper to treat Lower Central America per se).

The real interest of the Intermediate Area is that it illustrates a whole series of ecological and cultural adaptations within a well-defined range. If anything is worth studying, it is the development of local variations and their correlated social forms. It is only by understanding the particular that useful general theory can emerge.

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