

## THE LIFE CYCLE OF AN IDEA: TRANSPACIFIC VOYAGES AND AMERICAN ARCHAEOLOGY

By Richard E. Daggett

The decade following the end of the Second World War was remarkable in many respects, not the least of which was the resurgence of an interest in transoceanic contacts during pre-Columbian times. Certainly the well-publicized voyage of the raft *Kon-Tiki* (Heyerdahl 1948; 1950; 1952a; 1952b) served to puncture arguments which suggested the near-total isolation of the New World prior to European incursions. While Heyerdahl's exploits fueled the imagination of the American public, the impressive exhibit of the American Museum of Natural History under the direction of a leading American anthropologist served to promote increased scholarly interest in apparent cultural parallels between the New and Old Worlds (Ekholm 1950). This exhibit, held in conjunction with the XXIX Meeting of the International Congress of Americanists, heralded a fresh look at the question of potential prehistoric contacts (Tax 1951; Smith 1953).

Predictably, there was resistance to this liberated attitude toward New World prehistory. In a symposium on the historical approach to American anthropology, Alfred V. Kidder confessed to prejudice in the matter of transpacific influences and stated that he remained '100 percent American in the matter' while at the same conference, Alfred L. Kroeber declared himself 'a 90 percent chauvinist in Americanism' (Tax *et al.* 1953:47). However, despite a certain reluctance, American scholars were generally amenable to the idea of transoceanic voyages, while remaining skeptical of their importance to the development of New World cultures. Seemingly taking their cue from Heyerdahl's dramatic demonstration of the potential for ancient voyages and Ekholm's charge to look to mainland Southeastern Asia as the most likely source of transoceanic contact (Ekholm 1950), researchers turned their attention primarily toward the Pacific.

A problem which plagued the *Kon-Tiki* crossing and which raised questions about the success of the voyage was the craft's lack of maneuverability. In recognition of this difficulty Heyerdahl enlisted the aid of Sr. Emilio Estrada of Guayaquil in the construction of a balsa raft to be tested in the Bay of Playas, Ecuador. With a crew which included also the archaeologists Erik K. Reed and Arne Skjölsvold, the technique of *guara* sailing was rediscovered in 1953. Heyerdahl concluded enthusiastically that, for all intents and purposes, the range of South American balsa rafts was virtually unlimited within the Pacific Ocean (Heyerdahl 1959:340).

The above is intended to introduce the reader to the principal exponent of the Jomon-Valdivia hypothesis: Emilio Estrada. Sr. Estrada, apparently, was introduced to the study of New World prehistory crewing for Heyerdahl. Estrada was so impressed with prehistoric achievements that his spare time became devoted increasingly to the unearthing of Ecuador's past. In 1954, he established the Museo Víctor Emilio Estrada, intended initially as a facility to permit the housing and study of collections resulting from surface surveys and excavations conducted on his behalf.

With an apparent major interest in the Formative period of Ecuadorian prehistory, Estrada's efforts were directed toward clarifying the early ceramic period, as yet vaguely understood. A gradual survey of the Ecuadorian coast was conducted beginning with the area around Guayaquil. In May of 1956, Punta Arenas de Posorja was discovered on the north shore of the Gulf of Guayaquil. However, the utility of the site was restricted severely by erosion. The search continued northward until October of 1956 when Félix Martínez, an employee of Estrada, discovered the site of Valdivia (Estrada 1958:12).

Located along the coast of Guayas Province and named after the local fishing village, the site of Valdivia appeared to represent an important early ceramic occupation. In record time, Estrada published the preliminary results of this discovery (Estrada 1956). Then, cognizant of the importance of the site, he turned to Clifford Evans Jr. and Betty J. Meggers, a husband-and-wife team of American anthropologists, who were at that time working in Eastern Ecuador, along the Río Napo. Their assistance was sought 'to determine the exact limits of the Formative period occupation and to obtain a larger sample of pottery for classification and comparison' (Evans and Meggers 1958:175-176).

During four days of intensive work in January, 1957, Meggers and Evans surveyed, excavated and mapped in the vicinity of Valdivia. An unexpected bonus was the discovery nearby of a Formative site named Buena Vista. Based on their work, the investigators concluded that Valdivia pottery was indeed a Formative period complex which resembles more closely the Early Guañape complex of the Virú Valley, Peru, than that of Monagrillo, Panama. The carbon-14 analysis of uneroded shell of a single species dated the beginning of the occupation to between  $4450 \pm 200$  and  $4050 \pm 200$  B.P.<sup>1</sup> Due to coastal locations and an apparent preponderance of marine remains, the authors conclude that the ancient Ecuadorians had essentially a maritime adaptation. Finally, they conclude that Valdivia represents the earliest ceramic culture in Ecuador (Evans and Meggers 1958).

It was on the basis of additional excavations at Valdivia during 1960-1961 that a hypothetical link between the ceramics of Valdivia and those of the

<sup>1</sup>Three radiocarbon dates are reported by Meggers, Evans and Estrada (1965) for the 1956-57 excavations at Valdivia: W-630 ( $4050 \pm 200$ ), W-631 ( $4450 \pm 200$ ) and W-632 ( $4190 \pm 200$ ).

Jomon culture of Japan was proposed. A portion of the castellated rim of a Valdivia Red Incised vessel seemed to Estrada to compare remarkably well with some Middle Jomon pottery from the Japanese island of Honshu (Evans and Meggers 1966). Other discoveries in the depths of the Valdivia midden appeared to confirm this first impression. While Estrada was not the first to note similarities between Middle Jomon pottery and that of pre-Columbian aboriginal pottery (*vid.* Yawata 1955), he was the first to envision a transpacific voyage to Ecuador as the cause. True to his nature, Estrada quickly published the basics of this hypothesis (Estrada 1961), however, he succumbed unexpectedly to a heart attack that same year and was therefore unable to elucidate his idea fully. A later publication (Estrada, Meggers and Evans 1962) was the first to be addressed principally to an American audience. Meggers (1962) states that it was only at Estrada's insistence that she and her husband were included as joint authors, and that the discoveries and full credit for the hypothesis belonged to Estrada.

While potential critics seem to have been reluctant to voice dissenting views immediately after Estrada's passing, proponents of the hypothesis were more active. A study of the feasibility of transpacific drift voyages (Nelson 1962) lent an air of credence to the hypothesis, and Meggers and Evans made a trip to Japan in 1963 to study more fully Middle Jomon pottery. In 1965, the final and official report of the 1961 excavations at Valdivia was published as the inaugural volume of a series entitled *Smithsonian Contributions to Anthropology*. A much more thorough presentation of the Jomon-Valdivia hypothesis was included in this impressive report (Meggers, Evans and Estrada 1965). I believe it can be stated without hesitation that the considerable prestige of the publishing Institution served both to encourage the acceptability of the hypothesis and to discourage its immediate rejection.

Published reviews of the hypothesis ranged from unrestrained acceptance (Ford 1967) to outright rejection (Rowe 1966); however, the majority of critics assumed a more cautious stance. While granting the hypothesis a degree of merit, specific questions were raised which individually and collectively cast doubt as to its viability. The most frequent complaint was that the hypothesis failed to account adequately for the early ceramic site of Puerto Hormiga in Columbia which, according to one interpretation of the data, predated Valdivia (Bischof 1967; Coe 1967; Lathrap 1967, 1973). Related to this was the fact that proponents of the theory insisted on using a single radio-carbon date to suggest an older age for the site of Valdivia than is given by the remaining samples, which cluster around a younger date.<sup>2</sup> The result was an acceptance of

<sup>2</sup>Among the 12 radiocarbon dates obtained from Valdivia A contexts as reported by Meggers, Evans and Estrada (1965:149) all but one fall within the range of  $4620 \pm 140$  B.P. and  $4100 \pm 140$  B.P. A single anomalous date of  $5150 \pm 150$  B.P. (M-1320) was obtained from charcoal remains taken from Cut J, Section E at the level 360-390 cm.

the notion that Valdivia indeed was older than Puerto Hormiga, a judgement met with pessimism by many (Bischof 1967; Lathrap 1967, 1973).

Donald W. Lathrap (1967) was critical of the author's failure to dig by natural stratigraphic units where such stratigraphy was obvious. Others pointed to the lack of evidence showing the earliest ceramic culture at Valdivia to be superimposed on an underlying non-ceramic culture (Coe 1967; Ferdon 1966). The failure of the proponents of the hypothesis to demonstrate the existence of a single Jomon complex comparable to the earliest Valdivia complex likewise brought criticism (Lathrap 1967, 1973; Muller 1968). Again, Lathrap (1973) questioned the seaworthiness of Jomon vessels, while Edwin N. Ferdon, Jr. (1966) notes that the authors conveniently overlooked the abysmal state of Formative research in the New World and chose to look to Asia for a prototype of the Valdivian wares before a thorough New World investigation was conducted. To one reviewer (Noguera 1965) the seeming complexity of the Valdivia ceramics suggested not one inadvertent Asiatic voyage but a continuous repetition of contacts, which certainly is much more difficult to explain. Finally, Ferdon (1966) expressed regret at the decision to hypothesize a single inadvertent event to explain the introduction of the concept of pottery-making to the Valdivia people in particular and the New World in general. This last remark was to prove prophetic—by detailing the act of diffusion the progenitors of the hypothesis opened themselves up to specific and damaging criticisms.

While a cautious review of their 1965 tome was in progress, Meggers and Evans proceeded to publicize the Jomon-Valdivia hypothesis. The credentials of the authors combined with the previously mentioned institutional recommendation served to facilitate at least a tentative acceptance of the hypothesis. Mention of it became almost obligatory, especially in textbooks dealing with South American archaeology (Lumbreras 1974; Willey 1971). Even those who professed nothing but contempt for the idea of pre-Columbian transoceanic voyages suggested the viability of the Jomon hypothesis (Riley 1969). Such was the nature of the presentation of the hypothesis that unintentional but uncritical acceptance was a frequent result. This served to confirm further the hypothesis as accepted fact in the minds of many.

In one publication, Meggers and Evans actually provide a scenario whereby the hypothetical event is presumed to have taken place (Evans and Meggers 1966). However, a more theoretical approach taken in another published article (Meggers and Evans 1966) permits the reader to analyze better the specifics of their position. To the present writer, the following would seem to summarize their argument: Valdivia pottery is the oldest pottery in the New World (based on the single anomalous radiocarbon date discussed previously); the earliest Valdivia pottery, Valdivia A, lacks New World prototypes despite its relatively sophisticated manufacture; Early Valdivia and Middle Jomon are roughly contemporary; Middle Jomon culture provides prototypes for the Valdivia pottery

based on a comparative analysis of categories of decoration and shape; both Middle Jomon and Early Valdivia were fishing cultures; the Counter-Equatorial Current running eastward just north of the Equator leads directly toward the northern coast of Ecuador; Jomon fishermen blown out to sea during a storm in an open boat lacking propulsion could have drifted toward the New World; the westward projection of the Ecuadorian coast near Valdivia makes it a predictable landfall; similarities in subsistence activities would have facilitated the welcome of one group of fishermen by another; ceramic evidence is more likely to be preserved than less durable material and behaviorable manifestations of cultural borrowing; the net effect is the introduction of the concept of pottery-making to the New World from the Old. In what seems, retrospectively, to be an organized effort to disprove the Jomon-Valdivia hypothesis, a number of specific assumptions upon which it was based were attacked. The assumption that Valdivia A represented the oldest New World ceramics was the first to be tackled. In 1964 a Columbia University survey and excavation of the Santa Elena Peninsula in Ecuador provided evidence contrary to what had been found at Valdivia. Edward P. Lanning (1967) reported that a pre-Valdivia A ceramic complex was discovered at the site of Punta Concepción. This eventually led to a new excavation of Valdivia in 1971. Julio Viteri, Estrada's field assistant for the 1961 season, excavated a new cut near the earlier one in the presence of participants of the *Primer Simposio de Correlaciones Antropológicas Andino-Mesoamericanas* which was being held at Salinas, Ecuador. In light of Lathrap's (1967) criticism of the failure to dig by natural stratigraphic units, the following discovery is noteworthy: 'A pronounced dip of strata in 2 directions, the existence of artifact-bearing erosion channels, and of aboriginal pits, go far to explain the apparent longevity of ceramic features and the often contradictory radiocarbon dates which have resulted from previous research' (Bischof and Viteri 1972: 549).

The following are conclusions based on the 1971 excavation at Valdivia: there was an absence of sherds in the lower most layers at Valdivia but abundant evidence of man (charcoal, fish bones, burnt bones and stone and shell artifacts); the fully ceramic Valdivia A phase was preceded by a San Pedro phase when well-made pottery (polished, often bearing fine-lined and geometrical decoration) was used in small quantities; the minimum quantity of San Pedro sherds in the lower levels suggests that they were trade wares; Valdivia A probably represents the beginning of locally-manufactured pottery at Valdivia; pottery does not seem to make a sudden appearance at the site and the San Pedro complex is probably contemporaneous with Puerto Hormiga (Bischof 1972a, 1972b; Bischof and Viteri 1972; Lynch 1972).

Betsy D. Hill, while a graduate student at Columbia University, assisted Lanning in the 1964 survey of the Santa Elena Peninsula. An elaboration of her Masters thesis was published in the 1975 *Ñawpa Pacha*. Essentially, she presents

a refinement of the earlier chronology offered by Meggers, Evans and Estrada (1965). Their original four-phase scheme has been modified to include eight phases, the first or earliest of which has been subdivided further into two phases both of which predate the earliest phase of the initial scheme (Valdivia A). Based on a new series of radiocarbon dates from southwestern Ecuador, the earliest occupation at Valdivia is now thought to have begun around 3500 B.C. with the San Pedro and Valdivia A occupations beginning around 3300 and 3200 B.C. respectively (Bischof 1972a).

Accompanying Hill's article in *Ñawpa Pacha* is a second one by Patricia Lyon (1975) concerning Valdivia. The author indicates the difficulties she experienced while attempting to utilize Meggers, Evans and Estrada's 1965 publication on Valdivia. Her criticisms range from incompatible data to insufficient data to actual obfuscation of critical data. She concludes that the volume is 'empty' and essentially useless as a tool of research (*op cit.*, p. 45).

A second basic assumption of the Jomon-Valdivia hypothesis, and the one upon which the successful act of exchange was predicated, was that Jomon and Valdivia shared a maritime pattern of subsistence. To a number of investigators the concentration on coastal surveys by Meggers, Evans and Estrada, to the total exclusion of inland surveys, biased their results seriously. As a balance to this approach a series of investigations were conducted in an effort to disclose a more complete settlement patterning for the Valdivia culture. Such work has proven most rewarding. Extensive research has redefined Valdivia as a settled agricultural manifestation with an inland settlement pattern (Marcos 1977; Norton 1977; Zeidler 1977; Zevallos *et al.* 1977). Sites such as Loma Alta and Azúcar which are located some 15 and 30 kilometers respectively from the coast demonstrate the inland pattern. The argument that intensive maize agriculture was basic to Valdivia culture has been presented recently (Zevallos *et al.* 1977).

A third major assumption of the Jomon-Valdivia hypothesis—that such a transpacific drift voyage could have occurred within the time and space parameters set forth—has been analyzed only just recently (McEwan and Dickson 1977). The investigators concern themselves primarily with the mechanics of the proposed voyage and in so doing enumerate a number of difficulties which would have hampered such a crossing. Lack of provisions and shelter, cold ocean temperatures and stormy weather, as well as more complex and less dependable systems of currents than presumed by the original hypothesis are cited. Even under ideal conditions they conclude that the proposed voyage could have taken two years! On the basis of the particulars of the hypothesis the authors conclude such a crossing to be highly improbable. However, unlike others who have viewed the Pacific as an impassable barrier in prehistoric times, they do not reject altogether the possibility of transpacific contacts.

To summarize, it may be stated that three assumptions basic to the Jomon-

Valdivia hypothesis are not supported by the facts. Valdivia A is not the oldest pottery complex in the New World, or even at Valdivia for that matter—San Pedro pottery is older and it has no Jomon affiliations. Hence, the concept of pottery-making appears to have developed independently of Jomon influences. Valdivia, unlike Jomon, was an essentially agricultural society and as such the assumption of a friendly welcome in the postulated event loses credibility. Finally, an in-depth analysis of all pertinent factors makes an inadvertent transpacific voyage, from Japan to Ecuador in an open canoe lacking propulsion, most unlikely during the period in question.

Thus we have traced the origin, development and dismemberment of an idea but have not yet witnessed the recording of its death. The recent correspondence between Paul F. Healy and Allison C. Paulsen (Healy 1976, 1977; Paulsen 1977) over an unguarded statement testifies to the confusion in this matter. Mere mention of the idea gives it life according to Paulsen and in a way she is correct. It will live on with those who have embraced it even in the face of overwhelming contrary evidence. Novices to the field will more often than not receive their introduction to the hypothesis while reading textbooks and will form their judgements based in part upon the observations of the authors. As noted previously numerous texts now in use present the hypothesis in a favorable light, thereby aggravating the problem. The proliferation of materials written during the controversial life of the hypothesis will certainly deter many from pursuing actively the truth of the matter. A paper such as the present one offers a relatively brief synopsis of the debate, chronicles the life history of the idea and, in the end, certifies its ultimate demise.

## Bibliography

### Bischof, Henning

- 1967 [review of] Betty J. Meggers, Clifford Evans and Emilio Estrada, Early Formative Period of Coastal Ecuador: the Valdivia and Machalilla phases. *American Journal of Archaeology*, vol. 71, no. 2, pp. 216-219.
- 1972a The Origins of Pottery in South America—Recent Radiocarbon Dates From Southwest Ecuador. *Atti Del XL Congresso Internazionale Degli Americanisti*, vol. I, pp. [269]-281. Roma-Genova.
- 1972b The Stratigraphy of Valdivia (Ecuador): New Evidence. *Atti Del XL Congresso Internazionale Degli Americanisti*, vol. I, p. [283]. Roma-Genova.

### Bischof, Henning and Julio Viteri Gamboa

- 1972 Pre-Valdivia Occupations on the Southwest Coast of Ecuador. *American Antiquity*, vol. 37, no. 4, pp. 548-551.

### Coe, Michael D.

- 1967 [review of] Betty J. Meggers, Ecuador. *Science*, vol. 155, no. 3759, pp. 185-186.

**Ekholm, Gordon F.**

- 1950 Is American Indian Culture Asiatic? *Natural History*, vol. LIX, pp. [344]-[351], [382].

**Estrada, Emilio**

- 1956 Valdivia: Un Sitio Arqueológico Formativo en la Costa de la Provincia del Guayas, Ecuador. *Publicación del Museo Víctor Emilio Estrada*, No. 1.
- 1958 Las Culturas Pre-clásicas, Formativas o Arcaicas del Ecuador. *Publicación del Museo Víctor Emilio Estrada*, No. 5.
- 1961 Nuevos Elementos en la Cultura Valdivia: Sus Posibles Contactos Transpacíficos. Guayaquil: *Publicación del Sub-Comité Ecuatoriano de Antropología*.

**Estrada, Emilio, Betty J. Meggers and Clifford Evans**

- 1962 Possible Transpacific Contact on the Coast of Ecuador. *Science*, vol. 135, no. 350, pp. 371-372.

**Evans, Clifford Jr. and Betty J. Meggers**

- 1958 Valdivia: An Early Formative Culture of Ecuador. *Archaeology*, vol. 4, no. 4, pp. 175-182.

**Evans, Clifford Jr. and Betty J. Meggers**

- 1966 Transpacific Origin of Valdivia Phase Pottery on Coastal Ecuador. *XXXVI Congreso Internacional de Americanistas*, vol. 1, pp. [63]-67.

**Ferdon, Edwin N. Jr.**

- 1966 [review of] Betty J. Meggers, Clifford Evans and Emilio Estrada, Early Formative Period of Coastal Ecuador: the Valdivia and Machalilla phases. *Science*, vol. 152, pp. 1731-1732.

**Ford, James A.**

- 1967 [review of] Betty J. Meggers, Clifford Evans and Emilio Estrada, Early Formative Period of Coastal Ecuador: the Valdivia and Machalilla phases. *American Antiquity*, vol. 32, no. 2, pp. 258-259.

**Healy, Paul F.**

- 1976 [review of] Howard Campbell, Who Discovered America? *American Anthropologist*, vol. 78, no. 2, pp. 361-362.
- 1977 Reply to Paulsen's Comment on Healy's Review. *American Anthropologist*, vol. 79, no. 3, pp. 653-654.

**Heyerdahl, Thor**

- 1948 The Voyage of the Raft Kon-Tiki. *Natural History*, vol. 57, pp. 264-271, 286-287.
- 1950 The Voyage of the Raft Kon-Tiki. *The Geographical Journal*, Vol. CXV, p. [20]-41.
- 1952a Kon-Tiki's Ancestors. *The Geographical Magazine*, Vol. 25, pp. 421-426. London.
- 1952b *American Indians in the Pacific: the Theory Behind the Kon-Tiki Expedition*. London, George Allen & Unwin Ltd.
- 1959 Guara Sailing Technique Indigenous to South America. *Actas Del XXXIII Congreso Internacional de Americanistas*, tomo 1, pp. [333]-340. San José.

**Hill, Betsy D.**

- 1975 A New Chronology of the Valdivia Ceramic Complex From the Coastal Zone of Guayas Province, Ecuador. *Ñawpa Pacha*, vol. 10-11, pp. 1-32.

**Lanning, Edward P.**

- 1967 *Archaeological Investigations on the St. Elena Peninsula, Ecuador*. Report to the National Science Foundation.

**Lathrap, Donald W.**

- 1967 [review of] Betty J. Meggers, Clifford Evans and Emilio Estrada, Early Formative Period of Coastal Ecuador: the Valdivia and Machalilla phases. *American Anthropologist*, vol. 69, no. 1, pp. 96-98.
- 1973 [review of] Gordon R. Willey, An Introduction To American Archaeology Volume Two: South America. *American Anthropologist*, vol. 75, no. 6, pp. 1755-1767.



- Lumbreras, Luis G.**  
1974 *The Peoples and Cultures of Ancient Peru*. Betty J. Meggers, trans. Smithsonian Institution Press.
- Lynch, Thomas**  
1972 Current Research: Highland South America. *American Antiquity*, vol. 37, no. 2, pp. 274-278.
- Lyon, Patricia J.**  
1975 'Early Formative Period of Coastal Ecuador': Where is the Evidence? *Ñawpa Pacha*, vol. 10-12, pp. 33-48.
- Marcos, Jorge G.**  
1977 *Real Alto: Is Valdivia Really the Early Formative of Ecuador?* Paper presented at the 42nd Annual Meeting of the Society for American Archaeology. New Orleans.
- McEwan, Gordon F. and D. Bruce Dickson**  
1977 *Valdivia, Jomon Fisherman and the Nature of the North Pacific: Some Nautical Problems with Meggers, Evans, and Estrada's (1965) Transoceanic Contact Thesis*. Paper presented at the 42nd Annual Meeting of the Society for American Archaeology. New Orleans.
- Meggers, Betty J.**  
1962 Emilio Estrada: 1916-1961. *American Antiquity*, vol. 28, no. 1, pp. [78]-81.
- Meggers, Betty J. and Clifford Evans**  
1966 A Transpacific Contact in 3000 B.C. *Scientific American*, vol. 214, no. 1, pp. 28-35.
- Meggers, Betty J., Clifford Evans and Emilio Estrada**  
1965 Early Formative Period of Coastal Ecuador: the Valdivia and Machalilla Phases. *Smithsonian Contributions to Anthropology*, vol. 1. Washington.
- Muller, Jon D.**  
1968 A Comment on Ford's Review of Early Formative Period of Coastal Ecuador. *American Antiquity*, vol. 33, no. 2, pp. 254-255.
- Nelson, J.G.**  
1962 Drift Voyages Between Eastern Asia and the Americas. *Canadian Geographer*, vol. 6, no. 2, pp. 54-59.
- Noguera, Eduardo**  
1965 [review of] Betty J. Meggers, Clifford Evans, and Emilio Estrada, Early Formative Period of Coastal Ecuador: the Valdivia and Machalilla phases. *Pan American Institute of Geography and History*, vol. 26-28, pp. 136-141.
- Norton, Presley**  
1977 *The Loma Alta Connection*. Paper prepared for the 42nd Annual Meeting of the Society for American Archaeology. New Orleans.
- Paulsen, Allison C.**  
1977 Differential Survival of the Jomon-Valdivia Hypothesis. *American Anthropologist*, vol. 79, no. 3, pp. 652-653.
- Riley, Carroll L.**  
1969 *The Origins of Civilization*. Southern Illinois Press.
- Rowe, John Howland**  
1966 Diffusionism and Archaeology. *American Antiquity*, vol. 31, no. 3, pp. 334-337.
- Smith, Marian W. (ed)**  
1953 Asia and North America: Transpacific Contacts. *Memoirs of the Society for American Archaeology*, No. 9.
- Tax, Sol (ed)**  
1951 *Civilizations of Ancient America*. Selected Papers of the XXIX International Congress of Americanists, vol. 1, pp. 299-309.

**Tax, Sol, Loren C. Eiseley, Irving Rouse and Carl F. Voegelin, eds.**

1953 *An Appraisal of Anthropology Today*. Chicago: University of Chicago Press.

**Willey, Gordon R.**

1971 *An Introduction to American Archaeology*, Volume Two: South America. New Jersey: Prentice-Hall Inc.

**Yawata, Ichiro**

1955 The Affinity of Japanese and North American Prehistoric Pottery. *Anais Do XXXI Congresso Internacional de Americanistas*, vol II, pp. [867]-869. São Paulo.

**Zeidler, James A**

1977 *Early Formative Settlement in the Chanduy Valley, Southwest Ecuador*. Paper presented at the 42nd Annual Meeting of the Society for American Archaeology. New Orleans.

**Zevallos, Carlos M., Walton C. Galinat, Donald W. Lathrap, Early R. Leng, Jorge G. Marcos and Kathleen M. Klumpp**

1977 The San Pablo Corn Kernel and Its Friends. *Science*, vol. 196, no. 4288, pp. 385-389.