



A Maya Tooth Offering from Yakalche, British Honduras

Author(s): David M. Pendergast, Murray H. Bartley, George J. Armelagos

Source: *Man*, New Series, Vol. 3, No. 4, (Dec., 1968), pp. 635-643

Published by: Royal Anthropological Institute of Great Britain and Ireland

Stable URL: <http://www.jstor.org/stable/2798584>

Accessed: 08/04/2008 14:00

---

Your use of the JSTOR archive indicates your acceptance of JSTOR's Terms and Conditions of Use, available at <http://www.jstor.org/page/info/about/policies/terms.jsp>. JSTOR's Terms and Conditions of Use provides, in part, that unless you have obtained prior permission, you may not download an entire issue of a journal or multiple copies of articles, and you may use content in the JSTOR archive only for your personal, non-commercial use.

Please contact the publisher regarding any further use of this work. Publisher contact information may be obtained at <http://www.jstor.org/action/showPublisher?publisherCode=rai>.

Each copy of any part of a JSTOR transmission must contain the same copyright notice that appears on the screen or printed page of such transmission.

---

JSTOR is a not-for-profit organization founded in 1995 to build trusted digital archives for scholarship. We enable the scholarly community to preserve their work and the materials they rely upon, and to build a common research platform that promotes the discovery and use of these resources. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).

## A MAYA TOOTH OFFERING FROM YAKALCHE, BRITISH HONDURAS

DAVID M. PENDERGAST

*Royal Ontario Museum*

MURRAY H. BARTLEY

*University of Utah*

GEORGE J. ARMELAGOS

*University of Massachusetts*

In the course of the 1967 excavation season at Altun Ha, a coastal Maya centre in British Honduras, where the Royal Ontario Museum has been carrying out investigations since 1964, the project supervisors undertook preliminary exploration of a small site lying approximately sixteen miles northeast of the large centre (fig. 1). The smaller site, named by the investigators *Yakalche* (literally 'pond-tree', derived from the existence near the site centre of a small aguada, or rainwater catch-basin, in which several trees are growing), appears to be a satellite of Altun Ha, a centre occupied from Pre-Classic times (perhaps 100 or 200 B.C.) to the end of the Classic period about A.D. 925-950) with subsequent minor continuing use, or perhaps abandonment followed by reoccupation, extending into the fourteenth or fifteenth century A.D.

Following a brief examination of the central portion of Yakalche, the investigators undertook excavation of a small structure lying in the main plaza of the ceremonial complex. This building, designated Str. A-1, had been slightly damaged by local treasure-seekers, whose excavations had revealed indications of the possibility that the structure, a low rectangular mound, had been built to house a tomb. Investigation of Str. A-1 showed that the apparent elements of tomb construction were in fact portions of the walls of a long, low rectangular platform, with its long axis extending north-south for a distance of 1,955 cm. The width of the platform is 156 cm., and the maximum present height is 142 cm. Centrally located on the east face is a small projection, extending outward approximately 185 cm., and having a width of 425 cm. The projection was added to the face of what had originally been a simple rectangular platform, but gives no indication of having been a stairway or ramp leading to the platform surface.

The fill of both the platform and the addition consists of small to medium limestone boulders, with a binder of white lime soil. The small amount of pottery recovered from the fill provides no clear indication of the age of the structure, but the unusual nature of the masonry façade of the platform, which consists of extremely large limestone and flint slabs (up to 2 metres in length) set on one long edge in the plaster floor on which the structure was built, and surrounded by small, carefully shaped limestone blocks fitted around the irregularities in the slabs, suggests that Str. A-1 is not contemporaneous with the Classic period architecture at Altun Ha.

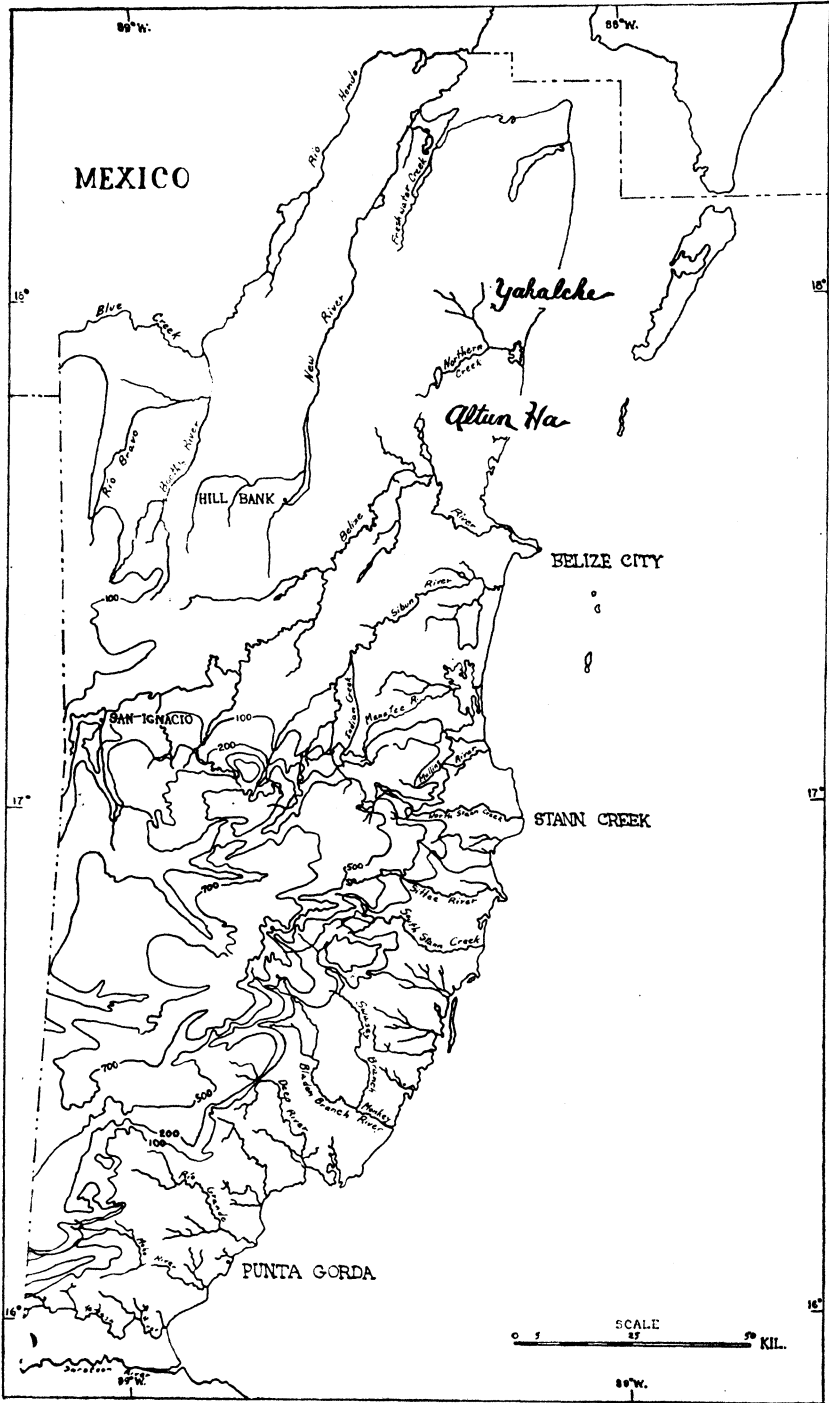


FIGURE 1. British Honduras.

Though the date of construction of the platform is not clear, the period of its use is indicated by the pottery recovered from black earth fill which concealed the platform face. Apparently scattered around the entire perimeter of the building, though concentrated on the eastern face, lay large quantities of pottery which can be related without question to that recovered from Tulum period sites in the Mexican state of Quintana Roo by Sanders (Sanders 1960), and to small collections from Altun Ha. The Yakalche ceramics point to a date in the thirteenth to fifteenth centuries A.D., and the nature of the collection suggests that Str. A-1 was the site of ceremonial activity during this period. Unfortunately, since no other structures at the site have yet been tested, it is impossible at present to determine the relationship of Str. A-1 to other ceremonial buildings, or to evaluate the importance of late Post-Classic activity in the total site occupation. It is, however, clear that the site constitutes an important link in the slowly accumulating chain of evidence bearing on late occupation in British Honduras.

Excavation of Str. A-1 involved initially the removal of overlying black soil from the eastern face of the platform, followed by cutting of a cross-section trench through the eastern projection, breaching the original face of the structure, and passing through the heart of the structural fill at this point. A small stratigraphic cut made at the southeastern corner of the building revealed two plaster floors which presumably extend over the entire area of the central plaza; the platform was constructed above the upper floor, and hence postdates the latest flooring of the plaza by an undetermined period. The upper floor was followed through the cross-section trench in the structure, and westward beyond the platform face, at which point the trench was turned southward to permit examination of the main platform and surrounding elements. This latter cut showed the upper plaza floor to be cut or broken away at a point 88 cm. west of the main platform face, for reasons which could not be determined. The platform fill extended west of the main structure face, suggesting the presence of a western projection, but no southern wall of such a projection was encountered.

It was in the black soil lying along the southern part of the western face of the platform that the teeth described below were recovered. In this area, the maximum depth of the deposit abutting the platform was 69 cm., with a gradual slope outwards to the level of the surrounding ground approximately 184 cm. from the platform face. Commencing at or near the surface of the black soil, in an area bordered on the north by the limit of the fill (possibly marking a western projection), and extending southward for 245 cm. and downward for 69 cm., human teeth were encountered scattered through the accumulated deposit, mingled with stones, decayed vegetation and roots, and usually occurring either singly or in groups of no more than four or five. The distribution of the teeth in the fill cannot be assumed to have any significance, as root action in the area had been intensive. Excavation was extended to the west and south until no further teeth were encountered, so that the total appears to approximate the original number of teeth deposited.

Associated with the teeth were some small, badly eroded fragments of human cranium, principally portions of parietals and occipitals, and probably representing at least two individuals. No other human skeletal material was recovered from the area, although a few small scraps were encountered on the eastern side of the

platform, and it is not clear whether the cranial fragments mingled with the group of teeth should be considered part of the apparent offering. The presence of several fragmentary bones of large mammals and rodents in the deposit raises the possibility that the cranial fragments are a chance inclusion.

The fill containing the teeth was found to overlie a stone slab placed at the level of the upper plaza floor, in an area where the floor had been broken or cut away. Teeth were found upon the slab itself, and removal of the slab yielded one additional tooth, as well as a small, irregular subglobular jadeite bead. It is possible, but not demonstrable, that the cutting away of the upper plaza floor in this area was connected with the deposition of the teeth, but in any case the presence of such a large number of teeth in association with an intentionally placed slab argues very strongly for identification of the material as a form of offering.

A total of 379 teeth was recovered from the deposit; in addition, a number of unidentifiable fragments was noted. Of this total, 101 (26.6 per cent.) are deciduous, while 278 (73.3 per cent.) are permanent teeth. In both the deciduous and permanent, nearly 65 per cent. are maxillary while the other 35 per cent. are mandibular (see table 1). In the deciduous series 55 per cent. are from the left side, while the left dentition comprises 48 per cent. of the permanent teeth.

TABLE 1. Frequency of deciduous and permanent dentition.

Deciduous dentition			
	<i>Maxillary</i>	<i>Mandibular</i>	<i>Total</i>
Right	31 (46.9%)	14 (40%)	45 (44.6%)
Left	35 (53.0%)	21 (60%)	56 (55.4%)
	<hr/> 66 (65.3%)	<hr/> 35 (34.7%)	<hr/> 101
Permanent dentition			
	<i>Maxillary</i>	<i>Mandibular</i>	<i>Total</i>
Right	92 (51.7%)	52 (52%)	144 (51.8%)
Left	86 (48.3%)	48 (48%)	134 (48.2%)
	<hr/> 178 (64.0%)	<hr/> 100 (35.9%)	<hr/> 278

TABLE 2. Frequency of teeth by class.

Summary of deciduous dentition		
<i>Tooth</i>	<i>Number</i>	<i>%</i>
M <sub>2</sub>	39	(38.6)
M <sub>1</sub>	28	(27.7)
C	20	(19.8)
LI	6	(5.9)
MI	8	(7.9)
Summary of permanent dentition		
M <sub>3</sub>	1	(0.4)
M <sub>2</sub>	25	(9.0)
M <sub>1</sub>	90	(32.4)
PM <sub>2</sub>	26	(9.4)
PM <sub>1</sub>	36	(12.9)
C	42	(15.1)
LI	24	(8.6)
MI	34	(12.3)

In the deciduous dentition, a majority of the sample (66·3 per cent.) are molars, while 19·8 per cent. are canines and 13·8 per cent. incisors (table 2). In the permanent series, 41·8 per cent. are molars, 22·3 per cent. premolars, 15·1 per cent. canines and 20·9 per cent. incisors (table 2). The frequencies of individual deciduous and permanent teeth are presented in tables 3 and 4.

TABLE 3. Frequency of individual deciduous dentition.

		<i>Deciduous Maxillary</i>		<i>Mandibular</i>		<i>Total Deciduous</i>	
		N	%	N	%	N	%
Right	M <sub>2</sub>	10	(15·2)	7	(20·0)	17	(16·8)
	M <sub>1</sub>	7	(10·6)	3	(8·5)	10	(9·9)
	C	9	(13·6)	2	(5·7)	11	(10·9)
	LI	3	(4·5)	0	(0)	3	(3·0)
	MI	2	(3·0)	2	(5·7)	4	(4·0)
Left	MI	4	(6·1)	0	(0)	4	(4·0)
	LI	3	(4·5)	0	(0)	3	(3·0)
	C	4	(6·1)	5	(14·3)	9	(8·9)
	M <sub>1</sub>	11	(16·7)	7	(20·0)	18	(17·8)
	M <sub>2</sub>	13	(19·7)	9	(25·7)	22	(21·8)
			<hr/>		<hr/>	<hr/>	
		66		35		101	

TABLE 4. Frequency of individual permanent dentition.

		<i>Permanent Maxillary</i>		<i>Permanent Mandibular</i>		<i>Total Permanent</i>	
		N	%	N	%	N	%
Right	M <sub>3</sub>	0	(0)	0	(0)	0	(0)
	M <sub>2</sub>	13	(7·3)	3	(3)	16	(5·8)
	M <sub>1</sub>	26	(14·6)	17	(17)	43	(15·1)
	PM <sub>2</sub>	6	(3·4)	5	(5)	11	(4·0)
	PM <sub>1</sub>	17	(9·6)	7	(7)	24	(8·6)
	C	13	(7·3)	6	(6)	19	(6·8)
	LI	10	(5·6)	6	(6)	16	(5·8)
	MI	7	(3·9)	8	(8)	15	(5·4)
Left	MI	14	(7·9)	5	(5)	19	(6·8)
	LI	7	(3·9)	1	(1)	8	(2·9)
	C	13	(7·3)	10	(10)	23	(8·3)
	PM <sub>1</sub>	8	(4·5)	4	(4)	12	(4·4)
	PM <sub>2</sub>	11	(6·2)	4	(4)	15	(5·4)
	M <sub>1</sub>	30	(16·9)	17	(17)	47	(16·9)
	M <sub>2</sub>	3	(1·7)	6	(6)	9	(3·2)
	M <sub>3</sub>	0	(0)	1	(1)	1	(0·3)
		<hr/>		<hr/>	<hr/>		
		178		100		278	

The deciduous dentition consists of both complete teeth and those in various stages of resorption. The permanent dentition includes complete teeth, as well as others in various stages of development. An assessment of the degrees of development, resorption, and dental attrition in the specimens permits inferences concerning the age at which the teeth were extracted, though it should be noted that the standards of age at which the teeth were extracted, though it should be noted that the standards of development employed in analysis of the Yakalche specimens are derived from studies of white children. It is quite likely that developmental and eruption patterns in both modern and prehistoric Mesoamerican populations would differ from those of modern whites, but specific data on this point are not available.

Since only an approximation of age is attempted, use of non-Mesoamerican standards should not bias the results greatly.

In this analysis, the developmental and eruption sequences presented by Schour & Massler (1941); Garn *et al.* (1959); Moorrees *et al.* (1963); and Anderson (1962) were used. These studies demonstrate clearly that it is possible to calculate age by assessing the stage of development and the degree of resorption; for example, in white populations the deciduous second molar erupts at one and a half years, is fully developed by three years (the roots at the time of eruption are not completely developed). By the sixth year, roots of the tooth are a quarter resorbed, a half by the eighth year, three-quarters by the tenth year; and the tooth is exfoliated by the eleventh year.

Equally valuable as a clue to the age at which a tooth was extracted is the degree of dental attrition. Brothwell (1963) has shown that analysis of wear patterns in dentition provides a basis for age estimates; and analysis of wear in the deciduous teeth from the Yakalche sample provides some insight into the relationship between age and attrition. Although it is obvious that severity of wear may differ in deciduous and permanent dentition, attribution of age on the basis of stages of attrition seems reasonably reliable. As a check on the figures derived, the materials were compared with samples from Great Basin populations; the results suggested that the amount of error in age assessments for the Yakalche material is likely to be small. As in the case of developmental and eruption patterns, data on rates of attrition in prehistoric Mesoamerican populations, which would provide a better basis for evaluation of the Yakalche specimens, are not available. There is, however, some basis for assuming that actual ages in a Mesoamerican population may be somewhat lower than as indicated by use of rate curves derived from white populations. In any case, the distribution pattern for the Yakalche sample should be internally correct, providing an accurate picture of age range, if not of precise ages of extraction.

The assessment of age of deciduous teeth based on developmental and resorptive stages provided the following distribution:

2-3 years	17	(17.6%)
4-5 years	31	(31.9%)
6-7 years	41	(42.0%)
8-9 years	8	(8.2%)
	<hr/>	<hr/>
	97	(99.7%)

The permanent teeth that were not fully developed were distributed as follows:

4-5 years	11	(7.6%)
6-7 years	29	(20.0%)
8-9 years	92	(63.4%)
10-11 years	7	(4.8%)
12-13 years	6	(4.1%)
	<hr/>	<hr/>
	145	(99.9%)

The completely developed permanent teeth aged on stages of attrition provided the following age group figures:

6-7 years	9	(8.5%)
8-9 years	33	(31.2%)
10-11 years	22	(20.7%)
12-13 years	22	(20.7%)
14-15 years	12	(11.3%)
16-17 years	6	(5.6%)
18-19 years	2	(1.8%)
	<hr/>	<hr/>
	106	(99.8%)

Which combined gives a distribution for the sample complete enough for ageing as follows:

2-3 years	17	(4.9%)
4-5 years	42	(12.1%)
6-7 years	79	(22.7%)
8-9 years	133	(38.2%)
10-11 years	29	(8.3%)
12-13 years	28	(8.0%)
14-15 years	12	(3.4%)
16-17 years	6	(1.7%)
18-19 years	2	(0.6%)
	<hr/>	<hr/>
	348	(99.9%)

Almost 61 per cent. of the teeth were obtained from individuals aged between six and nine years; this distribution argues strongly against the possibility that the teeth were extracted during a life crisis rite, a practice common in many groups. In addition, seventy-five (20.1%) of the teeth were extracted prior to their eruption, indicating the possibility that many, if not all, were post-mortem extractions. The number of individuals represented in the sample is not precisely ascertainable, since it is possible, in fact rather likely, that more than one tooth was extracted from a single individual. However, the range of possibilities is easily defined, and within this the more likely figures are readily recognisable. The maximum possible number of individuals represented is of course 379 or a figure slightly greater if the several unidentifiable fragments are included. If we assume that the deciduous teeth represent a group entirely separate from those yielding permanent teeth, we can derive some idea of the possible number of individuals involved by simply taking the largest totals for individual teeth from each table. Fortunately, as in each case molar teeth are involved, the assumption regarding separation of groups with deciduous and permanent dentition will not bias the figures produced. The tables indicate a minimum number of thirteen individuals as donors of deciduous teeth (Maxillary Left M<sub>2</sub>), and of thirty for permanent teeth (Maxillary Left M<sub>1</sub>), or a total of forty-three persons. Acceptance of this figure as a possible representation of the actual number of persons involved admittedly requires recognition that some individuals would have given up a

maxillary left second molar but no corresponding right second molar, while others might have surrendered one or more molars, an incisor or two, and perhaps one or more canines and premolars. This seemingly haphazard pattern of tooth removal, unlikely as it may seem, must in fact have been the case, given the wide range of totals for various individual teeth, and the many odd numbers among the totals. While no one figure can be seized upon as necessarily correct, a total number of persons at or near the minimum of forty-three seems the more plausible in the face of the apparently largely random tooth removal, which does not point to ritually prescribed removal of a single tooth from the jaws of each of 379 or more children and youths.

Although there is evidence of dental pathologies in the Yakalche sample, including enamel hypocalcification and carious lesion, the latter sometimes strikingly extensive, no examples occur of the purposeful alteration so common in pre-hispanic Mesoamerica. For the majority of the sample, absence of modification is to be expected on the grounds of age alone; beyond this, it should be noted that dental alteration appears to have been limited, at Altun Ha and other Maya centres, to relatively small portions of the upper and/or middle strata of the society, groups from which the individuals represented at Yakalche are not likely to have come.

Though offerings played a major role in the lives of the ancient Maya, a check of the archaeological literature reveals no recorded instance similar to the Yakalche discovery. While the archaeological data underscore the importance of inlaying and altering the form of teeth among the ancient Maya (see Romero 1958: 103-9), it is apparent that inclusion of human teeth in offerings, though it occasionally occurred in monument-associated caches during Early and Middle Classic times (Coe 1965: 465), was not a common practice, and that massive deposition of teeth is not in evidence in any context.

The ethnohistoric documentation by Diego de Landa (Tozzer 1941: 116-17) records the pre-Conquest Maya practice of sacrifice of children, commonly to Chac, the rain god, but makes no mention of tooth removal, either prior or subsequent to the killing of victims, as part of the ceremony. Nonetheless, the age range indicated in the Yakalche material points to the possibility of connexion between the tooth offering and rain ceremonies. The fact that the hearts of sacrificial victims were sometimes removed before the body was cast into a cenote (sacred well) might be taken as an indication that, though unrecorded, the removal of other parts of the body, including teeth, was also practised. J. E. S. Thompson has suggested (Thompson, personal communication) an intriguing alternative to the possibility of connexion between the Yakalche teeth and Chac ceremonies, noting that it is known that boys were sacrificed to the god Itzamna, whose cult certainly flourished in the province of Chetumal, the southern border of which may be marked by Yakalche, if not by Altun Ha. As Itzamna appears to have been represented as toothless except for a single molar at each corner of the mouth, it may be that the children's teeth were removed in order to give them a greater resemblance to the god to whom they were sacrificed. As the aguada at Yakalche seems rather small and shallow to have served as a scene for sacrifices of children to Chac, it may well be that the teeth result from one or more ceremonies of the cult of Itzamna. If so, we can suggest that the teeth, removed as part of the major

ceremony of sacrifice, were latterly deposited as a sort of secondary offering to the deity, and it may even be that the platform of Str. A-1 was the scene of the sacrificial activity.

In the absence of more extensive ethnohistoric data, and lacking parallel archaeological discoveries, we are left with the strong indication that the Yakalche material is somehow related to documented ceremonial activities, and the equally strong impression, almost certainly incorrect, that the events reflected in the Yakalche remains were unique in Maya prehistory. It is hoped that further excavation can be carried out at the site in forthcoming seasons, aimed at clarifying the nature of other structures, particularly one in which a tomb was discovered by treasure-seekers. Perhaps additional excavation will shed light on what can very probably be viewed as evidence for a previously unknown facet of the many rites and ceremonies which were the central focus of ancient Maya life.

## NOTE

The analysis of the teeth by Armelagos and Bartley was supported in part by PHS Grant No. H. D. A. M. 02771-01, National Institute of Child Health and Development.

## REFERENCES

- Anderson, J. E. 1962. *The human skeleton*. Ottawa: National Museum of Canada.  
 Brothwell, D. R. 1963. *Digging up bones*. London: British Museum (Natural History).  
 Coe, William R. 1965. Caches and offertory practices of the Maya lowlands. In *Handbook of American Indians* 2 (ed.) Gordon R. Willey. Austin: Univ. of Texas Press.  
 Garn, S. M., A. B. Lewis & D. L. Polachek 1959. Variability of tooth formation. *J. dent. Res.* 38, 135-48.  
 Moorrees, C. F. A., E. A. Fanning & E. E. Hunt Jr 1963. Formation and resorption of three deciduous teeth in children. *Am. J. phys. Anthropol.* 211, 205-15.  
 Romero, Javier 1958. *Mutilaciones dentarias* (Invest. Inst. nac. Antrop. Hist. 3). Mexico City: Instituto Nacional de Antropología e Historia.  
 Sanders, William T. 1960. *Prehistoric ceramics and settlement patterns in Quintana Roo, Mexico* (Publ. Carnegie Instn Wash. 606). Washington: Carnegie Institution.  
 Schour I. & M. Massler 1941. The development of the human dentition. *J. Am. dent. Ass.* 28, 1153-60.  
 Tozzer, Alfred M. 1941. *Landa's Relación de las Cosas de Yucatan* (ed.) A. M. Tozzer (Pap. Peabody Mus. Archaeol. Ethnol. 18). Cambridge, Mass.: Harvard Univ. Press.