CHIEFTAINS, POWER & TRADE: REGIONAL INTERACTION IN THE INTERMEDIATE AREA OF THE AMERICAS

CACIQUES, INTERCAMBIO Y PODER: INTERACCION REGIONAL EN EL AREA INTERMEDIA DE LAS AMERICAS

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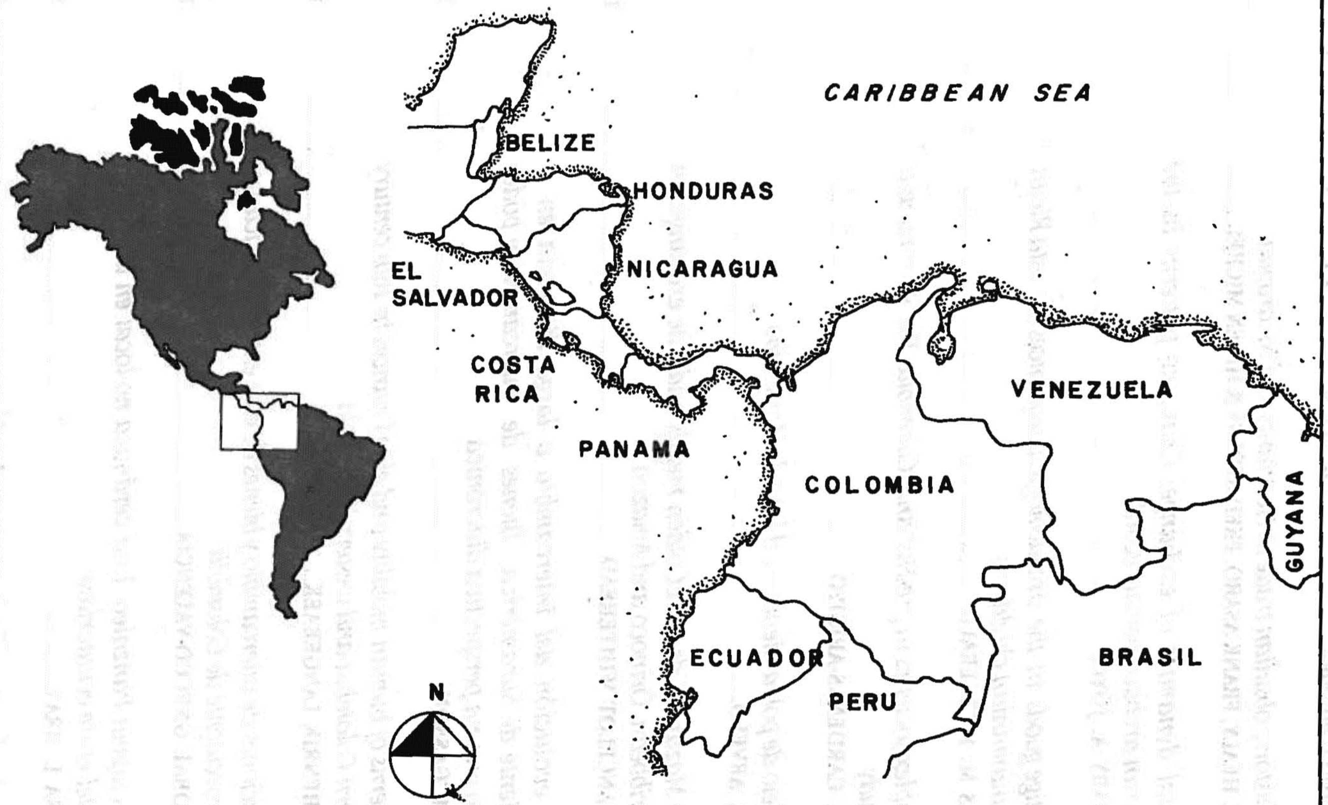

The Intermediate Area. El Area Intermedia.

FOREWORD

Editing scientific books is not an easy task. The original idea for this one was born at the Anthropology Department of the University of Pittsburgh three years ago. Initial work was under the direction of Carl H. Langebaek and Carlos Fitzgerald; subsequently the editorial coordination was the responsibility of Langebaek and Felipe Cárdenas-Arroyo at the University of los Andes in Colombia. The final product has been possible thanks to the patience and sacrifice of several people: Firstly, the authors, who waited more than we would have wanted to for their papers to be published; and secondly, the editors and the funding institution - Colciencias. We are indebted there to Ms. Lisbeth Fog for her support. At the University of Los Andes we thank Elssy Bonilla and Fabricio Cabrera for their cooperation.

This book is a collection of papers written by specialists around the subject of social interaction among prehispanic societies in the *Intermediate Area*. The central request presented to the authors was that papers should be original contributions concerning social processes and not traditionally descriptive works. It was our original interest that these papers address important issues regarding how societies function and change, and it is highly satisfactory to present a volume in which this goal has been properly achieved.

The analysis of social interaction processes plays a fundamental part in the study of social change processes. A number of interesting proposals have stemed from work in Mesoamerica and the Central Andes in the past few years. However, we should not expect theoretical coherence from these studies, because they are presented from varying perspectives: they range from the funcionalist approaches of the seventies to neo-Marxist center-periphery models of more recent years. Although social interaction studies have offered important data regarding social processes, the fact remains that their impact in the *Intermediate Area* is less clear, with the expection of some important developments in Central American archaeology.

Selecting the *Intermediate Area* as the geographical framework for this volume was based on several considerations. But perhaps it is easier to explain such a decision by presenting those which were not: For one thing, the *Intermediate Area* was not selected because it was considered to be a homogeneous area, nor because it was believed that this region was united by ties of social interaction making it some kind of analytical unit. The concept of *Intermediate Area* is plagued with problems when one tries to define it from either one of these perspectives. It was selected for its diversity, and because recent developments in the archaeology of this region have begun to offer data and new interpretations which are important for researchers interested in understanding prehispanic processes of social change.

Authors are representative of Latin American (Panamá, Venezuela, Colombia), North American and European archaeology. Papers were requested in Spanish and English because we consider that both languages are essential for anyone seriously interested in the archaeology of this area. We believe this book is a good example that shows it is possible to integrate archaeologists from Latin America and the English speaking countries which, unfortunately, have worked in relative isolation over scientific issues that concern us both.

The Editors.

PREÁMBULO

Editar libros científicos no es una tarea fácil. La idea original de la presente obra se gestó en el Departamento de Antropología de la Universidad de Pittsburgh hace ya tres años. Inicialmente, el trabajo de coordinación estuvo a cargo de Carl H. Langebaek y Carlos Fitzgerald. En las últimas etapas, el trabajo ha estado a cargo de Langebaek y Felipe Cárdenas-Arroyo en la Universidad de los Andes, Colombia. En este caso, se trata de una labor coordinada que ha exigido sacrificios y paciencia por parte de un número importante de personas: en primer lugar, de los autores, quienes debieron esperar más tiempo del que hubiésemos deseado para ver sus trabajos publicados; y en segundo lugar, de los editores y de quienes aportaron recursos económicos para que el libro saliera a la luz. Esta obra es posible gracias a la colaboración de Colciencias, donde agradecemos el empeño y guía de Lisbeth Fog. En la Universidad de los Andes, los editores agradecen la colaboración de Elssy Bonilla y Fabricio Cabrera.

En este libro se presentan una serie de artículos escritos por especialistas sobre el problema de la interacción social en sociedades prehispánicas de la llamada *Area Intermedia.* En la solicitud de colaboración a los autores, se hizo énfasis en la necesidad de enfocar los artículos como aportes originales sobre procesos sociales, alejándose así de la arqueología clásica que se interesa más en la descripción de objetos que en la profundización del conocimiento sobre cómo funcionan y cómo cambian las sociedades que estudiamos. Es motivo de orgullo el que, pese a contar con autores de las más diversas procedencias y tendencias teóricas, el énfasis de cada uno de los artículos es en procesos sociales y no en la aburrida "tiestología" que aún plaga la literatura arqueológica de la región.

El análisis de los procesos de interacción social ha sido llamado a jugar un papel fundamental en el estudio de los procesos de cambio social. A partir de trabajos realizados en Mesoamérica y los Andes Centrales, han surgido un buen número de propuestas durante los últimos años. Sin embargo, es imposible encontrar coherencia en esta clase de estudios, pues se presentan trabajos desde las aproximaciones funcionalistas de los años setenta, hasta los estudios neo-marxistas de los modelos centro-periferia más recientes. No cabe duda de que los estudios sobre interacción social han suministrado importantes datos sobre procesos sociales en su sentido más amplio; pero sin embargo, el impacto de dichos estudios en el *Area Intermedia* ha sido menos claro, aun cuando particularmente en Centroamérica se han realizado trabajos importantes desde hace algunos años.

Las razones para seleccionar el *Area Intermedia* como marco geográfico de este libro fueron múltiples, y quizás por ello sea más fácil explicar aquellas que no lo fueron. Por un lado, no se seleccionó esta área por considerarse que sea homogénea, ni que se piense que ésta gran región estuviese unida por vínculos de interacción social que le confirieran algún tipo de validez como unidad de análisis. El de *Area Intermedia* es un concepto plagado de problemas cuando se le pretende definir desde cualquiera de esas perspectivas. Se seleccionó, precisamente, por lo diversa, y también porque el trabajo de un buen número de colegas empieza a suministrar datos e interpretaciones que son importantes para cualquier investigador interesado en entender los procesos de cambio prehispánico.

Este volumen recoge artículos escritos por investigadores latinoamericanos (Panamá, Venezuela, Colombia), norteamericanos y europeos. Los artículos se solicitaron en inglés o español, debido a que ambas lenguas son indispensables para cualquiera que esté seriamente interesado en la arqueología de la región. Creemos que este trabajo, en su conjunto, es un buen ejemplo para integrar a la comunidad de arqueólogos de los países latinoamericanos y angloparlantes los cuales, lamentablemente, han interactuado muy poco en la solución de problemas científicos, que al fin y al cabo nos son comunes.

Los Editores

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PREHISTORIC OBSIDIAN TRADE IN HONDURAS AND NICARAGUA

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RESUMEN: INTERCAMBIO PREHISTÓRICO DE OBSIDIANA EN HONDURAS Y NICARAGUA.

El estudio de intercambio de obsidiana en el Area Intermedia se encuentra apenas en estado embrionario, aun cuando ahora empiezan a realizarse estudios que permiten identificar fuentes y patrones de intercambio. En este artículo se examina una muestra de artefactos de obsidiana provenientes de contextos fechados, correspondientes a cuatro sitios del noreste de Honduras y suroccidente de Nicaragua. Se hace un seguimiento de las fuentes de materias primas como también de los diferentes modelos de circulación que pueden dar cuenta de los patrones de aparición de objetos de obsidiana en el registro arqueológico. El resultado destaca cambios regionales y cambios a nivel cronológico en la circulación de dichos objetos de obsidiana.

INTRODUCTION

Obsidian is a volcanic glass which was a preferred, and highly desired, raw material among many ancient stone-tool using cultures of both the Old and the New Worlds (Torrence 1986). In the Americas, where metallurgy was a rather late development in the prehistoric era and never widely employed for tools, obsidian served as a substitute for "steel" because of its superb fracturing qualities and extremely sharp cutting edges. In the Mesoamerican culture area (central and southern Mexico, Guatemala, and Belize) where obsidian use was widespread, even the 16th century Spanish conquistadors, equipped with an array of steel instruments, were greatly impressed with the utility of the glasslike stone.

Over the past 30 years, geologists, chemists, nuclear physicists, and archaeologists have worked together to identify major sources of obsidian around the world, analyzing specimens from these localities for their distinctive chemical "fingerprint". Obsidian artifacts from many archaeological sites, representing different cultures and time periods, have now been traced to particular natural sources, providing researchers with important information on ancient obsidian exploitation patterns and trade networks (Cann and Renfrew 1964; Heizer et al. 1965; Renfrew et al. 1966; Taylor 1977; Weaver and Stross 1965).

In Mesoamerica, there has been considerable progress in identifying natural obsidian sources and tracing artifacts to these outcrops and quarries (Asaro et al. 1978; Graham et al. 1972; Hester 1978; Jack and Heizer 1968). As the obsidian database has expanded, particularly in the Maya subarea, researchers have begun to produce increasingly sophisticated (and some times competing) models of prehistoric exchange and economic interaction (Hammond 1972; Healy et al. 1984; McKillop and Healy 1989; Nelson 1985; Rice et al. 1985; Zeitlin 1982).

Further south, however, in the adjoining Intermediate Area (see Willey 1959, 1971:254-359), from Honduras to Ecuador, where archaeological research has been more limited, there have been few trace element analyses of this nature even though obsidian artifacts are known to occur in the archaeological contexts (particularly in the northern and southern extremes of the area). The absence of an obsidian database from the Intermediate culture area, comparable to that of Mesoamerica, is due partly to insufficient information on both the geology and archaeology. Collection of this data has also been hindered by major political upheavals over the past two decades. More information is needed, particularly on the location and description of natural obsidian sources lying within the area, and on the chemical element data for such localities.

Recently, Sheets and colleagues (1990) identified and described two previously unreported obsidian sources in Honduras: La Esperanza and Güinope. These are the first such sources to be located in the northern Intermediate Area and their identification (and successful chemical fingerprinting) is an important contribution. It again raises questions about prehistoric obsidian usage, sources for obsidian, trade routes, and mechanisms of exchange in this part of the New World.

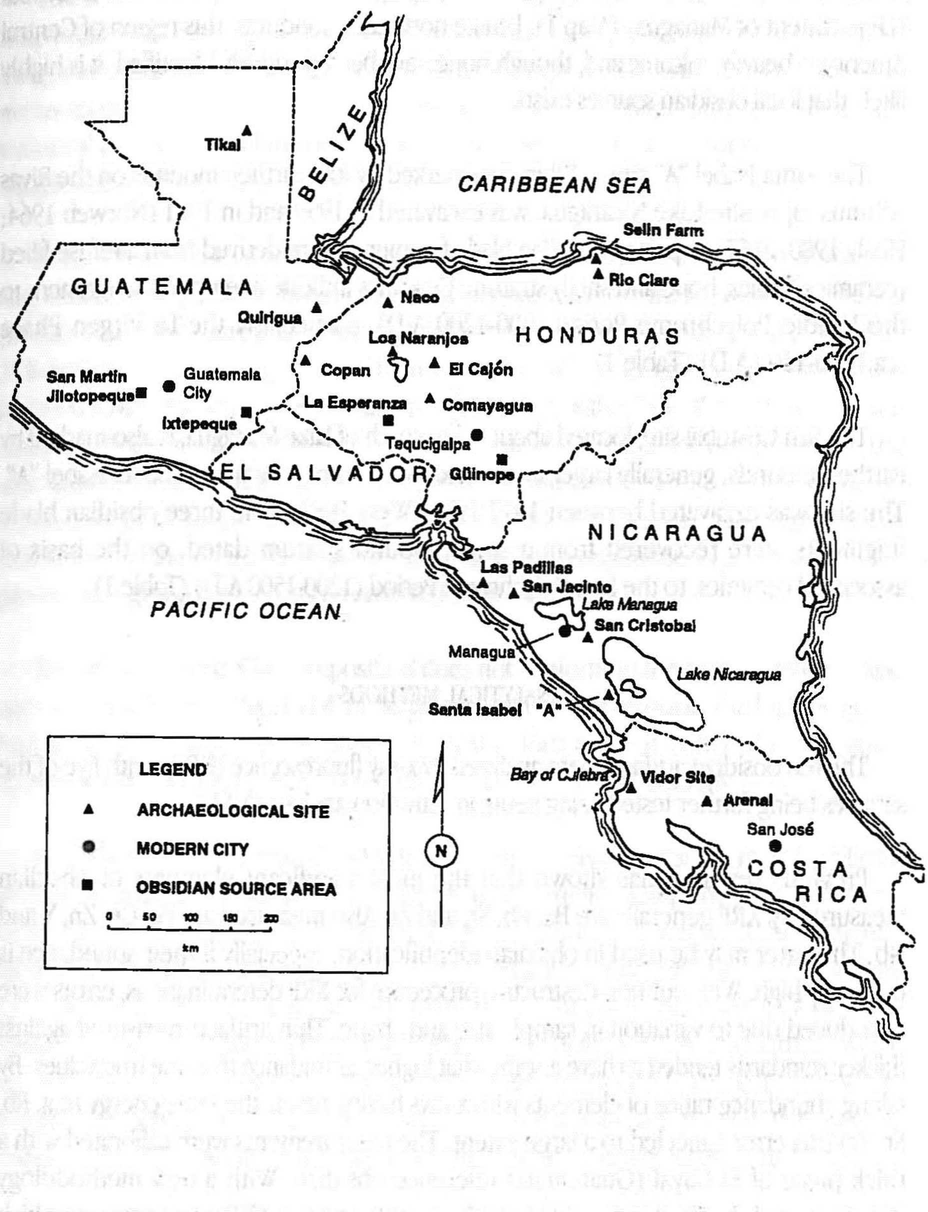
This report examines a small sample (n=10) of obsidian artifacts, recovered from dated provenience at four archaeological sites located in two regions of the Intermediate Area, northeast Honduras and southwest Nicaragua. The samples were carefully tested at the Lawrence Berkeley Laboratory of the University of California. Elemental analysis indicate the artifacts were derived from these two recently identified obsidian sources in Honduras, as well as a third source located in the highlands of Guatemala. The sites and samples, along with the method of analysis, are briefly described. Finally, comparisons with the few obsidian artifacts of known source in the northern part of the Intermediate Area is made, and comments on possible models of prehistoric exchange are presented.

HONDURAN SITES AND SAMPLES

The obsidian artifacts (n=5) consisted of prismatic blades derived from two sites located in the Department of Colón, northeast Honduras: Selin Farm and Río Claro (Map 1). To the best of our knowledge there are no sources of obsidian in this part of Honduras, which is non-volcanic in nature.

Selin Farm, situated on the south shore of the Guaimoreto Lagoon, was excavated in 1976 (Healy 1978a, 1982, 1984a, 1984b). Marked by a series of low earth and shell mounds, the site was occupied during the Selin Period (300-1000 A.D). A pair of prismatic blades, recovered from a Basic Selin (600-800 A.D) stratum composed of domestic refuse, was analyzed (Table 1).

The Río Claro site, a much larger community, was located in the Río Aguan valley. It was partially excavated in 1975, and dated to the succeeding Cocal Period (1000-1530 A.D) (Healy 1978b). The more than 50 earth and stone mounds, positioned atop a natural flat knoll rising 10-12 meters above the valley floor, were generally larger and much more densely compacted than those at the Selin Farm settlement. Three prismatic blades were recovered from an Early Cocal (1000-1400 A.D) context (Table 1).



MAP 1. ***The northern Intermediate Area detailing location of archaeological sites and obsidian sources noted in text.***

NICARAGUAN SITES AND SAMPLES

The obsidian sample (n=5) consists of prismatic blades recovered from two sites in southwest Nicaragua: Santa Isabel "A" (Department of Rivas) and San Cristobal (Department of Managua) (Map 1). Unlike northeast Honduras, this region of Central America is heavily volcanic and, though none have been positively identified, it is highly likely that local obsidian sources exist[1].

The Santa Isabel "A" site, a 12km area marked by low earthen mounds on the Rivas isthmus, opposite Lake Nicaragua, was excavated in 1959 and in 1961 (Norweb 1964; Healy 1980:49-57). A pair of obsidian blade fragments were derived from a refuse-filled (ceramics, lithics, bone and shell) stratum. Ceramics indicate a temporal assignment to the Middle Polychrome Period (800-1200 A.D), particularly the La Virgen Phase (ca.1000-1200 A.D) (Table 1).

The San Cristobal site, located about 1 km south of Lake Managua, is also marked by earthen mounds, generally larger in size and more numerous than at Santa Isabel "A". The site was excavated between 1977-1979 (Wyss 1983). The three obsidian blade fragments were recovered from a single mound stratum dated, on the basis of associated ceramics, to the Late Polychrome Period (1200-1500 A.D) (Table 1).

ANALYTICAL METHODS

The ten obsidian artifacts were analyzed by x-ray fluorescence (XRF), with five of the samples being further tested using neutron activation analysis (NAA).

Previous research has shown that the most significant elements of obsidian measured by XRF generally are Ba, Rb, Sr, and Zr. Also measured are Fe, Ce, Zn, Y and Nb. The latter may be used in obsidian identification, especially if their abundance is unusually high. With our non-destructive procedure for XRF determinations, errors were introduced due to variation in sample size and shape. Thin artifacts measured against thicker standards tended to have a somewhat higher abundance than the true values. By taking abundance ratios of elements with x-rays having nearly the same energy (e.g. Rb, Sr, Zr) this error canceled to a large extent. The measurements were calibrated with a thick piece of El Cayal (Guatemala) reference obsidian. With a new methodology (Giauque et al. 1992), it is possible to make non-destructive XRF measurements which are precise and accurate and not affected by the shape and size of the artifacts. The

1 Lange et.al (1992:175) mention at least two possible sources of natural obsidian in Nicaragua: one on the west side of Lake Managua, and the other on the northeastern shore of Lake Nicaragua. No further details were available.

measurements in this paper, however, were taken before that methodology was developed.

The abundances (i.e., of Ba) or ratios (i.e., of Rb, Sr, and Zr) are calculated for the individual samples. For each group of samples having a common provenience assignment, the mean values are calculated. In addition, the standard deviations or root-mean-square deviations (RMSD) in these values are calculated and compared with statistical errors inherent in counting x-rays; this permits evaluation of performance of equipment and procedures.

If the RMSD of the critical element(s) in a group is less than 10%, and no sample has abundances diverging by three standard deviations from the mean, all of the artifacts probably have the same provenience. If the RMSD for a provenience group is less than 10% and the group agrees to better than 10% with a reference group, it is provisionally assigned to the reference group. A high-precision, destructive, "short" neutron activation analysis (NAA) is then made of a representative member of the group. If the abundances of an artifact agree within three standard deviations of the errors of measurement or within three RMSD of the NAA reference group, the assignment of that artifact to the reference group is confirmed. The assignments of all artifacts in the provenience group are then also considered confirmed.

Any artifact whose XRF composition does not conform to the criteria stated, is also analyzed by a "short" NAA, and if an assignment still cannot be made, the high precision NAA is often extended. If the composition still does not match any of the obsidian sources known, it can at least be positively excluded from those sources.

In a "short" or "abbreviated" NAA, the elements measured that are most significant in obsidian analysis are Mn, Dy, Ba, Na, and K. In an "extended sequence" measurement, U, Ba, La, Ce, Sm, Eu, Yb, Co, Sc, Fe, Th, Cs, Rb, Hf, and Ta (as well as other elements) are well determined in most obsidians. The uncertainties of the calibration standard are the major sources of systematic uncertainty after other systematic errors have been taken into account. Standard Pottery, however, is one of the very few standards in which uncertainties are known for nearly all the elements measured. The composition of Standard Pottery, procedural details, and error estimates are described in Perlman and Asaro (1969, 1971). Additional details of the method are given in Stross et al. (1983).

Generally, if an obsidian artifact belongs to a well-defined group, the abundances in the artifacts of the best measured elements (usually 14-16 are taken) will deviate from those of the reference group by no more than 2-3% on the average. Somewhat greater deviations may indicate in homogeneity in the source, while significantly greater deviations normally are taken to indicate a different obsidian source.

ANALYTICAL RESULTS

Of the ten obsidian specimens analyzed, four (4) were determined to have been obtained from the La Esperanza source, and two (2) from the Güinope source, both in Honduras. The other four (4) specimens were determined to have come from the Ixtepeque source in Guatemala. While all ten samples were subjected to XRF, five of these were tested additionally by "extended" NAA runs for greater confidence. The sample concordance is given in Table 1, the XRF data are given in Table 2a, b c, and the NAA data in Table 3. It is seen in Table 3 that the average deviation between artifacts and source abundances is between 1.3 and 2.1% of the 16 most precisely measured elements. This close agreement is consistent with the requirements for a chemical match by high precision NAA given earlier.

The five northeast Honduran artifacts were attributable to three different sources. Three of the artifacts, with the Lawrence Berkeley Laboratory (LBL) catalogue numbers Tren-1, 2, and 3, come from the newly described La Esperanza (Honduras source), while one of the artifacts, Tren-9, matched the Güinope (Honduras) source, and one other, Tren-10, was assigned an Ixtepeque (Guatemala) provenience.

From southwest Nicaragua, the five artifacts were also attributable to the three separate locations, the same trio of sources identified from northeast Honduras. Three of the five artifacts, with the LBL numbers Tren-4, 5, and 7, were assigned to Ixtepeque, one artifact, Tren-6, to La Esperanza, and another, Tren-8, to Güinope.

DISCUSSION AND COMPARISONS

As noted earlier, there have been few previous elemental analyses of obsidian undertaken from sites in the northern zone of the Intermediate Area. To the best of our knowledge, the obsidian samples described here from northeast Honduras are the first specimens to be characterized, identified to source, and published. Obsidian is an exotic here, with no local source(s).

The analyses, taken site by site, period by period, indicate that natives of northeast Honduras acquired their obsidian from multiple sources. There is also evidence, though admittedly based on a tiny sample, that source reliance shifted diachronically. During the Selin Period (300-1000 A.D), as shown by the Selin Farm samples, obsidian was procured from sources more than 200 km (Güinope) and 350 km (Ixtepeque) away. In the succeeding Cocal Period (1000-1520 A.D), as exhibited by the Río Claro samples, obsidian was being derived from yet a third source (La Esperanza), approximately 250 km away[2].

From the Greater Nicoya sub-area, obsidian has been noted previously in site collections from both Nicaragua and Costa Rica (Creamer 1983; Healy 1980:285; Lange et al. 1992; Snarskis 1981:38; Wyss 1983:46, 49). There are as yet, however, no positively identified obsidian sources in the sub-area and only a handful of previously sourced archaeological specimens.

In regard to the latter, Sheets et al. (1990) chemically identified nine obsidian artifacts from adjacent northwest Costa Rica. Six of the nine Nicaraguan artifacts were produced from obsidian extracted at Güinope, and the other three were quarried from Ixtepeque. Of the Costa Rican specimens, one came from Ixtepeque, one from Güinope, one from Río Pixcaya (San Martín Jilotepeque), another highland Guatemalan source, and the fourth matched an obsidian (pebble) sample from the northeast shore of Lake Nicaragua (Map 1).

From the present study, reviewed spatially and temporally, it is apparent that multiple obsidian sources were being mined in the north with some of this material making its way into the Greater Nicoya sub-area of Lower Central America (Lange 1984b). During the Middle Polychrome Period (800-1200 A.D), as evident from the pair of obsidian samples from Santa Isabel "A", Ixtepeque obsidian was imported over a distance of about 450 km. In the succeeding Late Polychrome Period (1200-1520 A.D), as shown from the San Cristobal samples, Ixtepeque continued to be used, but obsidian from Güinope, about 180 km away, and from La Esperanza, approximately 270 km away, was also being acquired.

The picture which emerges is a complex one. In a recent publication on the archaeology of Pacific Nicaragua, Lange et al. (1992:163) have suggested that the local needs for lithics were predominantly met with local materials. They also reported that overall 10% of the obsidian artifacts that they collected in a regional survey in 1983 were produced in the Mesoamerican tradition of core-blade technology (ibid 174). Based on detailed studies of the probable production technology, artifact types, and more limited provenience studies, these authors suggested that this (Mesoamerican) obsidian trade or exchange was concentrated in the León-Managua region and constituted only a thin, spotty veneer compared to the use of largely local materials (ibid 163). They found a very distinct decrease in obsidian abundance between northern Pacific Nicaragua and the Rivas region in the south, and the abundance was particularly low in the region just east and north of Lake Nicaragua. Further south, into Costa Rica, they found that obsidian was (low and) concentrated in sites near to the modern Nicaraguan border. Indeed, at the

2 Cited distance estimates between archaeological sites and obsidian sources reflect most direct, straight line measurement and are, therefore, minimum distances for obsidian transport.

interior site of Arenal only 2 obsidian artifacts were found among 9000 chipped stone artifacts (Sheets et al. 1990:153).

Table 4 tabulates some of the recent data on abundance of lithic artifacts, obsidian artifacts, and obsidian prismatic blades in Nicaragua, northeast Honduras, and Costa Rica, as well as the provenience of the obsidian (when known). The data for Nicaragua are given as a function of the archaeological zones proposed (for lithics) by Lange et al. (1992:55)[3].

Some of the more usual modes of prehistoric distribution of obsidian have been characterized as supply zone (direct procurement) or down-the-line (Renfrew 1975, 1977:77, 1982). Direct procurement has a very slow "fall-off" with distance from the source, while the down-the-line distributions drop off rapidly. For Nicaragua, it is seen in Table 4 that the largest proportion of obsidian among total lithic artifacts is found, by far, to be in the northern zone. If all of the non-prismatic blade obsidian had the same provenience then the fall-off rate would be a factor of 16-20 from San Jacinto (León) to Santa Isabel "A" (Rivas), a distance of about 160 km. If the proveniences were not all the same, then some provenience group would have to fall-off even faster. (The abundance of obsidian artifacts at León is taken as 100% of the lithic artifacts because the abundance of prismatic blades relative to obsidian was given as about the same found for lithics). This pattern of fall-off suggests direct procurement of obsidian (for general use) was not the predominant exchange model and gives upper limit on down-the-line trade of obsidian in Pacific Nicaragua.

The ratio of the abundance of prismatic blades relative to obsidian artifacts for Nicaragua increases dramatically as the abundance of the obsidian artifacts declines. For example, it is 0.3% for Las Padillas in Zone 1, 6% in Zone 2, 21% in Zone 3, and 33% in Zone 4. On the other hand, the abundance of prismatic blades divided by the abundance of lithic artifacts is roughly constant, averaging slightly over 3% (when values are weighted by the number of blades) from San Jacinto (León) at the bottom of Zone 1 to Santa Isabel "A". The ratio for Zone 4 (north and east of Lake Nicaragua) may be smaller than the 3%, or the apparent difference may be due to the small numbers involved.

These data suggest that there was a distinct need for obsidian prismatic blades and this need could not be met by local sources of lithic raw materials. It appears, then, that there was a distribution network available, and functioning, which could supply those needs. It is reasonable to conclude that the prismatic blades were prestige items and,

[3] Uncertainties in the ratios were estimated from Poisson's statistics (Meyer 1975:203). An upper limit was chosen so that the probability of obtaining the observed value or smaller was 16%. The lower limit was chosen in a similar way. These limits converge to the familiar Gaussian statistics as the numbers become larger and larger.

hence, decrease in abundance at a much slower rate with distance from the original source than other, less important, lithic artifacts (Renfrew 1977:78). The network (or possibly networks) seems to have supplied prismatic obsidian blades as far south as the Santa Isabel "A" site in southwest Nicaragua, and possibly as far as the Bay of Culebra in northwest Costa Rica (Sheets et al. 1990; Lange and Stone 1984; Lange et al. 1992:124, sample 8139 G from Ixtepeque). The obsidian prismatic blade network probably did not extend much farther south or inland judging from the limited obsidian abundance (0.2%) at Arenal.

There are some difficulties with a prestige-chain model to explain obsidian prismatic blades in Nicaragua. There is, for example, no apparent decrease of abundance with distance from the originating source as would be expected even for an exchange model such as this. But this incongruity could be due to the large uncertainties in the values. Also, the abundance of prismatic blades relative to total lithic artifacts at Las Padillas seems distinctly lower than found at San Jacinto and further south.

Obsidian prismatic blades are taken as one of the key indicators of Mesoamerican connections with what is termed Lower Central America (Lange et al. 1992:163; Sheets 1975), or the northern part of the Intermediate Area. The evidence noted here from Pacific Nicaragua demonstrates that obsidian prismatic blade distribution followed a different pattern of exchange than that of ordinary obsidian artifacts, and was more like a prestige-chain than a down-the-line model. The present work also suggests that the Ixtepeque source was the most heavily used obsidian source for this distribution, that an exchange network for obsidian blades extended south at least to the Rivas region, and the extend of trade, or exchange, in Pacific Nicaragua corresponded to about 3% of the lithic material utilized. However, because of the prestige nature of the material, its "value" may have constituted significantly more than 3% of the lithic trade or exchange. With control over this type of material, with a high potential profit-margin, Mesoamerican influence may have been quite significant even at distances of several hundred kilometers.

In northeast Honduras, where virtually all obsidian had to be imported, the early inhabitants secured this exotic material at the same time as natives from Greater Nicoya and exploited identical sources in the south hundred of kilometers away. Without additional comparative data, and such a small data base, it is harder to reconstruct likely trade mechanisms or types of operational networks. However, overall, the implication from the northeast Honduras and southwest Nicaragua data is that obsidian exchange was widespread in the northern Intermediate Area and many different ethnic groups were concurrent recipients of obsidian from the same sources.

Questions also arise: How were such exchanges arranged or conducted? To what extent were native groups of the northern Intermediate Area integrated (if at all) among themselves? How did they interact with Mesoamerican groups, which likely controlled access to the Ixtepeque and Río Pixcaya sources, and possibly others? Unfortunately, the answer to all these questions is that we simply do not know. Without substantial expansion of the obsidian data base, through the addition of a significant number of sourced samples with dated contexts, it will remain difficult to do more than speculate about such prehistoric economic activity.

Ethnohistoric accounts reveal that some Greater Nicoya groups, like the Chorotega and Nicarao, were obvious immigrants from Mesoamerica, spoke Mesoamerican-derived languages, and practiced many Mesoamerican customs (Abel-Vidor 1981; Coe 1962; Fowler 1989; Healy 1980; Lothrop 1926). Similarly, the conquistador Hernando Cortés who conducted some of the first Spanish explorations in northeast Honduras, in 1524-1525 discovered Nahua-speaking groups there (Healy 1976:238-9). It is certainly evident from such ethnohistoric accounts that both regions (Greater Nicoya and northeast Honduras) had more than a passing interest in neighboring Mesoamerican groups.

Unfortunately, a response to the question of what kind of trade mechanism was operating is complicated not only by the limitations of the obsidian database, but also by considerable uncertainty about the precise form of socio-political organization of many native groups in the northern Intermediate Area. It is generally accepted that there was great political diversity, with native societies representing different levels of organization along a cultural evolutionary scale.

Cramer and Haas (1985) have focussed especially on tribes and chiefdoms of this area. They note that tribal societies typically are decentralized, and relatively independent economically, so that inter-regional, long-distance trade (to acquire obsidian, for example) would tend to be more limited than that for chiefdoms, which are more centralized and often import quantities of valuables and sumptuary goods from outside the local region. Knowing what type of socio-political system existed at different times in the prehistory of the northern Intermediate Area is, presently, a rather crucial missing piece of anthropological information.

Virtually all indicators are that the native societies of the northern Intermediate Area, including northeast Honduras and Greater Nicoya, were less centralized, economically, than their peers in, say, the adjacent Maya sub-area of Mesoamerica. Recent assessments of the ancient Maya suggest they functioned at the level of very highly evolved chiefdoms or, possibly, independent incipient states ruled by dynastic kings (Culbert 1991). Trade with less developed, or at least less centralized, economies of Intermediate

Area groups to the south may, therefore, have necessitated intermediaries[4].

CONCLUSION

Archaeology in much of the Intermediate Area is still in a formative stage of development. There remains an immense amount of information that we do not know about these early aboriginal groups and societies. As we search for clues to the myriad of transformations that occurred in the nature and organization of aboriginal cultural systems here before 1550 A.D, there are many factors worthy of closer examination. In our view, prehistoric exchange is one activity which likely played a central role in the relationships which prevailed among early Intermediate Area polities and is, therefore, crucial to an understanding of the overall cultural evolution of these emergent societies.

This paper provides new information about ancient trade of but one object, obsidian. It has been possible to identify imported goods, ascertain their date of appearance, and determine their point of origin. Hopefully it will serve as a small contribution to what will be a lengthy investigative process of understanding long-distance exchange in the Intermediate Area. Much remains to be done.

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[4] Creamer (1992) has examined regional exchange in the Gulf of Nicoya, arguing that it is an important type of trade network which warrants more investigation.

TABLE 1. ***Sample Concordance***

LBL Art.#	Country	Dept	Site	Unit	Date (Period)	Provenience	NAA sam #	XRF sam #
TREN-1	Honduras	Colon	Rio Claro	Pit #3 (25-50cm)	Early Cocal	La Esperanza	2227-V	8144-Y
TREN-2	Honduras	Colon	Rio Claro	Pit #3 (25-50cm)	Early Cocal	La Esperanza		8144-Z
TREN-3	Honduras	Colon	Rio Claro	Pit #4 (25-50cm)	Early Cocal	La Esperanza	2227-W	8144-1
TREN-9	Honduras	Colon	Selin Farm	Pit #2 (0-25cm)	Basic Selin	Güinope	2227-Z	8144-7
TREN-10	Honduras	Colon	Selin Farm	Pit #2	Basic Selin	Ixtepeque		8144-8
TREN-4	Nicaragua	Rivas	St.Isabel "A"	Pit #1 (150-175cm)	Middle Polychrome	Ixtepeque		8144-2
TREN-5	Nicaragua	Rivas	St.Isabel "A"	Pit #1 (150-175cm)	Middle Polychrome	Ixtepeque		8144-3
TREN-6	Nicaragua	Managua	Sn.Cristobal	Pit D (0-10cm)	Late Polychrome	La Esperanza		8144-4
TREN-7	Nicaragua	Managua	Sn.Cristobal	Pit D (0-10cm)	Late Polychrome	Ixtepeque	2227-X	8144-5
TREN-8	Nicaragua	Managua	Sn.Cristobal	Pit D (0-10cm)	Late Polychrome	Güinope	2227-Y	8144-6

TABLE 2a. ***Elemental abundances or abundance ratios by X-ray fluorescence analysis (XRF) of 4 obsidian artifacts assigned to the Ixtepeque source.***

Elements	TREN-4	TREN-5	TREN-7	TREN-10	Mean(4) and RMSD(4)	Ixtepeque source*
Ba(ppm)	1022	1097	1186**	1026		1030***
Zr(ppm)	191	183	224**	180		176
Rb/Zr	0.558	0.557	0.565	0.591	0.568±0.016	0.57±0.01
Sr/Zr	0.887	0.895	0.872	0.907	0.890±0.015	0.90±0.02

TABLE 2b. ***Elemental abundances or abundance ratios by XRF of 4 obsidian artifacts assigned to La Esperanza source***

Elements	TREN-1	TREN-2	TREN-3	TREN-6	Mean(4) and RMSD(4)	La Esperanza source*
Ba(ppm)	924**	798	788	930**		825***
Zr(ppm)	211**	176	173	210**		162
Rb/Zr	0.955	0.909	0.928	0.921	0.928±0.020	0.90±0.03
Sr/Zr	0.954	0.968	0.975	0.958	0.964±0.010	0.97±0.02

TABLE 2c. ***Elemental abundances or abundance ratios by XRF of 2 obsidian artifacts assigned to the Güinope source***

Elements	TREN-8	TREN-9	Mean(2) and RMSD(2)	Güinope source*
Ba(ppm)	1100	1064		1000***
Zr(ppm)	121	128		134
Rb/Zr	1.37	1.50	1.44±0.09	1.39±0.09
Sr/Zr	1.58	1.58	1.61±0.05	1.53±0.09

* Data for the Ixtepeque source are from Asaro et.al 1978 for all elements except Ba. That entry is from Stross et.al 1983. La Esperanza and Güinope source data are from Sheets et.al 1990.

** Thin samples, such as these, yield higher abundances than the true values with the XRF methodology employed, but these errors tend to cancel out when ratios of element abundances are taken.

*** Neutron activation analysis values.

TABLE 3. ***Elemental abundances* from neutron activation analysis of selected Nicaraguan and bonduran prismatic blades***

	TREN-7		Ixtepeque Source**		TREN-1		TREN-3		La Esperanza Source**		TREN-8		TREN-9		Güinope Source**	
	Abund.	Err.	Abund.	Err.	Abund.	Err.	Abund.	Err.	Abund.	Err.	Abund.	Err.	Abund.	Err.	Abund.	Err.
Ba	1048	26	1030	27	765	21	815	22	825	17	995	26	1022	27	1000	20
Ce	42.2	0.6	43.3	0.9	52.1	0.7	50.5	0.7	50.7	0.6	51.1	0.6	50.2	0.6	50.8	0.8
Co	1.01	0.06	1.05	0.08	0.76	0.06	0.71	0.06	0.86	0.04	0.57	0.05	0.49	0.05	0.59	0.05
Cs	2.72	0.09	2.71	0.17	4.59	0.12	4.54	0.12	4.52	0.05	8.10	0.16	8.03	0.17	7.88	0.10
Dy	2.43	0.10	2.30	0.11	2.24	0.09	2.24	0.09	2.36	0.07	2.47	0.10	2.74	0.06	2.52	0.10
Eu	0.547	0.008	0.541	0.013	0.492	0.008	0.498	0.009	0.501	0.006	0.494	0.008	0.506	0.008	0.504	0.008
Fe %	0.922	0.015	0.923	0.019	0.904	0.016	0.925	0.016	0.897	0.009	0.879	0.016	0.868	0.015	0.872	0.016
Hf	4.42	0.06	4.44	0.12	3.97	0.08	3.99	0.08	4.14	0.05	3.11	0.05	3.10	0.05	3.28	0.06
K(%)	3.94	0.25	3.61	0.26	4.33	0.27	3.75	0.26	3.75	0.17	3.95	0.25	3.78	0.25	4.09	0.25
La	23.3	0.6	23.5	0.9	28.5	0.7	28.6	0.7	28.9	0.4	28.2	0.7	28.5	0.7	28.3	0.6
Mn	453	9	449	9	429	9	428	9	427	9	518	10	525	10	519	10
Na %	3.04	0.06	3.05	0.05	2.82	0.06	2.81	0.06	2.84	0.06	2.69	0.06	2.71	0.06	2.70	0.05
Rb	98	4	103	6	156	5	149	5	163	15	160	5	168	5	161	20
Sb	0.27	0.04	0.19	0.04	0.32	0.05	0.25	0.04	0.24	0.14	0.36	0.05	0.41	0.05	0.48	0.07
Sc	2.09	0.02	2.11	0.05	2.58	0.03	2.56	0.03	2.54	0.03	2.11	0.02	2.12	0.02	2.13	0.02
Sm	2.59	0.03	2.65	0.03	2.99	0.03	2.96	0.03	3.02	0.03	2.95	0.03	2.99	0.03	2.98	0.03
Ta	0.759	0.008	0.76	0.02	0.960	0.010	0.944	0.009	0.959	0.01	0.880	0.009	0.891	0.009	0.894	0.009
Th	7.04	0.07	7.17	0.10	11.68	0.12	11.76	0.12	11.7	0.1	12.10	0.12	12.12	0.12	12.06	0.13
U	2.22	0.02	2.30	0.05	3.40	0.03	3.36	0.03	3.53	0.04	3.83	0.04	3.93	0.04	3.93	0.04
Yb***	1.894	0.027	1.91	0.04	1.593	0.027	1.562	0.028	1.62	0.03	1.78	0.027	1.83	0.03	1.82	0.03
A.D #	1.3%				2.1 %		2.1 %				1.4 %		1.3 %			

* Abundances and errors are in ppm except when otherwise indicated. Errors are usually the estimated uncertainties in counting gamma rays. Errors for the Ixtepeque reference group, however, are the root-mean-square-deviations for six measurements.

** Data for the Ixtepeque source are from Asaro et.al 1978 for all elements except Ba, which is from Stross et.al (1983). Data for the La Esperanza and Güinope sources are from Sheets et.al (1992).

*** Yb values are based on a recalibrated abundance (F.Asaro and H.R.Bowman, unpublished data) of 2.96±0.06 ppm in standard pottery, 5.7% higher than originally published (Perlman and Asaro 1969).

\# A.D. = Average deviation of artifact abundances from source values for 16 usually most-precisely-measured elements (excluding Co, Dy, K(%) and Sb.

TABLE 4 *Pattern of prismatic blade abundance*

Nic Lithic	Site	References	# Lithic artifacts	# Obsidian artifacts	# Prism. blades	# Prism.bld/ # Obsidians (%)	# Prism.bld/ # Lithics (%)	# Other.Obsid./ # Lithics (%)	# from Ixtepeque	# from La Espe-ranza	# from Güi-nope
	Nicaragua										
1		L1	17	14	0	0	0 (+11 -0)	82			
	Las Padillas	L2		320	1	0.3	<0.3 (+0.7 -0.3)				
	San Jacinto	W	538		13		2.4 (+0.9 -0.7)				
2		L1	274	177	11	6	4.0 (+1.6 -1.2)	61			
	San Cristóbal	This work			3				1	1	1
3		L1	107	19	4	21	3.7 (+2.9 -1.8)	14			
	Nindiri	S			6				3	0	3
	Santa Isabel "A"	This work	72	3	3	100	4.2 (+4.1 -2.3)	0	2		
4		L1	210	3	1	33	0.5 (+1.2 -0.4)	1			
	Costa Rica										
	Bay of Culebra	S			1				1	0	0
	Northeast Honduras										
	Río Claro	This Work			3				0	3	0
	Selin Farm	This Work			2				1	0	1

Nic.= Nicaraguan
# = Number
Pris.= Prismatic
S= Sheets et.al (1990).

L1= Table L1 (Lange et.al 1992).
L2= Page 54 (Lange et.al 1992).
W= Lydia Wyckoff (1976), mentioned on page 173 (Lange et.al 1992).