ENCOUNTER, EXCHANGE AND TECHNOLOGICAL INNOVATION IN THE TROPICAL LOWLANDS OF THE ORINOCO, VENEZUELA.

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ABSTRACT

In this paper I sketch the impact of foreign technologies and goods as they contributed to transformations in the indigenous societies of the Middle Orinoco, Venezuela. The analysis focuses on trade, the introduction of foreign manufactures and technologies, the professionalization of gathering and the commoditization of products, services and labor. Through insights derived from archaeological record and historical accounts, we discuss the way certain items may have contributed to native strategies aimed at increasing authority and status even while their acquisition perpetrated relations of dependency and domination.

KEYWORDS
Archaeology, colonial encounter, material culture, technological innovation, exchange, commoditization.

INTRODUCTION
In light of recent contributions to the examination of contact, colonialism and interaction in modern social theory, and the roles of material culture in colonial processes, this paper examines various lines of archaeological evidence that illustrate a long-term process of contact, exchange and technological innovation in the tropical lowlands of the Orinoco. Based on a regional archaeological framework (Scaramelli 1990, 2005; Scaramelli 2006), this paper centers attention on the analysis of stone implements and metal tools from different time periods (1500-1900). The distribution and variability of the evidence offer the opportunity to examine exchange relations and the forms and trajectory of certain technological transformations, associated in this case with the field of production, as these took place following the incorporation of metal items into native societies and cultures (1535-1900). The case under exa-

mination offers insights into the quandary facing societies when exposed to alien technologies and goods (Hill 1998; Whitehead 1988, 1994, 1996; Zucchi, et al. 1984). Examples provide elements for the interpretation of the ways material goods contribute to the channeling of social relations and to ways they become a force in social and cultural change (Dietler 1990; 1995; 1998; Sahlins 1992). Archaeological evidence derived from systematic surface collections and limited excavations at 15 archaeological sites, including colonial period missions, towns and native settlements, provides excellent indicators of a process involving the final stage of the utilization of stone axes previously employed for the felling of trees, the cutting of firewood, the making of houses and canoes, as well as in the use of other stone tools for grinding, cutting, dismembering, peeling, and shelling nuts. For some, this stage signals the initiation of a revolution of the axe characterized by the ready availability of metal tools (Metraux 1959). Initially, and depending on availability, the acquisition of metal items did not necessarily bring about any radical transformations of the native societies and productive practices including the production and use of stone tools. Through time, however, certain items, particularly machetes, knives, and firearms, became part of a larger process of technological substitution that served to endorse: 1) new forms of articulation between native and foreign economies, 2) new forms of status attainment involving the ability to purchase imported goods, through the sale of surplus *casabe* (flat manioc bread) or *manioco* (toasted manioc granules), or through the «professional gathering» of exportable items such as Tonka beans, resins, rubber, animal skins, and other forest products, the systematic exploitation of which was very much facilitated by the use of iron tools and weapons.

While some of the technological changes can be readily interpreted in techno/functional terms, such as the 'superior technology' of iron tools, and the greater 'efficiency' of machetes, axes, and firearms, the complexity and consequences of their incorporation go far beyond these fairly evident assumptions, and must be examined within different logics of social action as well as complex and reflexive consequences of multiple contradictory practices, played out by the different groups involved in the colonial situation (see Bamforth 1993). In the case at hand, I am particularly concerned with artifacts, tools and weapons; these allow us to scrutinize the ways local indigenous societies entered into larger relations of economic and political control, and the socio-cultural transformations they experienced through time. A focus on the transformations brought about in native material assemblages as well as on the manner of acquisition, distribution, and use of foreign technologies and goods among the native societies of the Middle Orinoco, provides the agenda for the interpretation of the consequences of contact, more particularly, the interplay of different industries, technologies and paraphernalia, the value structures in which these were exchanged, and the material supplies that serve as means for negotiation.

ANALYTICAL FRAMEWORK

The indigenous societies of the tropical lowlands of South America have been often considered as small-scale isolated cultures living at the fringes of civilization. When not seen as backward remnants of a distant past, indigenous cultures frequently have been depicted as fragile entities doomed to extinction (Meggers 1976). Understood from the vantage of 'sentimental pessimism' (see discursion in Carneiro da Cunha 1992; Sahlins 1992; Turner 1991), upon which the prediction of extinction was based, the past and present of these societies have been reduced to a chronicle of destruction and cultural loss. It has been frequently implied that the process of European expansion was simply the result of European cultural and technological superiority, often represented in the use of firearms and steel tools (as popularized by authors such as Jared Diamond (Diamond 1997). As a result, the impact of European conquest and colonization has often been reduced to a narrative of technological determinism, warfare, and mortality rates that has grossly oversimplified and obscured a long-term process of contact and adaptation and, occasionally, cultural enhancement. Unfortunately, early attempts to analyze situations of «contact», material exchange, and technological substitution, stressed the 'inevitability' of acculturation and the 'superiority' of the foreign. But the model was inherently Eurocentric and tended to over-emphasize the role of European standards as determining the trajectory of processes occurring in America. As a result, this model came to anticipate the inadequacies of subsequent academic approaches, as they concerned the «continuation» or «erosion» of «traditional native systems», and/or the uncritical application of teleological and evolutionist models of European expansion, which has made superfluous the question about the «nature and direction of historical processes» (Comaroff 1985/ :3).

Fortunately, in recent years there has been increasing awareness of the limitations of these unidirectional theories, as scholars have turned toward other more encompassing multidirectional approaches to investigate the nature and consequences of contact in different colonial contexts (Curbelo 1999; Funari 1996; Funari, et al. 1999; Kern 1994; Quiroga 1999; Sanoja 1998; Sanoja, et al. 1995; Sanoja and Vargas-Arenas 2002; Senatore 2003; Soares

1997), including material studies that explore the transfer/adoption/consumption of technologies, including multi-directional, rational-choice, and neo-Darwinian advances (Cusick 1998). The analysis of these aspects has varied considerably over time, as the old bias on the intrinsic superiority of Western goods and technologies has been re-evaluated through research programs designed to investigate native strategies of action in colonial situations of contact (Dietler 1990, 1995, 1998; Rogers 1990; Sahlins, 1988, 1992).

Interest in these broad issues led me to focus here on one fascinating aspect of the European expansion in the New World, as observed in the widespread incorporation of foreign goods and technologies in the tropical lowlands of the Orinoco, specifically the introduction of metal tools and weapons. Upon surveying the literature of this general process throughout the area, several questions come to mind with regard to the processes associated with the avidness with which European goods were demanded. A central interrogative has to do with the role of material culture in processes of contact and colonial encounters. These processes, manifested in the interchange of goods, foodstuffs, architectural knowledge, technology, religious ideas and manufactures, etc., can be documented in written, iconographic, and artifactual sources. In particular, archaeological studies of colonial situations have shown the potential to illuminate a wide variety of processes and transformations, especially in frontier regions and in the hinterlands where documentary sources are limited both in scope and in viewpoint (Schrire 1995; Trigger 1984; Wilmsen 1989).

In this paper I attempt to reconstruct a few artifact-technological trajectories following contact. Several questions guided this research: How can we account for and interpret the different transformations in native material assemblages through time? Moreover, what are the implications for the descendents of the indigenous populations involved, particularly in regard to productive practices? By framing the analysis in such a way, I seek to move away from previous ideas about the «Revolution of the Ax,» and to focus on the long-term consequences of contact in different time periods. In this study, archaeological remains and documentary sources constitute concrete evidence of significant technological transformation, characterized, in this case, by the commoditization of native material products, services and labor. This process provides an entry point for the analysis of distinctive contexts, patterns and trends in technology, a prolific field to derive appropriate explanations from the evidence concerning the early articulation of foreign and local societies on the colonial frontier (1680-1830) and their repercussions in the Republican, post-independence period (1830-1930.

ARCHAEOLOGICAL EVIDENCE AND MATERIAL PROCESSES

In an attempt to understand the historical intricacies of the aforementioned questions, I look at the interaction between indigenous peoples and colonizers as it unfolded in the mission setting. To this end I focus on the foundation and subsequent development of the colonial mission frontier along the Villacoa River (Bolívar State,Venezuela)—where the Jesuits founded the mission of Nuestra Señora de Los Angeles de Pararuma[1] in 1734—including the processes and transformations that took place in the area long after the collapse of Spanish intervention in the 19th century (following the War of Independence) (Vega 1974). These transformations are characterized by noteworthy changes in the landscape, in native settlement patterns, in the management and construction of space (domestic and ceremonial), in productive activities and material assemblages.

In addition to the changes that took place in native settlement patterns and site structure, initially derived from voluntary[2] or compulsory moves to the missions by the indigenous peoples and the clustering of settlements in their vicinities, the archaeological evidence provides a testimony of a long term process of contact, interaction and technological innovation.

1. According to the missionary accounts, the mission initially brought together 800 people, most of them Sáliva people. However, in the years to come the mission included people from several ethnic groups including Pareca (Carib), Mapoyo (Carib), Sáliva (Saliva), and Otomaco (unclassified), Yaruro (Guahibo-Pamigua), Guamo (unclassified), who were brought in from neighboring areas. With a total surface of 7 hectares, Pararuma occupied a relatively extensive area. The mission settlement was fairly dense and compact and may be best described as a village. Erosion has exposed more than 25 habitation floors which vary in construction elements, including adobe walls, stone bases, bahareque and nails but no bricks or tiles.

2. The location of the mission sites was determined by strategic decisions, but these areas were not necessarily appropriate for native agricultural practices. As a result, smaller satellite communities were established near the mission sites where the Indians could relocate during the weekdays in order to tend to their fields.

One first set of transformations that can be inferred from archaeological evidence points to the effects of contact on native productive activities. In the centuries that preceded the arrival of the colonists (Late Pre-Hispanic Period (1200-1530), the study area was occupied by intensive maize cultivators, exploiting the alluvial soils of the major rivers (Roosevelt 1980), and well-favored zones inland. A significant shift in production can be inferred, nonetheless, when we compare the artifact assemblages from pre- and post-contact sites. In the former, the numerous manos and metates, associated with the ceramics of the Camoruco Phase (600-1500 A.D), point to an emphasis on the production of maize (Roosevelt 1980), beans, and chili pepper (Perry, et al. 2007). These sites are also characterized by large quantities of ground and flaked stone artifacts, including polished axes, knifes, and polished stone beads, as well as many objects modified through use: bead polishers, nutting stones, hammer stones, etc. Sites are often located in the vicinity of lithic workshops and quarries in the hinterland, where fine-grained stone was sought out for the manufacture of cutting tools. On the rock outcrops of streams and rivers, but also in the hinterland, it is also common to find stones with multiple grooves, probably used to sharpen axes and other stone instruments. These honing stones are often associated with petroglyphs depicting elaborate zoomorphic, human and geometric images.

Very much in contrast, the economy of the early colonial period is characterized by a strong emphasis on manioc products, evidence for which can be found in the complete disappearance of grinding platforms (metates), and the presence of ceramic griddles (budares) and small stone flakes that may have formed part of graters used to prepare manioc. This process signals the arrival -and ephemeral presence- of agricultural groups characterized by a simplified Arauquinoid ceramics we have defined as San Isidro style. In San Isidro and Piedra Rajada, two of the satellite communities associated with the Jesuit mission of Nuestra Señora de Los Ángeles de Pararuma, the native material assemblage includes manioc griddles, cooking pots, drinking bowls, and huge chicha pots, as well as small, lithic micro-flakes. These were most likely used, among other things, for the production of manioc, and its conversion into portable, storable, non-perishable products with several uses in the Orinoco -as bread (*casabe*) or flour (*mañoco* or *farinha*), and as a drink either in the form of a soft drink (e.g. *yucuta*) or alcoholic beverage (e.g. *cashirí* or *yarake*). Although the production of manioc, as a primary cultigen, seems to be merely a part of a wider spectrum of production, the presence of numerous griddles both at Piedra Rajada, San Isidro, and even at the mission site of Pararuma, suggests that this root played a central role in the economy of the native societies during the colonial period.

Following the colonial intervention of the main waterways of the Orinoco, manioc continued to offer an inexhaustible source of carbohydrate for the inland populations, where it is abundant in different varieties. This plant grows in different kinds of soil, and does especially well on the relatively unfertile, acid soils of the study area. It requires very little maintenance, can be harvested as needed, while remaining for months underground, and, once transformed into flour or cakes, the product is easy to store and is resistant to insects and decomposition, even in the humid climate of the region. It was perhaps for these reasons that the cultivation of manioc became a profitable commodity among the natives, encouraged by the missionaries and other colonizers to guarantee their food supplies. With an emphasis on the production of manioc, the native populations established their settlements in the vicinity of the mission, and once there, they initiated extensive relationships with the colonizers. The exchange of native products and labor in return for foreign items and technologies soon came to characterize the economy of the missions[3]. In addition to the widespread incorporation of clothing, beads and other forms of body adornments, European ceramic plates and bowls, and alcoholic beverages (the incorporation of which into native social life have been discussed in detail in (Scaramelli and Tarble 2003) the indigenous groups of the area were quite open to technological innovations, particularly through the incorporation of iron tools and firearms into native productive techniques and practices. Although limited in number, the collection of metal items found at the archaeological sites of the study area includes a wide variety of hand wrought and industrial artifacts made out of iron, lead, silver, and copper. Iron nails, buckles, pins, caldrons, chain links, fishhooks, firearms, bullets, harpoons, and silverware were all found at the mission site of Pararuma, and in a lower proportion in the outlying sites. These items were useful for fishing, hunting, agriculture, and domestic activities. Almost 40% of the total number of metal items collected in the study was actually found at the mission site, and more particularly in the area interpreted as a blacksmith shop

3. On this matter Gilij comments: «It is not a cause for marvel, then, being so frequent this custom [barter] in the Orinoco that the Spaniards get used to this, also buying and selling in the manner they have found here. In this way canoes are bought, food and clothes are acquired, and houses are built… (….)…. He who hires rowers to navigate or hires someone to work in the fields, or for any other thing, establishes the number of axes, of yards [varas] of cloth, of mirrors, and of anything else the Indians request for their labor» (1965 II: 100).

located to the east of the residential area of this site. Here, small artifacts of iron, such as nails, fishhooks, harpoon points, etc. were made.

Archaeologically, the area defined as a blacksmith shop was easy to distinguish from other activity areas of the mission as an oval, circumscribed surface deposit of blackened soil, imbedded with iron artifacts, bars, slag, and detritus. Metal items forged at the site are most frequent in this area, but are also found throughout the mission. Although some items, such as cauldrons, firearms, and silverware, were probably imported into the area, most hunting and fishing devices were made in situ. Also, it appears that copper, lead, and silver objects were used, made, repaired, or modified on the site. The technology employed in the manufacture of most items is consistent with that available in a modest blacksmith shop, perhaps limited to a hammer and a few other tools. The smith made some iron artifacts from imported rods or bars, but the presence of slag also points to a local manufacture of iron. In general, items exhibit little stylistic variations in manufacture; most of them are square in section and show evidence of hammering on all sides. The smith was able to produce a large quantity of square section nails, harpoons, and spear points, and various other artifacts employed for hunting, fishing, horseback riding, and architecture[4].

In addition to their usefulness among the colonizers, some of these items became an important source of attraction for the local groups, as inferred from their presence in native satellite communities. Although surprisingly limited in number, knives, arrow points, harpoons, cauldrons, fish hooks, firearms and needles were incorporated into native hunting, fishing and domestic activities during the Early Colonial Period. The most frequent metal items were basically small knives, probably used in multiple activities, including ritual and/or cosmetic purposes. Although the evidence for this period does not offer much information about the use of machetes and axes (probably due to continuous recycling of metal items), these instruments were likely to be among the most important items incorporated by the local populations. According to the missionaries, the adoption of machetes and axes dramatically increased native efficiency in the exploitation of certain agricultural resources that, prior to contact, required a substantial investment of time. Eventually, but not rapidly, this process brought to an end the use of stone axes and fire previously employed for the felling of trees. According to Gumilla (1944), for example, knives and machetes facilitated cutting firewood, felling trees, making houses and canoes, hunting, fishing, and warfare. In the short run, the acquisition of these items involved the engagement of the natives in a sort of «professionalization of gathering» or commodity agriculture, in which certain individuals dedicated themselves to the production of a surplus of cultivated and forest products that were easily exploited and given in exchange to the missionaries as part of profitable transactions.

As we shall see below, the desire for the acquisition of certain foreign items, which started in the form of barter, brought the indigenous societies of the Orinoco into an economic system with no precedents in the region. Initially, the demand for manioc, sugar cane, and other forest products in return for foreign manufactures already incorporated into native structures of consumption, led to the progressive involvement of the native population with the colonizers. But the conversion of value implied in the selling of labor seems to have paved the way to a more durable restructuring of native social and productive relations, hand in hand with a privatization of property that had not existed prior to Jesuit intervention. In both cases, the value of certain products could be further invested toward the acquisition of other desired items, a process ultimately conducive to the articulation of different economies through the exchange of certain cultivated products, such as manioc, sugar cane, and turtle oil, which were in high demand for the economy of the mission.

A factor of importance in this process of exchange is of course the growing dependence on certain imported goods that indigenous groups had incorporated and that became «indispensable» with time; among these were glass beads, iron utensils such as axes, knives, and machetes, liquor, and firearms. The desire created by these goods may have resulted in an increase in activities dedicated to the production of surplus, whose value could be reinvested in the acquisition of even more goods. In particular, this process may have eventually contributed to an increase in the production of certain cultivated and gathered products and to their commoditization (ie. Manioc and turtle oil).

In the analysis of these transformations, however, there is no need to overstress native dependency on the missionaries for the acquisition of foreign items. Evidence for the incorporation of imported goods is not abundant at the indigenous settlements during the Early Colonial period, and a large percentage of the imported items is not of Spa-

4. Iron nails, in particular, are almost exclusive to the mission, being completely absent in native satellite communities. Most iron nails were bent following use on hard solid woods or due to post-depositional deformation due to recurrent grass fires. Some others were probably used for shoeing horses, which required short headed nails. Other nail types were probably reused for the manufacture of spear points.

nish provenience, suggesting that many supplies were obtained through contraband with non-Spanish traders. Salt-glazed jugs, Delft and Faience earthenwares, square section gin bottles and Dutch beads are among the most frequent items incorporated by the local populations during the Early Colonial Period. This evidence tends to give support to the documentary sources that abound with complaints about the lack of supplies and payment to the Orinoco missions, and with accusations of contraband against the missionaries (Rey Fajardo 1966, 1974; Vega 1974).

On the other hand, even though missionary accounts make references to plantations (*sementeras*), in the Middle Orinoco, this system never entirely adopted the characteristics of a «plantation economy», with a full-time dedication to the sale of labor or the production of a surplus for exchange (see Schwartz 1978). Although trade provided a stimulus to increased production, this motivation seems to have found many obstacles in the Orinoco. While the missionaries recognized the amount of time saved by the incorporation of machetes and axes, they also observed that indigenous men were not ready to do any supplementary work beyond what was necessary to their basic needs or perceived desires. Even though many activities were highly facilitated by the incorporation of iron tools, missionary chronicles are replete with accounts about the «laziness» of men.

Indeed, despite the attraction of the imported items, native goods, technologies, and practices continued to dominate in all spheres of indigenous social life. In addition to the almost exclusive use of local construction materials in the missions, indigenous women overwhelmingly controlled culinary practices, using pottery and basketry to transport, prepare and store foodstuffs. Artifacts such as ceramic griddles (budares), used to bake manioc cakes, and micro-flakes, used in the manufacture of graters, support the inference for the processing of these products following native technologies and culinary traditions. Other artifacts such as spindle whorls indicate the widespread use of locally produced cotton goods, despite missionary attempts to impose foreign cloth and dress items. Most metal objects recovered at the mission and indigenous satellite communities had technological antecedents in native artifacts, many of which continued to be used during the colonial period, as observed in the continued use of stone to craft arrow points, scrapers, graters, axes, and spear throwers (Gil 2003). Most of the imported items were substitutes for some previous forms of native material culture. The same happened with the use of slow-burning and hollowing techniques in the construction of canoes (*curiaras*), which is still the method for building watercraft in the area. Among other things, the incorporation of iron tools did not bring to an immediate end the native lithic industry in the Orinoco; the use of knifes, machetes and guns actually required a new set of stone artifacts, including knife sharpeners, and gunflints made from local materials. Moreover, most artifacts and technical innovations incorporated by the indigenous societies were selected, modified and used following native purposes (an aspect that has been observed in other contact situations (Sahlins 1992:15).

At the same time, the conversion of foreign materials into traditional products includes fragments of glass bottles transformed into scrapers and points. A small number of glass bottle fragments were flaked following breakage to be used as scrapers, or were shaped into flakes to be used as cutting devices. Imported ceramics were shaped into disks, to be use as game pieces, spindle whorls and/or armband decorations; broken machete blades were transformed into arrowheads, spear points and other items used in traditional hunting and fishing practices; and European coins were drilled and worn as pendants. Moreover, the whole exchange system became 'indigenized' (Sahlins 1992:16) through the widespread use of *quiripa*, an indigenous adornment/currency in the form of strands of fresh-water shell beads that came to dominate all monetary transactions between Europeans and the natives during the Early Colonial Period (Gassón 2000; Morey and Morey 1975).The manufacture of *quiripa* in our study area can be inferred from the presence of grooved stones and sherd 'polishers' found particularly at the San Isidro site (Gil 2003; Tarble and Scaramelli 2004). Furthermore, the introduction of new technologies on the part of colonial agents, such as the iron forge, the wheel, and the loom were ephemeral and disappeared abruptly, with the expulsion of the missionaries in 1767. Although certain cultigens such as the banana and sugar cane, as well as some domestic animals such as chickens and pigs were readily adopted, neither the horse nor bovine livestock were incorporated into native productive systems among the indigenous groups of the area.

A closer examination of the field of production actually provides additional evidence that allows us to infer the vulnerability of the colonial project in the Orinoco. The archaeological record offers concrete evidence for native control of certain spheres of culture in the mission context (Tarble and Scaramelli 2004). Despite the significant changes in the production of primary cultigens, the missionaries depended on the natives for most of their subsistence, technology and labor source. The initial phase of settlement at the missions was particularly vulnerable to severe scarcity when the Indians refused to plant or when they pretended to be clearing the fields, but surreptitiously were planning to run away from the missions. Although the missionaries imported domestic animals, these were not sufficient to provide animal protein to the population of the missions during the first years of settlement. Therefore, the whole mission depended on traditional hunting and fishing practices as can be inferred in the pre-

sence of arrowpoints, spearpoints, harpoons, and fishhooks. Although the friars claimed to be teaching agricultural practices to the natives, archaeological and historical evidence unequivocally points to a persistence of native agriculture with a predominance of local cultivars such as maize, manioc, tobacco, beans and cotton. The Europeans introduced some exotic commercial crops, such as sugar cane, indigo, and coffee, but these imports were limited by colonial legal restrictions and transportation difficulties. Therefore, the missionaries had to rely on the indigenous expertise of the terrain, the local resources, and the appropriate productive modes to exploit them giving the natives considerable advantage over the missionaries.

It is difficult to ascertain, then, the extent to which the physical presence of the missionaries and their support crowd of servants, slaves, soldiers, animals, cultivars, and material properties, were capable of producing immediate effects in native economies and societies. In the context of the mission, however, initial native engagement with the missionaries was conducive toward unprecedented forms of communities (native settlement pattern was altered by the desire for trade goods) and economic activities (a counter-flow of native products and imported goods). This restructuring of social and productive relations, induced by the Jesuits since 1731-32, had a sort of epitomizing effect in native culture history, in the sense that it promoted certain forms of indigenous interaction with the outside world that continued well beyond the War of the Independence (1810-1830), when indigenous communities were pushed into less productive areas due to the expansion of cattle ranching in the Orinoco. This process has contributed to the restriction of game, fish and other food sources exploited previously by the indigenous populations, especially those who have attempted to remain in the savannah regions, who, nonetheless, have maintained a high degree of autonomy in their traditional subsistence activities (Greaves 1991). Efforts to understand the nature and consequences of the incorporation of foreign goods invite us to pay more attention to the various ways native productive technologies may have actually shaped the course of the interaction between the parties -even while experiencing severe changes.

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