

The roots of the Columbian Exchange: an entanglement and network approach to early Caribbean encounter transactions

Floris W. M. Keehnen^a and Angus A. A. Mol^b

^aFaculty of Archaeology, Leiden University, Leiden, The Netherlands; ^bLeiden University Centre for Digital Humanities, Leiden, The Netherlands

ABSTRACT

The colonization of the Caribbean initiated a process of entanglement of people, goods, and ideas between the “New” and “Old World,” which is popularly referred to as the Columbian Exchange. This paper seeks to highlight the multiscalar and material underpinnings of this process of global importance by tracing it to its roots: the earliest encounters between the indigenous peoples of the Caribbean and European colonists. We present a database, based on key Spanish historical sources, which catalogs all references to the transaction of objects between Amerindians and Europeans from AD 1492–1497. We furthermore argue for the need of a framework that is able to connect, explore, and track the structural materiality of things in encounter events. For this we suggest a combination of entanglement theory with network and substantive analyses. This multiscalar theoretical and methodological framework shows how a diverse and contextually specific network of humans and things arose in tandem with European and Amerindian attempts to establish, manipulate, and contest ties of significant personal and historical interest.

ARTICLE HISTORY

Received 8 August 2019;
Accepted 26 May 2020

KEYWORDS

Early colonial encounters;
ethnohistory; Caribbean;
materiality; networks

Introduction

Over the last decade, the study of early colonial encounters in the Caribbean and beyond has kept in step with the wider implications of “new materialism” thought. While this has resulted in a better understanding of the material underpinnings of specific encounter events, places, and objects, there is still much ground to be gained by moving from a unitary to a (socio)material relational approach (Hodder 2012; Knappett 2011). The challenge here lies in connecting the entanglements of encounter at the smallest level—that of individual humans and things—to that of larger scales (i.e., the global(izing) colonial networks with which they were dependent). In the Caribbean, the archaeology of the encounter is already making advances (Cooper et al. 2016; Hofman and Keehnen 2019; Hofman et al. 2014; Valcárcel Rojas 2016), but there is a paucity of ethnohistorical studies, which provide much needed comparisons.

CONTACT Floris W. M. Keehnen  floriskeehnen@hotmail.com; f.w.m.keehnen@arch.leidenuniv.nl  Faculty of Archaeology, Leiden University, Van Steenis Building, Einsteinweg 2, 2333 CC Leiden, The Netherlands.

© 2020 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group
This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives License (<http://creativecommons.org/licenses/by-nc-nd/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited, and is not altered, transformed, or built upon in any way.

What has been missing thus far are the regional databases as well as theoretical and methodological innovations that allow for an exploration of the encounter that tacks between micro and macro scales. Furthermore, while there is a centuries-long tradition of scholarship that discusses historical results of interactions and relations between human agents during the Caribbean encounter (e.g., Irving 1828; Keegan 2015; Las Casas 1875–1876; MacNutt 1912; Morison 1942; Navarrete 1825–1837; Wilson 1990), there is a comparative dearth of comprehensive treatments discussing the encounter of things and the material relations in which they were embedded.

To this end, this paper presents a study of the complex and transformative material network that emerged through early interactions between the indigenous peoples of the Caribbean and the Spanish.¹ This is supported by a database listing individual objects transacted during early colonial encounter events, based on their description in Spanish primary sources. The entries in this database are complemented by a deep substantive reading and detailed treatment of the social and cultural dynamics of individual events. We furthermore leverage network analysis as an interpretative tool to explore and illustrate this microcosm of person-to-person and object-to-object interactions, how these developed through a series of interconnected encounters, and how these dynamics lie at the roots of the sociomaterial colonial network.

A material encounter

The new material networks that were forged in the early colonial Caribbean built upon millennia of cultural change in the hitherto mutually unconnected parts of the Atlantic Ocean. Yet even before these intercontinental networks were forged, these regions were already characterized by interwoven regional and interregional networks of things. After the first settlement in the fifth millennium BC, the Caribbean archipelago gradually evolved into a “continent divided by water” (Torres and Rodríguez Ramos 2008), where the Caribbean Sea was used as a highway stimulating the mobility and exchange of people, goods, and ideas through multiscale and dynamic interaction networks (Callaghan 2013; Hofman et al. 2007, 2008; Hofman, Bright, and Rodríguez Ramos 2010; Hofman and Hoogland 2011; Keegan and Hofman 2017; Mol 2014). Such Caribbean exchange practices are frequently understood in the context of gift economies, in which the highest values are attributed to the relationship between the exchange partners (Mauss 1925; Mol 2007; Oliver 2009). This practice, in which familiar and exotic goods alike became entangled with communal and personal identities, status, and alliances, is also what served as a template for the first encounters between indigenous Caribbean people and Europeans.

In Iberian society, trade fulfilled an essentially market economic role. Long-term connections between Europe, Africa, and Asia strengthened over time as cultural, political, and religious boundaries were crossed for knowledge and gain. Trade extended over increasingly larger distances, resulting in Iberian trade relations along the western coast of Africa. The conquest of the Canaries and the Azores in the fourteenth and fifteenth centuries initiated the European expansionist endeavor into the Atlantic, prefiguring much of the colonial processes that would subsequently unfold in the Caribbean and the Americas at large (Fernández-Armesto 1987; Phillips and Phillips 2011). Yet here too, we see that, alongside the economic and political aims of the first colonial

expeditions, diplomacy and simple curiosity also shaped the social and material dynamics, frequently in the form of gift giving.

The first encounter took place on 12 October 1492 when the indigenous peoples of the Bahamas and a Spanish expedition led by Christopher Columbus first met on the beach of Guanahani. This and subsequent interactions were the start of an emerging entanglement of the “New” and “Old World.” Eventually, these initial encounters culminated in what has been termed the Columbian Exchange (Crosby 1972), the cross-continental spread of people, technologies, and goods on an unprecedented scale. The materialities of these transatlantic transactions are global in scale and enduring. Yet, as we seek to highlight, they started on a much smaller scale.

Here, we look in detail at cross-connections between transactions of objects described for the Bahamas and Greater Antilles from the first encounter in 1492 to 1497. The transactions took place in a variety of social and political contexts, running from reciprocal and informal to deeply stratified and ceremonial. However, this paper does not focus on reconstructing social networks; rather we take the social setting as a backdrop for the emergence of entanglements. The encounter events and the objects transacted therein will be compared between two periods: October 1492–August 1493 and November 1493–June 1497. These time slices reflect very different stages of the encounter. The first period corresponds with Columbus’s First Voyage, when interactions were exploratory and directed toward trade, whereas the subsequent period marked the start of permanent European colonization and shifting power relations (Deagan and Cruxent 2002a; Wilson 1990).

Characterizations of the role of material culture in these encounters have long been influenced negatively by persistent Grand Narratives of colonization (Rodríguez-Alegría 2008; Voss 2015). Meanwhile, scholars have debunked many of these myths, including those on a presumed Amerindian lack of a (Western) concept of exchange value and the inevitable replacement of indigenous tools and technologies for more advanced European alternatives (e.g., Rodríguez-Alegría, Scaramelli, and Navas Méndez 2015). Building upon the work of other Caribbean historians, ethnographers, and archaeologists that foregrounded the materiality of the encounter (Crosby 1972; Hofman and Keehnen 2019; Hofman et al. 2014; Mann 2011; Oliver 2009; Ortiz 1995; Ostapkowicz 2018; Valcárcel Rojas, Samson, and Hoogland 2013), one of the aims here is to further our understanding of these entanglements. In particular, this study proposes an entanglement and network approach as a way to construct better informed micro to macro histories in early colonial settings (Hodder and Mol 2016). This moves beyond a tradition of scholarship that mostly utilized ethnohistorical accounts to reconstruct pre-colonial social systems and contextualize archaeological finds.

Beyond the Caribbean, many recent studies have laid bare the processual, entangled, and transformative nature of encounters between European and indigenous peoples, specifically stressing negotiation, creativity, and innovation as key elements in colonial engagements (Dietler 2010; Funari and Senatore 2015; Given 2004; Graeber 2001; Lightfoot 1995; Loren 2008; Murray 2004; Oland, Hart, and Frink 2012; Silliman 2005; Stein 2005; Voss and Casella 2012). These insights have also had repercussions for how material culture in processes of colonialism is understood (Cornell and Fahlander 2007; Cusick 1998; Gosden 2004; Lightfoot, Martinez, and Schiff 1998; Lyons and

Papadopoulos 2002; Maran and Stockhammer 2012; Rogers 1990; Rubertone 2000; Silliman 2010; Thomas 1991; Van Dommelen 2006). These works show the central importance of things in early colonial settings for the negotiation of social and cultural boundaries, which in turn led to the transformation of identities, practices, and indeed material culture repertoires of all groups involved. This study bases itself on this idea that things and humans are part of mutually constitutive networks as well as the understanding that material culture circulating in the early encounter is part of a larger power dynamic between, what came to be, colonizer and colonized. The resulting entanglements are therefore part of a process in which multiple actors involved in the encounter—including contemporary readers of the sources discussing these encounters—“read into” the material culture of the other and come to (re-)construct culture through the other (see Boruchoff, Hock, and Mackenthun 2012; Hodder 1986). In the Caribbean, studies propagating these ideas also include contributions on indigenous-European material interactions in localities that border the Caribbean Sea (Boomert 2002; Deagan 2003; Gassón 2000; Hofman and Keehnen 2019; Hofman et al. 2014; Keehnen 2012; Mol 2008; Oliver 2009; Ostapkowicz 2018; Pugh 2009; Scaramelli and Tarble de Scaramelli 2005; Valcárcel Rojas 2016).

This paper contributes to this existing body of research on the material nature of encounters, by exploring the creation of the first Amerindian and European sociomaterial networks. In doing so, we build on a long anthropological tradition of studies on exchange, particularly post-Maussian studies of the gift (e.g., Graeber 2001; Malinowski 1922; Mauss 1925; Meskell 2004; Strathern 1988). In addition, this discussion on the connective and relational properties of material culture falls in line with current ideas on networks and materiality in archaeology (Cornell and Fahlander 2007; Knappett 2011; Malafouris 2013; Watts 2013). More specifically, we take on board the concept of “entanglement” as it has been developed for encounter situations by Thomas (1991) and applied more recently and generally by Hodder (2012). The early Caribbean encounter provides an excellent example of this process of entanglement: indigenous communities and Spanish explorers and colonists tried to establish a mutual base of understanding, which was for a great part negotiated through the exchange, offering, and demands for each other’s things. The Spanish relied on a set of trade goods previously proven successful in exchanges with indigenous peoples of West Africa (c.f., Graeber 1996). In addition, indigenous Caribbean cultures employed an array of exchange valuables and especially valued lustrous objects (Berman 2011; Keehnen 2012; Oliver 2000; Saunders 1999).

We approach the idea of entangled encounter through three main questions: (1) which things figured most prominently in Amerindian-Spanish interactions; (2) in what configurations with other things did these occur; and, (3) how did the connections of certain things with others change through time? These are all effectively questions of interconnectivity (of materials), the mapping and analyzing of which is at the core of network science (Brandes et al. 2013). We therefore suggest that network analyses can be profitably used to explore the main three questions, using: (1) status and betweenness centrality analysis (Borgatti, Everett, and Johnson 2013, 163–180; Hennig et al. 2012, 123–129); (2) measures of network distance and clustering (Borgatti, Everett, and Johnson 2013, 181–205; Hennig et al. 2012, 130–133); and (3) diachronic tracking of changes in (ego-)networks (Borgatti, Everett, and Johnson 2013, 262–282; Hennig et al. 2012, 55–56, 109). These network

explorative measures will be juxtaposed with a substantive analysis of the culture-historical context in which these transactions took place. This network analytic and substantive approach forms the basis for a framework that speaks to the multiscale nature of the encounter.

The first section of the paper introduces the database collection process as well as the network approach. The second part presents the object type network model based on the database entries. The final part takes a closer look at diachronic changes in the importance of three object types: beads, food, and belts. These are among the most central things that featured in European, Amerindian, and high-status gift assemblages, respectively, as will be explained in more detail below.

Encounter transactions: From textual sources to entanglements

Over the last few decades Caribbean researchers have made significant advances in deconstructing the Eurocentric biases contained in early colonial documents (e.g., Churampi Ramírez 2007; Curet 2014; Hulme 1986; Keegan 2007, 2015; Keegan, Hofman, and Rodríguez Ramos 2013; Oliver 2009; Reid 2009; Whitehead 1995; Wilson 1990). However, since the focus of the database was to catalog the transfer of any material things across cultural boundaries, the result may be subject to a specific set of biases on the nature, purpose, and desirability of early colonial trade. To prevent this, as part of the construction of the database, transaction events have been cross-referenced with the descriptions of the same event by other primary authors where possible. The conclusion was that, even if sources do not always agree on the social incentives and diverge in their exact date or location, reports on the objects that were given or received are consistent. In other words, our contextual reading complements the exploration or modeling of these interactions as social networks, as such we feel the database can be used for the purpose of exploring the material interconnectivity of the encounter.

The database on which this study is built was compiled from the following historical documents: Columbus's *Diario* (Dunn and Kelley 1989) and other writings of his hand (Farina 1994; Parry and Keith 1984), Peter Martyr's *De Orbe Novo* (MacNutt 1912), and the accounts of Ferdinand Columbus (Keen 1992), Diego Álvarez Chanca (Farina and Zacher 1992), Andrés Bernaldez (Farina and Zacher 1992), Guillermo Coma (Morison 1963; Thacher 1903), Michele de Cuneo (Morison 1963), and Diego Méndez (Morison 1963). Also incorporated were a list of goods which the Spanish received in tribute between 10 March 1495 and 19 February 1496 (Alegría 1985; Torres de Mendoza 1868), as well as other official documents issued by or addressed to the Spanish Crown (Parry and Keith 1984).² While the main historical character in these sources is Christopher Columbus (and his crewmembers), the actors involved are as diverse as villagers, fishermen, and ship's boys to *hidalgos* (Spanish noblemen) and *caciques* (indigenous chiefs).

For the exploration and analysis of the connections between objects in the database we apply methods from Social Network Analysis (SNA). As such, most of these methods have originally been developed for the study of direct social interactions between persons or groups. Yet, network analyses can be and have been successfully applied to study the structural properties of a wide range of other types of networks (Brandes

et al. 2013; Newman 2010). Studies of (ethno)historical and archaeological or material culture networks are also among these (e.g., Brughmans 2013; Cody 1995; Collar et al. 2015; Gamper, Reschke, and Düring 2015; Knappett 2011, 2013; Mol 2014; Mol, Hoogland, and Hofman 2015; Padgett and Ansell 1993). For this study of objects recorded in ethnohistorical sources, the challenge in adopting SNA lies not in the application of its methods, but on the interpretive level: in the conceptualization of these networks as entanglements.

First, in order to create such networks, all ethnohistorical descriptions of Amerindian-European transaction events which fall within the scope of this study ($n = 153$) were coded and recorded in a database. The first part of the code is shared by all objects that are part of the same event, allowing them to be connected to each other. The second part of the code relates to an object's type. Each entry in the database ($n = 546$) represents a single object. In this text we consistently refer not to "objects" but to "object types," since we model the relations between kinds of objects (e.g., beads, bells, parrots) instead of individual objects.³ For each entry of an object type information such as its cultural affiliation, fabrication material, and other qualifying aspects were recorded. Additionally, for each event we included data such as date, location, and other contextual information. As an example of the above process, consider the following excerpt from Las Casas's transcription of the Diary of Columbus:

I gave red caps, and glass beads which they put on their chests, and many other things of small value, in which they took so much pleasure and became so much our friends that it was a marvel. Later they came swimming to the ships' launches where we were and brought us parrots and cotton thread in balls and javelins and many other things, and they traded them to us for other things which we gave them, such as small glass beads and bells – 12 October 1492, Guanahani, Bahamas (C. Columbus in Dunn and Kelley 1989, 65).

Figure 1 offers a visual clarification of the coding of this fragment, as well as an insight into the subsequent steps toward network representation. In assigning codes, a capital letter indicating the source (in this case the D of *Diario*) and a number sequencing the event (1, 2) were added to the object type mentioned (Figure 1, step 1).⁴ Thereafter, object and event (meta)data were recorded in the database (Figure 1, step 2).⁵ With *visone*, a network software tool for visualization and analyses, the matrix showing the connections between object types was visualized (Figure 1, steps 3 and 4).⁶ In this figure and below, an individual node represents a type of object that has been transacted during one or more encounter events. Two nodes or object types described to have been transacted during the same event are connected by a link or tie. For each such instance of co-presence a tie increases in strength, for which it attains a greater width.

The idea behind co-presence networks of object types is akin to assemblage-based approaches used in archaeological network reconstruction (e.g., Mills et al. 2013; Mol 2014, 131–171; Sindbaek 2007; Terrell 2010). Of course, as we have outlined above, the method of network creation from textual sources differs from the archaeological study of assemblages. Here, each transaction event can be seen as one "assemblage," which can have ties to other "assemblages" or encounter events. We do not argue that such material-based co-presence networks are directly comparable. However, both types of networks stress the connectivity between types of material culture as well as their

**Step 1:
Coding**

"I gave red caps [capsD1: event D1, caps], and glass beads [beadsD1] which they put on their chests, and many other things of small value [goodsD1], in which they took so much pleasure and became so much our friends that it was a marvel. Later [start of event D2] they came swimming to the ships' launches where we were and brought us parrots [parrotsD2] and cotton thread [cottonD2] in balls and javelins [javelinsD2] and many other things [goodsD2.1; event D2, goods #1], and they traded them to us for other things [goodsD2.2] which we gave them, such as small glass beads [beadsD2] and bells [bellsD2]."

**Step 2:
Database**

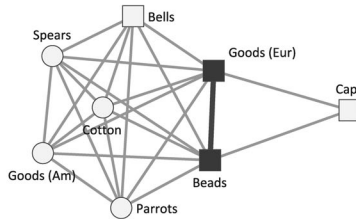
Event	Code	Type	Material	Sic	Cultural affiliation	Date	Location
D1	capsD1	caps	fabric	<i>bonetes colorados</i>	European	1492-10-12	San Salvador
D1	beadsD1	beads	glass	<i>cuentas de vidrio</i>	European	1492-10-12	San Salvador
D1	goodsD1	goods	unspecified	<i>otras cosas muchas de poco v.</i>	European	1492-10-12	San Salvador
D2	parrotsD2	parrots	living being	<i>papagayos</i>	Amerindian	1492-10-12	San Salvador
D2	cottonD2	cotton	cotton	<i>hilo de algodon en ovillos</i>	Amerindian	1492-10-12	San Salvador
D2	javelinsD2	spears	wood	<i>azagayas</i>	Amerindian	1492-10-12	San Salvador
D2	goodsD2.1	goods	unspecified	<i>otras cosas muchas</i>	Amerindian	1492-10-12	San Salvador
D2	goodsD2.2	goods	unspecified	<i>otras cosas</i>	European	1492-10-12	San Salvador
D2	beadsD2	beads	glass	<i>cuentezillas de vidrio</i>	European	1492-10-12	San Salvador
D2	bellsD2	bells	metal	<i>cascaveles</i>	European	1492-10-12	San Salvador

**Step 3:
Type-type matrix**

	Beads	Bells	Caps	Cotton	Goods (Am)	Goods (Eur)	Spears	Parrots
Beads			1	1	1	1	2	1
Bells	1		0	1	1	1	1	1
Caps	1	0		0	0	1	0	0
Cotton	1	1	0		1	1	1	1
Goods (Am)	1	1	0	1		1	1	1
Goods (Eur)	2	1	1	1	1		1	1
Spears	1	1	0	1	1	1		1
Parrots	1	1	0	1	1	1	1	

The values in the cells of the matrix reflect co-occurrence in the same transaction event, which means in this example:
 0: not transacted together
 1: transacted together once (D1 or D2)
 2: transacted together twice (D1 and D2)

**Step 4:
Network visualization**



Nodes in the network correspond to object types transacted during encounter events D1 and D2. Square nodes are object types transacted by Europeans. Circles are object types transacted by Amerindians. Ties indicate co-occurrence of object types in the same transaction event and correspond to the values in the matrix above. Light grey ties have strength 1. The dark grey tie has strength 2.

Figure 1. Schematic overview of the steps followed in the creation of object network representations from ethnohistorical documents.

embeddedness in social relations. In this study, the network that results from these co-presence ties is an abstraction of an encounter phenomenon in which objects from separate cultural backgrounds become entangled in emergent, cross-cultural networks (Figure 2).

A diverse network of things

Figure 2 represents an overview of early colonial Caribbean entanglements. The cohesiveness of the network is remarkable: only three types of objects are not connected to the big knot of nodes. In total, the network distinguishes four components or disconnected parts. Three of these components (tin, tobacco, and gloves) are gifts that in themselves represent a single complete transaction, meaning that they do not occur in any (other) constellation of things. The largest component contains all other types of objects. The diversity in this network of things is striking, featuring 110 types of objects, of which 42 are of European origin. This reflects a lower variation than the Amerindian assemblage (68), but is still higher than expected if the Spaniards would have only made use of a highly specific set of trade goods (see Brain 1975).

Using the network's "underlying" matrix (see Figure 1, step 3), we can explore network distance⁷ and clustering.⁸ The first measure reveals an average distance between nodes of only 2.1. This low average distance indicates that nodes can relatively easily "reach" each other. To be more concrete: an average distance of 2.1 means that any

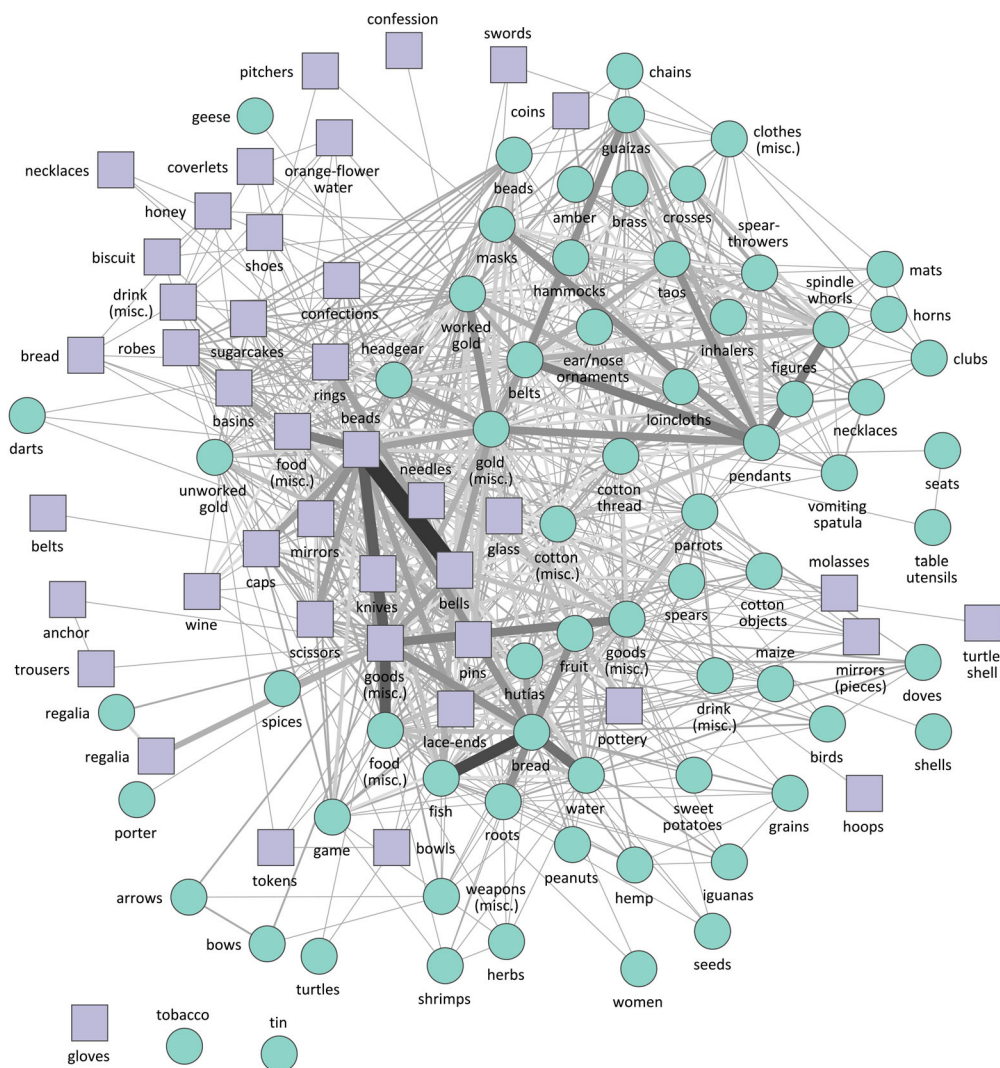


Figure 2. Network of object types transacted between Amerindians and Europeans in the period 1492–1497. In this and all subsequent network figures, circles represent Amerindian-affiliated objects and squares European ones. In addition, darker and wider ties are stronger than lighter, narrower ties. The network is laid out using visone’s stress minimization algorithm (Brandes and Mader 2012).

object type in the database is transacted together with other things, which, through other encounter events, connected them to the vast majority of all other object types. This, as well as the low number of unconnected nodes, means no circumscribed spheres of exchange existed either upon the encounter or arose directly after. In other words, from the perspective of the Spanish historical sources, this was an encounter in which a thing was freely transacted together with every other thing (Kopytoff 1986).

One of the other important things this hints at is the presence of a central set of things, which, given the relatively high coherence of the network, “enabled” the connections between most other object types. Together with other less frequently employed

Table 1. The top 20% most central nodes as measured by Katz's status centrality in the network of object types transacted between Amerindians (A) and Europeans (E) in the period 1492–1497 (Figure 2).

Rank	Object Type	Material	Status (%)
1	Beads (E)	Glass	5.46
2	Gold (A)	Metal	4.71
3	Bells (E)	Metal	4.63
4	Goods (E)	Various	3.78
5	Bread (A)	Organic	3.70
6	Belts (A)	Organic	3.23
7	Worked gold (A)	Metal	2.87
8	Pendants (A)	Various	2.80
9	Goods (A)	Various	2.60
10	Food (A)	Organic	2.21
11	Fish (A)	Organic	2.16
12	Cotton thread (A)	Organic	2.12
13	Food (E)	Organic	2.11
14	Cotton (A)	Organic	1.92
15	Pins (E)	Metal	1.85
16	Water (A)	Liquid	1.82
17	Headgear (A)	Various	1.76
18	Mirrors (E)	Glass	1.76
19	Masks (A)	Wood/shell/gold	1.75
20	Spindle whorls (A)	Wood/ceramic	1.70
21	Lace-ends (E)	Metal	1.69
22	Scissors (E)	Metal	1.66

object types, this core set of things created highly variable and flexible exchange assemblages. The core of the network consists of a set of 19 highly connected nodes, which have been transacted together with 18 other object types. The strength of the connecting ties (i.e., the number of times object types have been transacted together) varies from 1 for a majority (57%) of ties to 18, the tie between beads and bells.

In SNA, centrality is often expressed in terms of “power,” where a more central position in a network can be equated to a more powerful or influential position in a social group. Yet, this notion of social power cannot be easily equated to the position of object types in a material network. Instead, the position of a certain object type in these networks should be seen as an indication of its relative importance for transaction events. In other words, centrality can be seen as a measure of the materiality of an object type in its entanglements with other things (see Hodder and Mol 2016). Here we employ Katz's status centrality, which measures the position of a node by its total amount of ties and the amount of ties of its neighbors (Katz 1953).⁹ Rather than a “direct” measurement of the centrality of one node and its ties, such as degree (total number of ties from and to a node), status centrality quantifies the position of a node based on its own ties as well as that of the other nodes to which it is tied. This provides a view of not only its own materiality for the network, but also the impact of the assemblage to which an object is tied. Table 1 provides an overview of the object types representing the top 20% most central nodes as measured by Katz's status centrality.¹⁰

An inspection of the individual nodes in the network shows that sometimes more general object categories, which are not further specified in the sources, such as “food” and “clothes,” are mentioned alongside specific items that could be considered to belong to that category. For this reason it happens that alongside these nodes more precisely stated object types, such as “hutías” and “trousers” occur, even though technically these

could be considered to be part of the same, more general, category. Some nodes, most notably women and living animals are not material things – as we would understand it, at least. We included these only because they were specifically referred to as being part of a clearly identified transaction event that also involved material goods. Rather than dilute the picture, we believe this shows the sociomaterial dynamism of early colonial encounters.

Looking at the European object types on this list, it is clear that beads, bells, lace-ends, rings, knives, and the generic category of “goods” are heavily represented. Most of these items had been brought from Europe to the Caribbean specifically to be used in trade. More importantly, all of these things were able to tap into Amerindian systems of value, with the hardness, luminosity, and lustrousness typical of European glass and metal items being considered important material traits in precolonial societies and cultures as well (Keehnen 2012). Archaeological evidence of the circulation of, for example, polished wood, jadeitite, greenstone, and *guanín* (i.e., copper-alloy) objects is indicative of deep-time esthetics shared among the precolonial inhabitants of the Caribbean Sea (Boomert 1987; Hofman and Hoogland 2011; Hofman et al. 2008; Knippenberg 2006; Oliver 2000; Rodríguez Ramos 2011). The specific connotation of the European items can, however, only be connected to these earlier items tangentially.

Amerindian object types in the table fall into two categories: (1) possible high-status goods or elite valuables, and (2) food varieties. Belts, pendants, masks (*guaízas*), head-gear, and, to a lesser degree, unworked cotton and gold circulated in precolonial exchange networks (Boomert 1987; Keegan 2015; Laffoon et al. 2014; Mol 2007; Morsink 2012; Oliver 2009; Ostapkowicz 2013; Walker 1997). Foodstuffs likewise built on precolonial “networking” traditions, as evidenced by archaeological studies of their regional and interregional movement and distribution (Giovas et al. 2016; Laffoon et al. 2018; LeFebvre et al. 2019; Mickleburgh et al. 2019; Newsom and Wing 2004; Pagán-Jiménez, Rodríguez Ramos, and Hofman 2019). The Spanish readily received the Amerindian markers of status. The same applies to the Amerindian food items in the table, which were offered freely and in great numbers in early encounter events.

Shifts in entanglements: Contact versus colonization

The network discussed above is an amalgam of all transactions in the period 1492–1497. As such, it somewhat obscures the rapid sociocultural and political developments taking place in this short period of time: from early contact to colonial system. There is no clear point at which this transformation can be said to have begun or been completed, but, as discussed above, the different motives of the first Columbian voyage (1492–1493) versus the subsequent period of European settlement and incipient colonization (1493–1497) can be taken as a clear moment of divergence. In order to explore whether this shift in motives for cross-cultural interactions as well as power dynamics is reflected in material transactions as well, we will examine the ego-networks or direct networks of European beads, Amerindian foodstuffs, and Amerindian chiefly belts for these two periods. These items were among some of the most transacted types of objects during both periods (i.e., ranked in the top 20% of the overall network) (Figure 2; Table 1).

Ego-networks (Everett and Borgatti 2005; Freeman 1982) are networks consisting of one center node (ego) and its direct neighbors (or ego's alters). In SNA, they are employed to identify those actors that may have a high influence over personal networks. In the case of material networks, ego-networks can be used to chart the often complex set of interrelations that a thing can be part of, particularly when used in conjunction with contextual information (Hodder and Mol 2016; Mol, Hoogland, and Hofman 2015). Alters are generally ranked according to their betweenness centrality, which here relates to the relative importance of other object types in transactions in which an "object ego" is also featured.¹¹ For example, if an alter has a high betweenness in ego's network, this means it was often transacted together with ego and thus may have been part of a specific gift set or may otherwise have been deeply entangled with that type of object. Conversely, if there are few or no other "alter" nodes with a high betweenness in ego's network, this suggests that this particular object type was freely featured in a diverse set of social contexts and material interactions.

Ego-network 1: European beads

Some of them were wearing pieces of gold hanging from their noses, and they willingly gave it for a bell of the sort [put] on the foot of a sparrow hawk and for small glass beads – 22 October 1492, Bahamas (C. Columbus in Dunn and Kelley 1989, 109).

The beads described above were typically fabricated from blue or green-colored glass, although white and yellow, as well as stone and amber varieties are also mentioned in this very early phase of encounter. Beads were exchanged both loose and in strings of variable quantities. Like beads, also bells were often specifically shipped for trade purposes, and, as illustrated in the quote above, often co-featured in transactions with beads.¹² Their interrelation in early exchange encounters has been noted earlier by Jeffrey Brain (1975), who referred to beads and bells as key components of Spanish "gift kits."

The ego-network of beads transacted during Columbus's First Voyage explicitly shows this connection to bells (Figure 3). However, the network shows that food was often presented along with beads, even more so than bells. It furthermore illustrates that, even if the Spanish were seeking to trade beads for gold, in practice, the variation in types of goods traded by Amerindians was much greater. The most frequently transacted Amerindian object type were unspecified "goods." Second most central was, indeed, gold, but it is closely followed in importance by threads of cotton, parrots, and spears.¹³

What is more, alongside beads the Spanish transacted an even greater variety of items: clothes, pieces of glass and pottery, rings, and metal lace-ends. Similar to the indigenous counterparts, with this motley assortment of things the Spanish likely adapted their gift repertoire over time based on its local receptions and context of the event. Object types that were less frequently transacted alongside beads can be found on the fringes of the network in Figure 3. These were part of interactions between high-ranking persons or occasional encounters with individuals. It is noteworthy that beads had the flexibility to be part of these "special" and more personal encounter events as well.

In the period 1493–1497 a notably different picture emerges from the ties of beads to other types of objects (Figure 4). Bells, still, but also pins, occupy central positions as popular items transacted together with beads. If Figure 3 showed that the Spanish

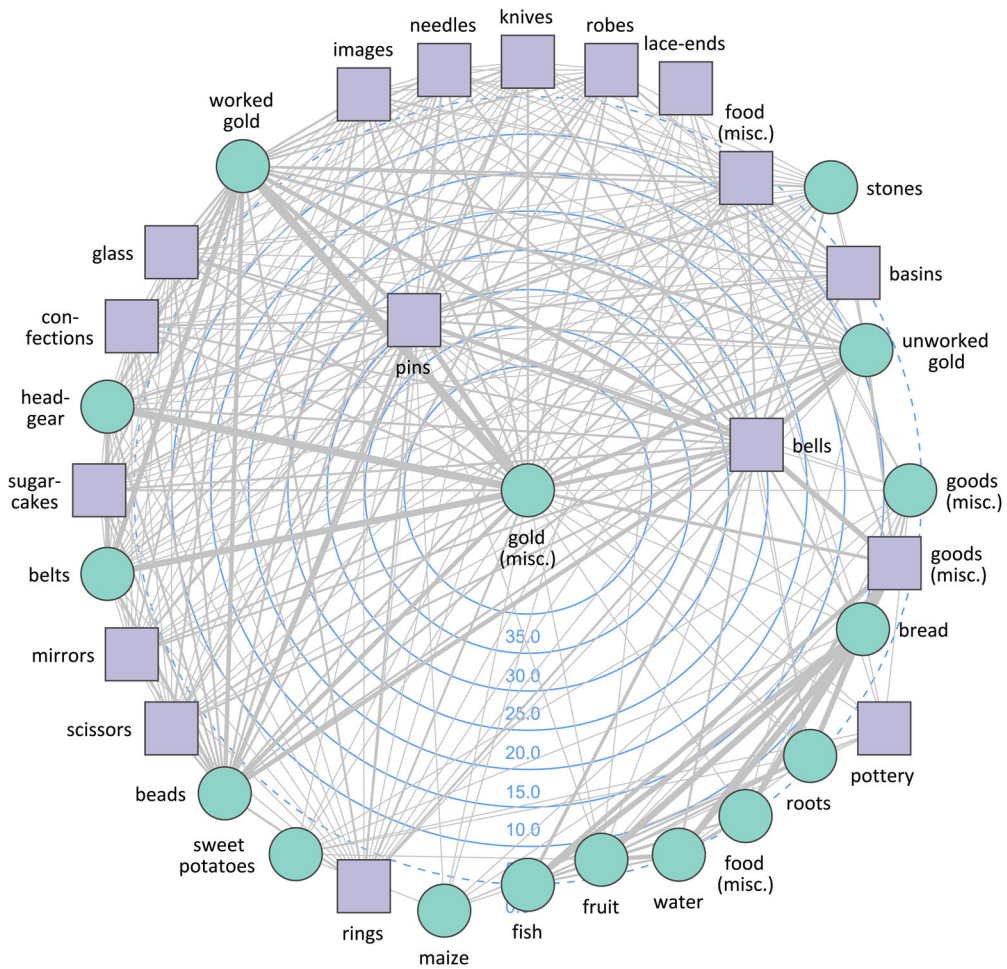


Figure 4. Ego-network of “European beads” for the period 1493–1497.

reunion upon Columbus’s return to Hispaniola in late 1493 was the start of a lively exchange of gifts meant to further solidify their uneasy alliance.

The remaining nodes of the network are noteworthy, because they consist principally of Amerindian food varieties such as bread (cassava), fish, fruit, and roots. This overrepresentation of foodstuffs is striking. With the success of the colonial venture hinging on their ability to send gold back to Seville, there is no other explanation than that the colonists were in more direct need of something else: food.

Ego-network 2: Amerindian food

The king had dinner on the caravel with the Admiral and afterward left with him to go ashore, where they did the Admiral much honor and gave him refreshments of two or three kinds of yams and shrimp and game and other foods that they had and some of their bread, which they call cassava – 18 December 1492, Hispaniola (C. Columbus in Dunn and Kelley 1989, 285).



Figure 5. Ego-network of “Amerindian food varieties” for the period 1492–1493.

As the ego-networks of beads indicated, foodstuffs played an important role in structuring Amerindian-Spanish interactions (see VanderVeen 2006). The variety of objects that featured in transactions together with Amerindian types of food attests to this idea (Figure 5).¹⁴ Figure 5 illustrates the various roles of food during the first Columbian voyage: (1) as small gifts part of the more common and haphazard transactions which included things such as beads, bells, “goods,” gold, and parrots (the inner circles of the ego-network), and (2) as part of elite interactions during feasts and dinners, where food preceded the exchange of more unique objects such as belts, herbs, and water used for washing hands (outer circles of the ego-network).

The opening quote from the *Diario* shows the inclusion of food in the more “formal” contacts between high-ranking figures. In descriptions of dinners with caciques, Columbus notes how the Amerindian leaders received, “tasted,” and distributed the food and beverages Columbus presented them. These chiefly manners were part of specific ritual protocols characteristic of indigenous welcoming ceremonies. Columbus’s

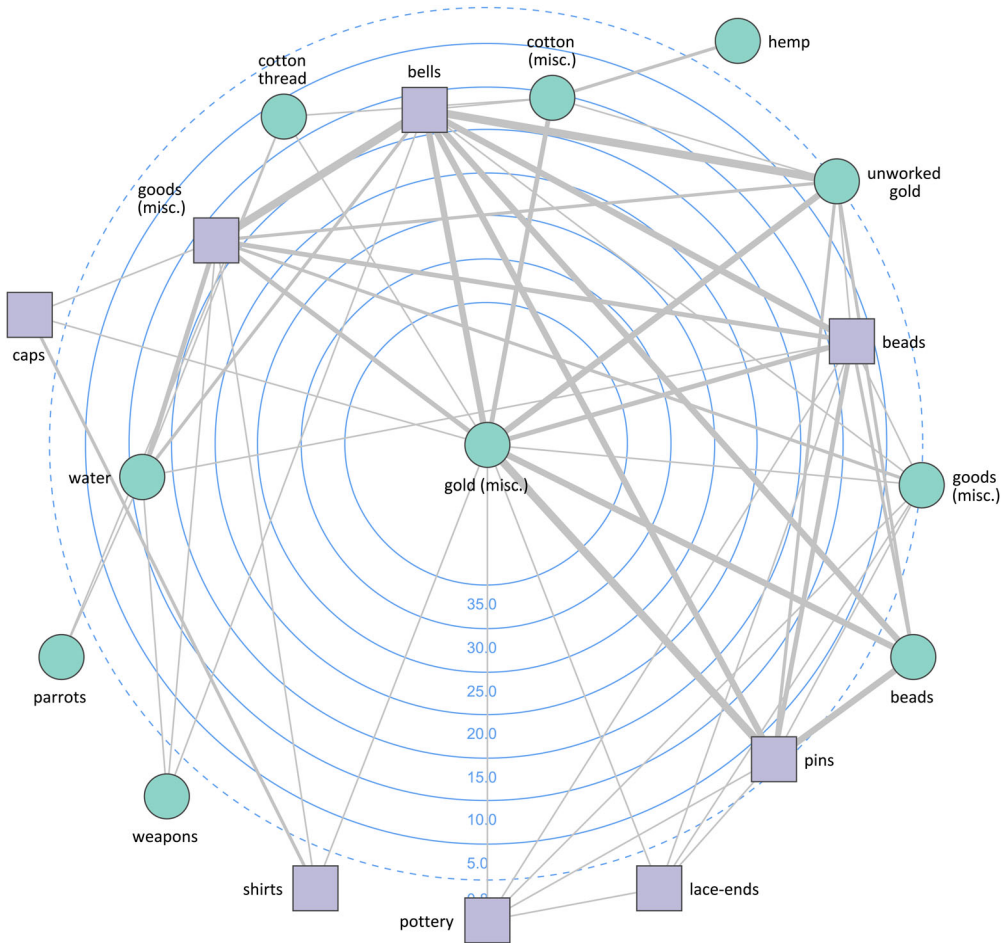


Figure 6. Ego-network of “Amerindian food varieties” for the period 1493–1497.

adherence to these etiquettes – food before gifts – facilitated the subsequent exchange of valuable gifts (Wilson 1990, 64–66). At the same time, in various situations Amerindians presented food and drink without any apparent expectation of the Spanish reciprocating. For this, precolonial traditions of intercommunal feasting and hospitality may serve as explanation.¹⁵

The types of objects transacted with Amerindian foodstuffs changed during the subsequent years (Figure 6).¹⁶ Gold is central to the 1493–1497 ego-network, while the relative importance of other types of objects is much smaller. In transactions with food, the Spanish most often returned “goods,” beads, and bells. Other things the Amerindians transacted along with food were mostly varieties of cotton.

The strong correlation between food, gold, and cotton is illustrative for the Spanish imposition of a tribute system, which obligated indigenous communities to provide these three different commodities. In principal, gold and food were what was asked for, yet cotton quickly became an alternative payment when it became clear these demands could not be met. The tribute system was installed after the Spanish had put down

several mass Amerindian uprisings. The constraining measures this entailed effectively lasted from 1495 to 1497. Caciques were occasionally able to negotiate tribute payments, as also the caciques of the Hispaniolan province of Xaraguá, Behechio and Anacaona, did. Peter Martyr describes how upon collecting the agreed amount of tribute, Bartholomew Columbus – who was left in charge of the island by his brother Christopher before returning to Spain – was hospitably received and treated to a feast:

Thirty-two caciques were assembled in the house of [Behechio] Anacauchoa, where they had brought their tribute. In addition to what had been agreed upon, they sought to win favor by adding numerous presents, which consisted of two kinds of bread, roots, grains, [h]utias, ... fish, ... and those same serpents, resembling crocodiles, which they esteem a most delicate food [i.e., iguanas] (MacNutt 1912, 123–124).

The substitution of food for gold tributes, speaks to the serious problem of food shortages in the first years of Spanish presence in the Americas, attested through research at the first Spanish town of La Isabela (Deagan and Cruxent 2002a, 2002b). Provisions were quickly depleted, while attempts to cultivate European crops in the tropical environment of the islands failed miserably. The Spaniards' initial desire to maintain their familiar diet was not feasible and doubts on the consumption of indigenous types of food – at first regarded as inferior or barbaric, tasteless, or even possibly dangerous for general health and condition (Earle 2012) – were soon abandoned. For example, Chanca, an Andalusian physician who joined Columbus on his second voyage, expresses this shift in Spanish tastes by describing indigenous yams as “a most nutritious food” (Farina and Zacher 1992, 53).

In short, the harsh reality of settling in an unfamiliar environment required the colonizers to lower their expectations of economic gain and shift their focus to the fulfillment of more basic needs for their survival. This is evidenced in the network in Figure 5, which shows strong ties between European trade goods such as beads and bells. If we look at the context of transactions, beads, bells, and other trade items have shifted in function from small gifts to “currency” used to buy indigenous types of food. In effect, this practice already hearkened back to the First Voyage, when Columbus gave instructions to exploration parties to take beads with them to pay for their food on the way (Dunn and Kelley 1989, 129). Instructions sent by Columbus in April 1494 to Mosen Pedro Margarite, commander of the fortress at Concepción in central Hispaniola, indicate that this practice soon became more common and that paying for food was to continue alongside the preferred but as of yet unenforceable tribute system (Farina 1994, 45).

Ego-network 3: Amerindian belts

After eating, an Indian squire brought a belt just like those of Castile in form, except that it is of different workmanship, which he took and gave to me, and two pieces of worked gold, which were very thin ... I saw that he was pleased with a coverlet that I had on my bed. I gave it to him and some very good amber beads that I wore on my neck, and some red shoes, and a flask of orange-flower water, with which he was so pleased that it was a marvel – 18 December 1492, Hispaniola (C. Columbus in Dunn and Kelley 1989, 243).

Laboriously crafted fabric belts and their stone counterparts are among the most enigmatic artifacts of indigenous Caribbean culture (Ostapkowicz 2013; Walker 1997). Woven cotton belts or *cintos* were ceremonial objects worn by caciques at important

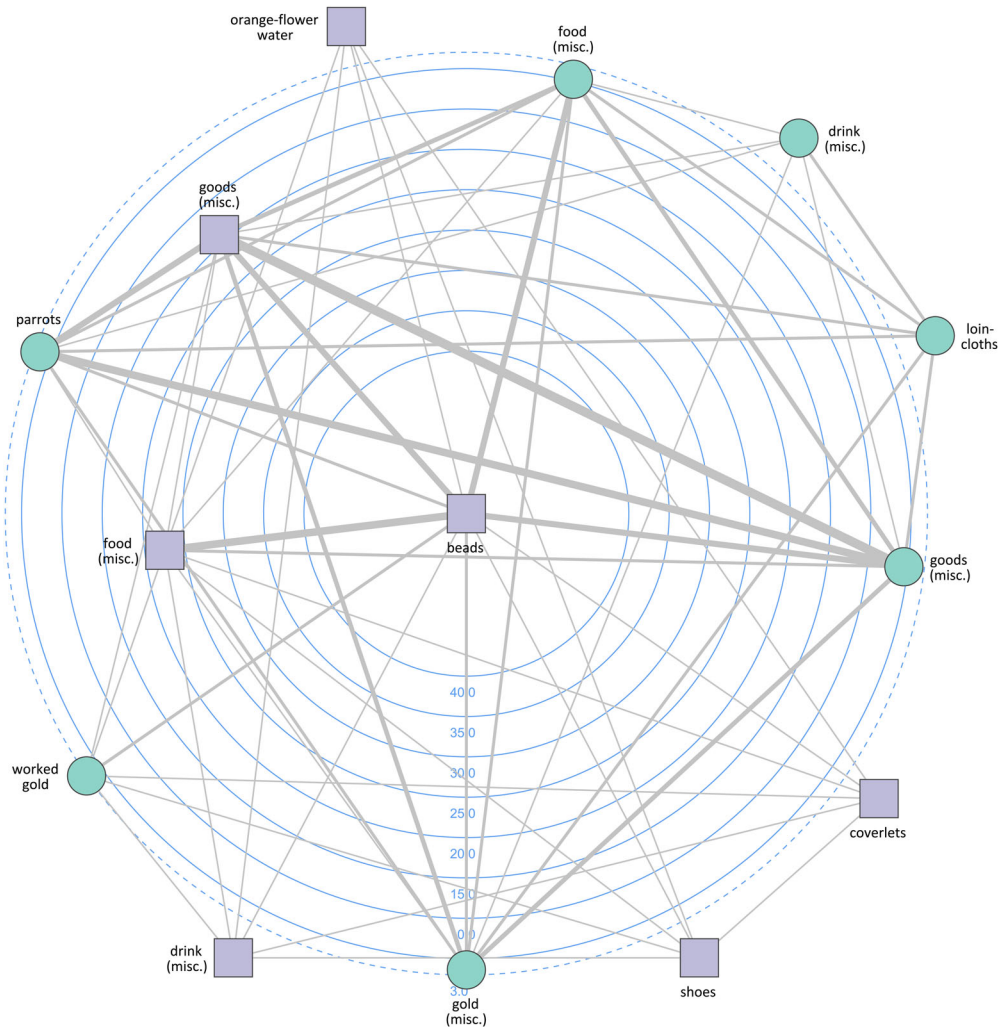


Figure 7. Ego-network of “Amerindian high-status cotton belts” for the period 1492–1493.

communal gatherings. Their artistic appearance is characterized by shell-beaded, multi-colored – typically a combination of red, white, and green – geometric designs. The center of the belt often features an anthropomorphic face or *cemí*, the representation of a spiritual power (Ostapkowicz 2013). Belts were likely only exchanged between caciques and their significance must have been understood by the Spanish (Mol 2007; Oliver 2009; Ostapkowicz 2018; Wilson 1990). Many were shipped to Europe, where they became “curiosa” that circulated among courts and elites, several of which ended up in collections and museums across the “Old World” (Ostapkowicz 2013).

Two events during the first Columbian voyage included the transaction of fabric belts (Figure 7). The object types involved in both events are, apart from the belts, beads, (European) food, and also gold. Noteworthy, both interactions comprise either predominantly European or Amerindian things, hinting at the specific contexts in which the belts were presented. The opening quote of the *Diario* recounts the first instance of Columbus receiving a belt, a present from the cacique whom Columbus had dined with,

as described in the preceding section. Only some days later, on 22 December 1492, when anchored in the Baie de l'Acul, Haiti, Columbus was offered a second belt. This time, it was sent by his prospective ally, cacique Guacanagarí. The seeds for this unique alliance were planted that day, as Columbus wrote

The lord of that region, who had a place nearby, sent him a big canoe full of people, and in it one of his principal retainers to beg the Admiral to come to his land and that he would give him all that he had. The lord sent with the retainer a belt that in place of a purse bore a mask which had two big ears and the tongue and nose of hammered gold (Dunn and Kelley 1989, 263; see also Ostapkowicz 2013, 289).

Columbus responded by sending out an exploration party to Guacanagarí's village where Spanish sailors reciprocated the gift of the belt:

This king was very courteous to the people from the ships, and each of the common people brought them something to eat and drink. Afterward the king gave to each one some of the pieces of cotton cloth that the women wear, and parrots for the Admiral, and certain pieces of gold. The common people also gave the sailors some of the same pieces of cloth, and other things from their houses, for small things that the Spaniards gave them, which, for the way in which they received them, seemed to be esteemed as sacred relics (Dunn and Kelley 1989, 273).

The first gift both caciques gave Columbus was a belt. Although the significance and purpose of these valuable gifts cannot be stated with certainty, they likely represented a welcoming present with an aim to "entangle" this powerful new stranger in local politics. In the months after first contact gifts such as these scaffolded the diplomatic negotiations and shifts in (personal) power networks that later resulted in the change from barter to tribute systems.

Over the period 1493–1497 the ego-network of belts shows a considerably different picture (Figure 8). The figure is distinct from the previous one mainly for the greater diversity of things belts were transacted with. The network constitutes seven transaction events, six of which lead back to the list of "treasures" documented by Sebastian de Olaño, the treasurer of the Spanish Crown at the settlement of Isabela, between 10 March 1495 and 19 February 1496 (Alegria 1985). In contrast to belts received on the First Voyage, most of the things entangled with belts obtained during this period were part of plunder or tribute payments. This is substantiated by the central position of gold and Amerindian high-value beads, often made of amber or colored stones. Two belts at least were confiscated from the defeated cacique Caonabó, while one was brought by "an Indian from Guacanagarí."

However, here too we find European things transacted in exchange for Amerindian belts. These were part of the aforementioned large set of exchanges between Guacanagarí and Columbus upon the latter's return in 1493. The incentive for this gift was politically motivated: in his absence the men Columbus had left behind had been killed and their temporary fort, close to Guacanagarí's village, had been burnt to the ground. It is likely that Guacanagarí had anticipated a tense reunion with an appeasing gesture that should help to reinstitute peaceful relations. Perhaps because of this elaborate gift – which, along with the belts, included among other things a gold pendant and a cotton diadem the chief wore around his head – Guacanagarí managed to convince Columbus he was not to blame for this disaster. Indeed, perhaps equally eager to keep the peace, Columbus reciprocated with gifts himself. Apart from some of the more

contextually explore in detail the emergence of the earliest transatlantic material culture networks. When it comes to these early entanglements, the total quantity of object types as well as the variety of the constellations in which they co-featured in transaction events stands out (Figure 2). Even if there was a core of frequently transacted objects, for most types there seem to have been no specific restrictions or proscriptions on what should be exchanged with what and for what—or, where they were in place, they were frequently not reinforced (even in the case of tribute deliveries). This belies the stereotypical view of a profit-driven Spanish colonial venture focused purely on the acquisition of gold, still present in many popular (scientific) narratives, and instead reveals a process of entanglement that can only be understood by a contextualized and connected understanding of material affordances and constraints (Hodder 2012). This also shows the need for a further substantiation of Amerindian agency, practices, and sensibilities regarding interactions with (cultural) others.

Beads, hawk's bells, as well as other trade goods and gold form the core of these entanglements, being most frequently transacted in unison. They are interspersed with specific, yet therefore no less important, exchanges taking place between Amerindian and European leaders. In addition, some of the foci of Crosby's (1972) study, such as the transatlantic movements of plants, animals, and foodstuffs, are foreshadowed by an early series of interactions in which (Amerindian) food items are among the object types that are most often moved across cultural boundaries.

A specific focus on the first five years after contact enables a more detailed examination of the transformations of these entanglements. Based on the exploration of the (ego-)networks discussed above, we suggest the first two years reflect a brief period in which both Amerindians and Europeans sought to gain access to exotic goods as well as establish a mutual frame of reference for their transactions. It is noteworthy that at first both peoples resorted to a familiar repertoire of exchange items: beads and other trade goods for the Europeans and belts and other valuables for the Amerindians. In addition to these things, small gifts of food played an important role for both parties. Exchanges of high-status valuables such as belts took center stage as indigenous and Spanish leaders jockeyed for positions of power in a newly emerging political system.

In subsequent years the encounter increasingly took on the disbalanced and violent dynamics that would characterize the subsequent colonial venture. The material repercussions of this early shift in relations are visible in the diachronic comparison of the networks of three significant object types. Beads increasingly came to function as "currency" to acquire indigenous foodstuffs needed to relieve the poorly supplied Spanish settlements, while valuables were taken out of their elite exchange contexts to become part of tribute payments. The networks of individual object types allow for a contextually sensitive analysis of the developments in early colonial relations. In addition, they show that the material networks of these "ego objects" were very much entangled as well: beads were central to the transaction of food, while ceremonial food exchanges framed the gifts of high-status ornaments, which were representative of a system of value that had no trouble to incorporate new exotic ornaments such as beads.

When it comes to studies of textual sources, there are no readily comparable frames of reference for the approach presented here. Still, the conclusions drawn here can be viewed as complementary to Caribbean network studies in specific as well as general

studies on indigenous mobility and exchange (e.g., Boomert 2000; Fitzpatrick et al. 2009; Hofman and Hoogland 2011; Hofman et al. 2007, 2019; Keegan and Hofman 2017; Laffoon et al. 2014; Leppard 2013; Mol 2014; Morsink 2012; Oliver 2009; Ostapkowicz 2018). Furthermore, material-based co-presence networks have been reconstructed from archaeological assemblages in other regions as well. Indeed, we would argue that the approach laid out in the first part of the paper can be applied in a variety of historical, cultural, and disciplinary contexts. Even though this paper has focused on the Bahamas and the Greater Antilles, the idea of co-occurrence in object assemblages or, more specifically, encounter transaction events can be used as a basis for (comparative) studies of the material dynamics of encounters in other periods or parts of the world.

In conclusion, by looking at Caribbean ethnohistorical sources through the lens of a network study and an understanding of precolonial indigenous and Spanish material culture histories, it is clear that the biological, societal, and cultural transformations of the Columbian Exchange began with a set of local and specific entanglements between mutually exotic things. New material networks arose from and at the same time gave rise to social networks of great historical importance between key players in the early years of European colonization, such as Columbus, Guacanagarí, and Anacaona. We hope to have shown how an exploration of the material constituents of these and similar entanglements enables a novel understanding of the large-scale, sociocultural, and geopolitical processes of the Caribbean encounter.

Notes

1. On the eve of European contact, the indigenous peoples of the Caribbean formed a plethora of ethnically, culturally, and linguistically diverse groups (Hofman and Van Duijvenbode 2011; Keegan and Hofman 2017; Keegan, Hofman, and Rodríguez Ramos 2013; Wilson 2007). The most neutral general identifier for the inhabitants of the Greater Antilles and the Bahamas is “Amerindian,” the denomination we will also use here. Similarly, it should be acknowledged that “Spanish” is an anachronistic term referring generally to the late medieval kingdoms of Castile and Aragon. Furthermore, while most early European explorers and colonists came from the Iberian peninsula, others had different origins (e.g., Christopher Columbus himself likely originates from Genoa).
2. With the exception of the writings by Peter Martyr (MacNutt 1912) and Andrés Bernaldez (Farina and Zacher 1992) all of these works comprise accounts of eyewitnesses. Peter Martyr personally interviewed many of the returned explorers as chaplain to the royal court and official chronicler in the Council of the Indies. Andrés Bernaldez, parish priest of Los Palacios, near Seville, started writing an historical work out of personal interest, for which he mostly relied on the works of others. While we used English translations instead of the Spanish source materials this did not impact the network analyses itself, which were based on the connection of object type categories defined by the authors. In case of doubt on the correctness of the translation of object names and where possible, we consulted alternative translations as well as original Spanish source materials.
3. The typology was constructed by copying the (English) name of the object in its plural form. In a small number of cases, we have chosen to deviate from this method (see note 5). To be sure, the creation of a typology is an interpretive act and the typology used here does not directly relate to an Amerindian or even Spanish classification of objects (Meskell 2004; Oliver 2000).
4. The (coded) object types in Figure 1 show the occasional use of “goods.” Goods, both in Amerindian and Spanish contexts, refer to all those items that are not further specified, but

which clearly refer to some kind of exchange ware(s). In the ethnohistorical sources these typically read as “other things,” often complemented with qualitative wordings such as “of small value,” “many,” “of theirs,” or “of our trading truck.” In reality, these unspecified objects probably were the more common trade items the chroniclers referred to, which they did not consider interesting enough (anymore) to specify, or of which more detailed information was lacking. We can assume, therefore, that part of the European “goods” were in fact also beads and bells.

5. Whereas the text in [Figure 1](#) features “javelins,” fragments elsewhere refer to “spears.” In this case we renamed the object type to “spears.” Small discrepancies such as these often arise from translator’s preferences. In fact, for both javelins and spears, the original Spanish word used was *azagayas*.
6. Software and documentation available at visone.info.
7. Distance between nodes in a network is normally measured by its shortest path. A path is a core concept of graph theory, signifying a sequence of ties in which each node and tie is distinct. The length of the path equals the number of ties in it: for example, object types X and Z, which are not transacted together but are on separate occasions transacted with object type Y, are at distance 2.
8. There are numerous ways to look at clustering or grouping in a network (i.e., areas of the network in which the connections between nodes are locally dense with no or fewer connections to other clusters).
9. As an illustration of Katz’ status centrality (or $c_v = \alpha \cdot \sum_{(u,v) \in \text{instar}} (1 + c_u)$, where $\alpha = \min\{\max_{v \in V} \text{indegree}(v), \max_{v \in V} \text{outdegree}(v)\}^{-1}$), take the following situation: person A has ten contacts each of whom have fifty contacts and person B has one hundred contacts. Person B can be said to be the most powerful based on its absolute number of personal contacts (also known as degree centrality). Yet, a measure of Katz’s status will indicate that A is the more powerful actor.
10. “Gold” covers all references to gold that are not specified as either worked (e.g., hammered gold nuggets) or unworked (e.g., gold dust). If these two nodes would have been combined, the centrality of gold would only become higher, surpassing beads, but not causing any other major changes to the status centrality of other things in the network.
11. Betweenness centrality is the standard positional measure for these types of networks, ever since Freeman’s (1982) seminal paper on the measurement of centered graphs or ego-networks. A node’s betweenness centrality can be established by determining the shortest paths between a pair of nodes and calculating which fraction of the path runs through the node in question, repeating this measure for all pairs of node in the graph and summing up all of these fractions. In essence, a node with a high betweenness rating functions as a bridge between clusters, facilitating or controlling access from nodes to other nodes.
12. These bells were relatively small brass rumbler bells the European medieval elite used in falconry. In the ethnohistorical sources these are referred to as *cascabeles*, while in English they are often called hawk’s bells.
13. In European conceptual thinking of the time, parrots—as well as gold and people with dark skins—were connected to warm climates. As most wealth was believed to be found in hot regions, it is no surprise Columbus proves fond to mention their presence in his correspondence. The same applies to his remarks about the blackness of skins and the intensity of the heat. Parrots were furthermore considered as curiosities interesting enough to bring back to Spain (Todorov 1999, 21, 35).
14. In order to obtain a more significant picture of the role of food in Spanish-Amerindian transactions, all varieties of Amerindian foodstuffs in this figure have been merged into one single node called “food.” This node also includes “geese,” which, although transacted as live animals, we could expect to have been eaten as well. The position of parrots is equivocal: some would have served as food, while others were kept as company and/or shipped to Spain. For this reason a distinct node has remained intact.
15. In contemporary Amerindian communities of Lowland South America feasts are a common means to create and uphold intercommunal sociopolitical networks (Fausto 2007; Grotti

2007; Heckenberger 2005; Rivière 2000). Indeed, the exchanging of food between strangers is ubiquitous in many past and contemporary cultures (Rodríguez-Alegría 2005; Sahlins 1985; Spielmann 2002).

16. See note 14. In this figure, the node “food” also includes hutías, birds, and doves for reasons stated above.

Acknowledgements

We are indebted to Scott Fitzpatrick, Mark Hauser, Jimmy Mans, Hayley Mickleburgh, Emma Slayton, and two anonymous reviewers for providing valuable feedback on earlier versions of this article. We thank Daniel Weidele for his assistance with the formation of the type-to-type networks.

Declaration of interest statement

The manuscript has been submitted solely to this journal and is not published, in press, or submitted elsewhere. We declare no potential conflict of interest for this study.

Funding

The research of which this paper is the result was supported by the Netherlands Organization for Scientific Research (PhDs in the Humanities “Values and Valuables in the Early Colonial Caribbean,” grant PGW-13-02; Rubicon “Entangled Encounters,” grant 446-15-001), and the European Research Council (ERC-Synergy “NEXUS 1492”, grant 319209), and was supervised by Corinne L. Hofman.

References

- Alegría, R. E. 1985. Christopher Columbus and the treasure of the Taíno Indians of Hispaniola. *Jamaica Journal* 18 (1):2–11.
- Berman, M. J. 2011. Good as gold: The aesthetic brilliance of the Lucayans. In *Islands at the crossroads: Migration, seafaring, and interaction in the Caribbean*, ed. L. A. Curet and M. W. Hauser, 104–34. Tuscaloosa: University of Alabama Press.
- Boomert, A. 1987. Gifts of the Amazons: “Green stone” pendants and beads as items of ceremonial exchange in Amazonia and the Caribbean. *Antropológica* 67:33–54.
- Boomert, A. 2000. Trinidad, Tobago and the Lower Orinoco interaction sphere: An archaeological/ethnohistorical study. PhD diss., Leiden University.
- Boomert, A. 2002. Amerindian-European encounters on and around Tobago (1498–ca. 1810). *Antropológica* 97-98:71–207.
- Borgatti, S. P., M. G. Everett, and J. C. Johnson. 2013. *Analyzing social networks*. Los Angeles: Sage.
- Boruchoff, D. A. 2012. The three greatest inventions of modern times: An idea and its public. In *Entangled knowledge: Scientist discourses and cultural difference*, ed. K. Hock and G. Mackenthun, 133–63. Munster: Waxmann.
- Brain, J. P. 1975. Artifacts of the adelantado. In *Conference on historic site archaeology papers*, ed. S. South, vol. 8, 129–38. Columbia: South Carolina Institute of Archaeology and Anthropology.
- Brandes, U., and M. Mader. 2012. A quantitative comparison of stress-minimization approaches for offline dynamic graph drawing. In *Proceedings of the 19th international symposium on graph drawing*, ed. M. van Kreveld and B. Speckmann, 99–110. Berlin: Springer.
- Brandes, U., G. Robins, A. McCranie, and S. Wasserman. 2013. What is network science? *Network Science* 1 (1):1–15. doi:10.1017/nws.2013.2

- Brughmans, T. 2013. Thinking through networks: A review of formal network methods in archaeology. *Journal of Archaeological Method and Theory* 20 (4):623–62. doi:10.1007/s10816-012-9133-8
- Callaghan, R. T. 2013. Archaeological views of Caribbean seafaring. In *The Oxford handbook of Caribbean archaeology*, ed. W. F. Keegan, C. L. Hofman, and R. Rodríguez Ramos, 283–95. Oxford, UK: Oxford University Press.
- Churampi Ramírez, A. I. 2007. Caizcimu: El cacicazgo oriental escenario de la tristemente célebre Bahía de Las Flechas y de las feroces guerras de Higüey [Caizcimu: The eastern chiefdom scene of the sadly famous Bay of Arrows and the ferocious wars of Higüey]. *El Caribe Arqueológico* 10:165–72.
- Cody, A. 1995. Kalinago alliance networks. In *Proceedings of the XV International Congress for Caribbean Archaeology*, ed. R. E. Alegría and M. Rodríguez, 311–25. San Juan: Centro de Estudios Avanzados de Puerto Rico y el Caribe.
- Collar, A., F. Coward, T. Brughmans, and B. J. Mills. 2015. Networks in archaeology: phenomena, abstraction, representation. *Journal of Archaeological Method and Theory* 22 (1):1–32. doi:10.1007/s10816-014-9235-6
- Cooper, J., A. V. M. Samson, M. A. Nieves, M. J. Lace, J. Caamaño-Dones, C. Cartwright, P. N. Kambesis, and L. del Olmo Frese. 2016. The Mona chronicle. *Antiquity* 90 (352):1054–71. doi:10.15184/aqy.2016.103
- Cornell, P., and F. Fahlander, eds. 2007. *Encounters, materialities, confrontations: Archaeologies of social space and interaction*. Newcastle, UK: Cambridge Scholars Press.
- Crosby, A. W. 1972. *The Columbian exchange: Biological and cultural consequences of 1492*. Westport, CT: Greenwood.
- Curet, L. A. 2014. The Taíno: Phenomena, concepts, and terms. *Ethnohistory* 61 (3):467–95. doi:10.1215/00141801-2681759
- Cusick, J. G., ed. 1998. *Studies in culture contact: Interaction, culture change, and archaeology*. Carbondale: Center for Archaeological Investigations, Southern Illinois University.
- Deagan, K. A. 2003. Colonial origins and colonial transformations in Spanish America. *Historical Archaeology* 37 (4):3–13. doi:10.1007/BF03376619
- Deagan, K. A., and J. M. Cruxent. 2002a. *Columbus's outpost among the Taínos: Spain and America at La Isabela, 1493-1498*. New Haven, CT: Yale University Press.
- Deagan, K. A., and J. M. Cruxent. 2002b. *Archaeology at La Isabela: America's first European town*. New Haven, CT: Yale University Press.
- Dietler, M. 2010. *Archaeologies of colonialism: Consumption, entanglement, and violence in ancient Mediterranean France*. Berkeley: University of California Press.
- Dommelen, P. V. 2006. Colonial matters: Material culture and postcolonial theory in colonial situations. In *Handbook of material culture*, ed. C. Tilley, W. Keane, S. Küchler, M. Rowlands, and P. Spyer, 104–24. London: Sage.
- Dunn, O., and J. E. Kelley, eds. 1989. *The diario of Christopher Columbus's first voyage to America 1492-1493. Abstracted by Fray Bartolomé de Las Casas*. Norman: University of Oklahoma Press.
- Earle, R. 2012. *The body of the conquistador: Food, race and the colonial experience in Spanish America, 1492-1700*. Cambridge: Cambridge University Press.
- Everett, M. G., and S. P. Borgatti. 2005. Ego network betweenness. *Social Networks* 27 (1):31–8. doi:10.1016/j.socnet.2004.11.007
- Farina, L. F., ed. 1994. *Christopher Columbus: Accounts and letters of the second, third, and fourth voyages. Nuova Raccolta Colombiana*. Rome: Istituto Poligrafico e Zecca Dello Stato.
- Farina, L. F., and C. K. Zacher, eds. 1992. *Christopher Columbus's discoveries in the testimonials of Diego Alvarez Chanca and Andrés Bernáldez. Nuova Raccolta Colombiana*. Rome: Istituto Poligrafico e Zecca Dello Stato.
- Fausto, C. 2007. Feasting on people: Eating animals and humans in Amazonia. *Current Anthropology* 48 (4):497–530. doi:10.1086/518298

- Fernández-Armesto, F. 1987. *Before Columbus: Exploration and colonization from the Mediterranean to the Atlantic, 1229–1492*. 2nd ed. Philadelphia: University of Pennsylvania Press.
- Fitzpatrick, S. M., Q. Kaye, J. Feathers, J. A. Pavia, and K. M. Marsaglia. 2009. Evidence for inter-island transport of heirlooms: Luminescence dating and petrographic analysis of ceramic inhaling bowls from Carriacou, West Indies. *Journal of Archaeological Science* 36 (3):596–606. doi:10.1016/j.jas.2008.08.007
- Freeman, L. C. 1982. Centered graphs and the structure of ego networks. *Mathematical Social Sciences* 3 (3):291–304. doi:10.1016/0165-4896(82)90076-2
- Funari, P. P. A., and M. X. Senatore, eds. 2015. *Archaeology of culture contact and colonialism in Spanish and Portuguese America*. Cham: Springer.
- Gamper, M., L. Reschke, and M. Düring. 2015. *Knoten Und Kanten III: Soziale Netzwerkanalyse in Geschichts- Und Politikforschung* [Knots and edges III: Social network analysis in historical and political research]. Bielefeld: Transcript.
- Gassón, R. A. 2000. Quiripas and mostacillas: The evolution of shell beads as a medium of exchange in Northern South America. *Ethnohistory* 47 (3-4):581–609.
- Giovas, C. M., G. D. Kamenov, S. M. Fitzpatrick, and J. Krigbaum. 2016. Sr and Pb isotopic investigation of mammal introductions: Pre-Columbian zoogeographic records from the Lesser Antilles, West Indies. *Journal of Archaeological Science* 69:39–53. doi:10.1016/j.jas.2016.03.006
- Given, M. 2004. *The archaeology of the colonized*. London: Routledge.
- Gosden, C. 2004. *Archaeology and colonialism: Cultural contact from 5000 BC to the present*. Cambridge: Cambridge University Press.
- Graeber, D. 1996. Beads and money: Notes toward a theory of wealth and power. *American Ethnologist* 23 (1):4–24. doi:10.1525/ae.1996.23.1.02a00010
- Graeber, D. 2001. *Toward an anthropological theory of value: The false coin of our own dreams*. New York: Palgrave.
- Grotti, V. E. 2007. *Nurturing the other: Wellbeing, social body and transformability in Northeastern Amazonia*. PhD diss., University of Cambridge.
- Heckenberger, M. J. 2005. *The ecology of power: Culture, place, and personhood in the Southern Amazon, A.D. 1000-2000*. London: Routledge.
- Hennig, M., U. Brandes, J. Pfeffer, and I. Mergel. 2012. *Studying social networks: A guide to empirical research*. Frankfurt: Campus.
- Hodder, I. 1986. *Reading the past: Current approaches to interpretation in archaeology*. Cambridge: Cambridge University Press.
- Hodder, I. 2012. *Entangled: An archaeology of the relationships between humans and things*. Malden, MA: Wiley-Blackwell.
- Hodder, I., and A. A. A. Mol. 2016. Network analysis and entanglement. *Journal of Archaeological Method and Theory* 23 (4):1066–94. doi:10.1007/s10816-015-9259-6
- Hofman, C. L., A. J. Bright, and R. Rodríguez Ramos. 2010. Crossing the Caribbean Sea: Towards a holistic view of pre-colonial mobility and exchange. *Journal of Caribbean Archaeology*, Special Publication #3:1–18.
- Hofman, C. L., L. Borck, E. Slayton, and M. L. P. Hoogland. 2019. Archaic Age voyaging, networks and resource mobility around the Caribbean Sea. In *Early settlers of the insular Caribbean: Dearchiving the Archaic*, ed. C. L. Hofman and A. T. Antczak, 245–61. Leiden: Sidestone.
- Hofman, C. L., A. J. Bright, A. Boomert, and S. Knippenberg. 2007. Island rhythms: The web of social relationships and interaction networks in the Lesser Antillean archipelago between 400 BC and AD 1492. *Latin American Antiquity* 18 (3):243–68. doi:10.2307/25478180
- Hofman, C. L., A. J. Bright, M. L. P. Hoogland, and W. F. Keegan. 2008. Attractive ideas, desirable goods: Examining the Late Ceramic Age relationships between Greater and Lesser Antillean societies. *The Journal of Island and Coastal Archaeology* 3 (1):17–34. doi:10.1080/15564890801984097
- Hofman, C. L., and M. L. P. Hoogland. 2011. Unravelling the multi-scale networks of mobility and exchange in the pre-colonial Circum-Caribbean. In *Communities in contact: Essays in*

- archaeology, ethnohistory & ethnography of the Amerindian Circum-Caribbean*, ed. C. L. Hofman and A. van Duijvenbode, 15–44. Leiden: Sidestone.
- Hofman, C. L., and F. W. M. Keehnen, eds. 2019. *Material encounters and indigenous transformations in the early colonial Americas: Archaeological case studies*. Leiden: Brill.
- Hofman, C. L., A. A. A. Mol, M. L. P. Hoogland, and R. Valcárcel Rojas. 2014. Stage of encounters: Migration, mobility and interaction in the pre-colonial and early colonial Caribbean. *World Archaeology* 46 (4):590–609. doi:10.1080/00438243.2014.925820
- Hofman, C. L., and A. van Duijvenbode, eds. 2011. *Communities in contact: Essays in archaeology, ethnohistory & ethnography of the Amerindian Circum-Caribbean*. Leiden: Sidestone.
- Hulme, P. 1986. *Colonial encounters: Europe and the native Caribbean, 1492-1797*. Cambridge: Cambridge University Press.
- Irving, W. 1828. *A history of the life and voyages of Christopher Columbus*. 4 vols. New York: G. & G. Carvill.
- Katz, L. 1953. A new status index derived from sociometric analysis. *Psychometrika* 18 (1):39–43. doi:10.1007/BF02289026
- Keegan, W. F. 2007. *Táino Indian myth and practice: The arrival of the stranger king*. Gainesville: University of Florida Press.
- Keegan, W. F. 2015. Mobility and disdain: Columbus and cannibals in the land of cotton. *Ethnohistory* 62 (1):1–15. doi:10.1215/00141801-2821644
- Keegan, W. F., and C. L. Hofman. 2017. *The Caribbean before Columbus*. New York: Oxford University Press.
- Keegan, W. F., C. L. Hofman, and R. Rodríguez Ramos, eds. 2013. *The Oxford handbook of Caribbean archaeology*. Oxford, UK: Oxford University Press.
- Keehnen, F. W. M. 2012. Trinkets (f)or treasure? The role of European material culture in intercultural contacts in Hispaniola during early colonial times. Research master's thesis, Leiden University.
- Keen, B., ed. 1992. *The life of the admiral Christopher Columbus by his son Ferdinand*. New Brunswick, NJ: Rutgers University Press.
- Knappett, C. 2011. *An archaeology of interaction: Network perspectives on material culture and society*. Oxford, UK: Oxford University Press.
- Knappett, C., ed. 2013. *Network analysis in archaeology: New approaches to regional interaction*. Oxford, UK: Oxford University Press.
- Knippenberg, S. 2006. Stone artifact production and exchange among the Northern Lesser Antilles. PhD diss., Leiden University.
- Kopytoff, I. 1986. The cultural biography of things: Commoditization as process. In *The social life of things: Commodities in cultural perspective*, ed. A. Appadurai, 64–91. Cambridge: Cambridge University Press.
- Laffoon, J. E., R. Rodríguez Ramos, L. Chanlatte Baik, Y. Narganes Storde, M. Rodríguez Lopez, G. R. Davies, and C. L. Hofman. 2014. Long-distance exchange in the precolonial Circum-Caribbean: A multi-isotope study of animal tooth pendants from Puerto Rico. *Journal of Anthropological Archaeology* 35:220–33. doi:10.1016/j.jaa.2014.06.004
- Laffoon, J. E., T. F. Sonnemann, M. M. Antczak, and A. T. Antczak. 2018. Sourcing nonnative mammal remains from Dos Mosquises Island, Venezuela: New multiple isotope evidence. *Archaeological and Anthropological Sciences* 10 (6):1265–81. doi:10.1007/s12520-016-0453-6
- Las Casas, B. d. 1875–1876. *Historia de Las Indias* [History of the Indies]. 5 vols. Madrid: Miguel Ginesta.
- LeFebvre, M. J., G. DuChemin, S. D. deFrance, W. F. Keegan, and K. Walczesky. 2019. Bahamian hutia (*Geocapromys ingrahami*) in the Lucayan realm: Pre-Columbian exploitation and translocation. *Environmental Archaeology* 24 (2):115–31. doi:10.1080/14614103.2018.1503809
- Leppard, T. P. 2013. The logics of island life: The archaeology of movement, distance, and settlement in the Neolithic Aegean and Ceramic Age Lesser Antilles. PhD diss., Brown University.
- Lightfoot, K. G. 1995. Culture contact studies: Redefining the relationship between prehistoric and historical archaeology. *American Antiquity* 60 (2):199–217. doi:10.2307/282137

- Lightfoot, K. G., A. Martinez, and A. M. Schiff. 1998. Daily practice and material culture in pluralistic social settings: An archaeological study of culture change and persistence from Fort Ross, California. *American Antiquity* 63 (2):199–222. doi:10.2307/2694694
- Loren, D. D. 2008. *In contact: Bodies and spaces in the sixteenth- and seventeenth-century Eastern Woodlands*. Lanham, MD: AltaMira.
- Lyons, C. L., and J. K. Papadopoulos. 2002. *The archaeology of colonialism*. Los Angeles: Getty Research Institute.
- MacNutt, F. A., ed. 1912. *De orbe novo. The eight decades of Peter Martyr d'Anghera*. New York: G.P. Putnam's Sons, Knickerbocker Press.
- Malafouris, L. 2013. *How things shape the mind: A theory of material engagement*. Cambridge, MA: MIT Press.
- Malinowski, B. K. 1922. *Argonauts of the Western Pacific*. Long Grove, IL: Waveland.
- Mann, C. C. 2011. *1493: Uncovering the new world Columbus created*. New York: Knopf.
- Maran, J., and P. W. Stockhammer, eds. 2012. *Materiality and social practice: Transformative capacities of intercultural encounters*. Oxford, UK: Oxbow Books.
- Mauss, M. 1925. Essai sur le don. Forme et raison de l'échange dans les sociétés archaïques [The gift. The form and reason for exchange in archaic societies]. *L'Année Sociologique*, 1923-1924: 30–186.
- Meskel, L. 2004. *Object worlds in ancient Egypt: Material biographies past and present*. Oxford, UK: Berg.
- Mickleburgh, H. L., J. E. Laffoon, J. R. Pagán-Jiménez, A. A. A. Mol, S. Walters, Z. J. M. Beier, and C. L. Hofman. 2019. Precolonial/Early Colonial human burials from the site of White Marl, Jamaica: New findings from recent rescue excavations. *International Journal of Osteoarchaeology* 29 (1):155–61. doi:10.1002/oa.2707
- Mills, B. J., J. M. Roberts, J. J. Clark, W. R. Haas, D. Huntley, M. A. Peebles, L. Borck, S. C. Ryan, M. Trowbridge, and R. L. Breiger. 2013. The dynamics of social networks in the Late Prehispanic US Southwest. In *Network analysis in archaeology: New approaches to regional interaction*, ed. C. Knappett, 181–202. Oxford, UK: Oxford University Press.
- Mol, A. A. A. 2007. Costly giving, giving guaizas: Towards an organic model of the exchange of social valuables in the Late Ceramic Age Caribbean. Research master's thesis, Leiden University.
- Mol, A. A. A. 2008. Universos socio-cósmicos en colisión: Descripciones etnohistóricas de situaciones de intercambio en Las Antillas Mayores durante el período de proto-contacto [Colliding socio-cosmic universes: Ethnohistoric descriptions of proto-historic exchange situations in the Greater Antilles]. *El Caribe Arqueológico* 10:13–22.
- Mol, A. A. A. 2014. The connected Caribbean: A socio-material network approach to patterns of homogeneity and diversity in the pre-colonial period. PhD diss., Leiden University.
- Mol, A. A. A., M. L. P. Hoogland, and C. L. Hofman. 2015. Remotely local: Ego-networks of Late Pre-Colonial (AD 1000–1450) Saba, North-Eastern Caribbean. *Journal of Archaeological Method and Theory* 22 (1):275–305. doi:10.1007/s10816-014-9234-7
- Morison, S. E. 1942. *Admiral of the ocean sea: A life of Christopher Columbus*. Boston, MA: Little, Brown.
- Morison, S. E., ed. 1963. *Journals and other documents on the life and voyages of Christopher Columbus*. New York: The Heritage Press.
- Morsink, J. 2012. The power of salt: A holistic approach to salt in the prehistoric Circum-Caribbean region. PhD diss., University of Florida.
- Murray, T., ed. 2004. *The archaeology of contact in settler societies*. Cambridge, UK: Cambridge University Press.
- Navarrete, M. F. d. 1825–1837. *Colección de los viajes y descubrimientos, que hicieron por mar los españoles, desde fines del siglo XV* [Collection of the voyages and discoveries made by the Spaniards since the late 15th century]. 5 vols. Madrid, Spain: Real.
- Newman, M. E. J. 2010. *Networks: An introduction*. Oxford, UK: Oxford University Press.
- Newsom, L. A., and E. S. Wing. 2004. *On land and sea: Native American uses of biological resources in the West Indies*. Tuscaloosa: University of Alabama Press.

- Oland, M., S. M. Hart, and L. Frink, eds. 2012. *Decolonizing indigenous histories: Exploring prehistoric/colonial transitions in archaeology*. Tucson: University of Arizona Press.
- Oliver, J. R. 2000. Gold symbolism among Caribbean chiefdoms: Of feathers, çibas and guanín power among Taíno elites. In *Precolumbian gold: Technology, style and iconography*, ed. C. McEwan, 196–219. London: British Museum Press.
- Oliver, J. R. 2009. *Caciques and cemí idols: The web spun by Taíno rulers between Hispaniola and Puerto Rico*. Tuscaloosa: University of Alabama Press.
- Ortiz, F. 1995. *Cuban counterpoint: Tobacco and sugar*. Durham, NC: Duke University Press.
- Ostapkowicz, J. 2013. 'Made ... with admirable artistry': The context, manufacture and history of a Taíno belt. *The Antiquaries Journal* 93:287–317. doi:[10.1017/S0003581513000188](https://doi.org/10.1017/S0003581513000188)
- Ostapkowicz, J. 2018. New wealth from the Old World: Glass, jet and mirrors in the late fifteenth to early sixteenth century indigenous Caribbean. In *Gifts, goods and money: Comparing currency and circulation systems in past societies*, ed. D. Brandherm, E. Heymans, and D. Hofmann, 153–93. Oxford, UK: Archaeopress.
- Padgett, J. F., and C. K. Ansell. 1993. Robust action and the rise of the Medici, 1400–1434. *American Journal of Sociology* 98 (6):1259–319. doi:[10.1086/230190](https://doi.org/10.1086/230190)
- Pagán-Jiménez, J. R., R. Rodríguez Ramos, and C. L. Hofman. 2019. On the way to the islands: The role of domestic plants in the initial peopling of the Antilles. In *early settlers of the insular Caribbean: Dearchizing the Archaic*, ed. C. L. Hofman and A. T. Antczak, 89–106. Leiden: Sidestone.
- Parry, J. H., and R. G. Keith, eds. 1984. *The Caribbean*. Vol. 2 of *New Iberian world: A documentary history of the discovery and settlement of Latin America to the early 17th century*. New York: Times Books.
- Phillips, W. D., and C. R. Phillips. 2011. Portuguese and Spaniards in the age of European expansion. In *A companion to Latin American history*, ed. T. H. Holloway, 58–72. Oxford, UK: Blackwell.
- Pugh, T. W. 2009. Contagion and alterity: Kowoj Maya appropriations of European objects. *American Anthropologist* 111 (3):373–86. doi:[10.1111/j.1548-1433.2009.01139.x](https://doi.org/10.1111/j.1548-1433.2009.01139.x)
- Reid, B. A. 2009. *Myths and realities of Caribbean history*. Tuscaloosa: University of Alabama Press.
- Rivière, P. 2000. The more we are together ... In *The anthropology of love and anger: The aesthetics of conviviality in native Amazonia*, ed. J. Overing and A. Passes, 252–67. London: Routledge.
- Rodríguez-Alegría, E. 2005. Eating like an Indian: Negotiating social relations in the Spanish colonies. *Current Anthropology* 46 (4):551–73.
- Rodríguez-Alegría, E. 2008. Narratives of conquest, colonialism, and cutting-edge technology. *American Anthropologist* 110 (1):33–43. doi:[10.1111/j.1548-1433.2008.00006.x](https://doi.org/10.1111/j.1548-1433.2008.00006.x)
- Rodríguez-Alegría, E., F. Scaramelli, and A. M. Navas Méndez. 2015. Technological transformations: Adaptationist, relativist, and economic models in Mexico and Venezuela. In *Archaeology of culture contact and colonialism in Spanish and Portuguese America*, ed. P. P. A. Funari and M. X. Senatore, 53–77. Cham: Springer.
- Rodríguez Ramos, R. 2011. The circulation of jadeite across the Caribbeanscape. In *Communities in contact: Essays in archaeology, ethnohistory & ethnography of the Amerindian Circum-Caribbean*, ed. C. L. Hofman and A. van Duijvenbode, 117–36. Leiden: Sidestone.
- Rogers, J. D. 1990. *Objects of change: The archaeology and history of Arikara contact with Europeans*. Washington, DC: Smithsonian Institution Press.
- Rubertone, P. E. 2000. The historical archaeology of native Americans. *Annual Review of Anthropology* 29 (1):425–46. doi:[10.1146/annurev.anthro.29.1.425](https://doi.org/10.1146/annurev.anthro.29.1.425)
- Sahlins, M. D. 1985. *Islands of history*. Chicago: University of Chicago Press.
- Saunders, N. J. 1999. Biographies of brilliance: Pearls, transformations of matter and being, c. AD 1492. *World Archaeology* 31 (2):243–57. doi:[10.1080/00438243.1999.9980444](https://doi.org/10.1080/00438243.1999.9980444)
- Scaramelli, F., and K. Tarble de Scaramelli. 2005. The roles of material culture in the colonization of the Orinoco, Venezuela. *Journal of Social Archaeology* 5 (1):135–68. doi:[10.1177/1469605305050152](https://doi.org/10.1177/1469605305050152)
- Silliman, S. W. 2005. Culture contact or colonialism? Challenges in the archaeology of native North America. *American Antiquity* 70 (1):55–74. doi:[10.2307/40035268](https://doi.org/10.2307/40035268)

- Silliman, S. W. 2010. Indigenous traces in colonial spaces: Archaeologies of ambiguity, origin, and practice. *Journal of Social Archaeology* 10 (1):28–58. doi:10.1177/1469605309353127
- Sindbaek, S. M. 2007. The small world of the Vikings: Networks in early medieval communication and exchange. *Norwegian Archaeological Review* 40 (1):59–74. doi:10.1080/00293650701327619
- Spielmann, K. A. 2002. Feasting, craft specialization, and the ritual mode of production in small-scale societies. *American Anthropologist* 104 (1):195–207. doi:10.1525/aa.2002.104.1.195
- Stein, G. J., ed. 2005. *The archaeology of colonial encounters: Comparative perspectives*. Santa Fe, NM: School of American Research Press.
- Strathern, M. 1988. *The gender of the gift: Problems with women and problems with society in Melanesia*. Berkeley: University of California Press.
- Terrell, J. E. 2010. Language and material culture on the Sepik coast of Papua New Guinea: Using social network analysis to simulate, graph, identify, and analyze social and cultural boundaries between communities. *The Journal of Island and Coastal Archaeology* 5 (1):3–32. doi:10.1080/15564890903142891
- Thacher, J. B. 1903. *Christopher Columbus: His life, his work, his remains*, vol. 2. New York: G.P. Putnam's Sons, Knickerbocker Press. doi:10.1086/ahr/9.4.785
- Thomas, N. 1991. *Entangled objects: Exchange, material culture and colonialism in the Pacific*. Cambridge, MA: Harvard University Press. doi:10.1086/ahr/98.1.224-a
- Todorov, T. 1999. *The conquest of America: The question of the other*. Trans. R. Howard. Norman: University of Oklahoma Press.
- Torres, J. M., and R. Rodríguez Ramos. 2008. The Caribbean: A continent divided by water. In *Archaeology and geoinformatics: Case studies from the Caribbean*, ed. B. A. Reid, 13–29. Tuscaloosa: University of Alabama Press.
- Torres de Mendoza, D. L. ed. 1868. *Colección de documentos inéditos, relativos al descubrimiento, conquista y organización de las antiguas posesiones españolas de América y Oceanía* [Collection of unedited documents relating to the discovery, conquest and organization of the ancient Spanish possessions in America and Oceania], vol. 10. Madrid: J. M. Perez.
- Valcárcel Rojas, R. 2016. *Archaeology of early colonial interaction at El Chorro de Maíta, Cuba*. Gainesville: University of Florida Press.
- Valcárcel Rojas, R., A. V. M. Samson, and M. L. P. Hoogland. 2013. Indo-Hispanic dynamics: From contact to colonial interaction in the Greater Antilles. *International Journal of Historical Archaeology* 17 (1):18–39. doi:10.1007/s10761-012-0208-8
- VanderVeen, J. M. 2006. Subsistence patterns as markers of cultural exchange: European and Taíno interactions in the Dominican Republic. PhD diss., Indiana University.
- Voss, B. L. 2015. Narratives of colonialism, grand and not so grand: A critical reflection on the archaeology of the Spanish and Portuguese Americas. In *Archaeology of culture contact and colonialism in Spanish and Portuguese America*, ed. P. P. A. Funari and M. X. Senatore, 353–61. Cham, CH: Springer.
- Voss, B. L., and E. C. Casella. 2012. *The archaeology of colonialism: Intimate encounters and sexual effects*. Cambridge: Cambridge University Press.
- Walker, J. B. 1997. Taíno stone collars, elbow stones, and three-pointers. In *Taíno: Pre-Columbian art and culture from the Caribbean*, ed. F. Bercht, E. Brodsky, J. A. Farmer, and D. Taylor, 80–91. New York: The Monacelli Press.
- Watts, C., ed. 2013. *Relational archaeologies. humans, animals, things*. London: Routledge.
- Whitehead, N. L. 1995. *Wolves from the sea: Readings in the anthropology of the native Caribbean*. Leiden: KITLV.
- Wilson, S. M. 1990. *Hispaniola: Caribbean chiefdoms in the age of Columbus*. Tuscaloosa: University of Alabama Press.
- Wilson, S. M. 2007. *The archaeology of the Caribbean*. Cambridge: Cambridge University Press.