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THE COUNTRY THAT THEY BUILT: THE DYNAMIC AND COMPLEX INDIGENOUS ECONOMIES IN NORTH AMERICA BEFORE 1492

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Abstract

The economic history of the United States is that of Europeans and their institutions. Indigenous nations are absent. This absence is due partly to lack of data but in large measure to a perception that Indigenous communities have contributed little to US growth. This paper argues that this erasure of Indigenous activity overestimates the contributions of European colonists and immigrants. Three case studies explore the economic complexity and social stratification across different nations/regions. Migrants to the Unites States did not come to an empty land but one with settled agriculture, complex production processes and extensive trade relations.

Keywords: Indigenous economic history, North America.

JEL Codes: J15, N31, N51, N91.

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> How we make meaning of those differences depends, in part, on the meaning that we think ought to be there (Bamforth 2011, p. 35).

1492 is generally taken as the date when Europeans arrived in the Americas, even though Europeans (Norse) had settled in Greenland and parts of Artic and subarctic Canada centuries earlier. While that contact faded with the disappearance of those settlements, contact after 1492 fundamentally altered the character and trajectory of Indigenous societies. Yet, economic historians have written little about Indigenous economies in North America prior to the arrival of Europeans and only a little more about their economies in the two to three hundred years post contact (exceptions are Ray 1974, 1978; Carlos and Lewis 2010).[1] One reason is obvious. Economic historians work primarily with the written record – ledgers, journals, business archives, census records, church records, legal records, letters – and the Indigenous nations north of urban Mexico left no written footprint. A written record does not mean a lack of economic activity nor should it mean an invisibility of Indigenous nations in North American economic history. Theirs are cultures with deep oral traditions – and our unthinking acceptance of writing as critical has perhaps biased perception.

The invisibility of Indigenous nations and communities may, however, stem from a more deeply embedded frame. We frequently describe North American indigenous communities as primitive or mere hunter/gatherer/fisher groups. Not untrue in the sense that Indigenous communities did hunt, fish and gather, these descriptors reflect a stereotype.[2] Perhaps also in the hunter/gatherer descriptor is an underlying belief on the part of economic historians that indigenous communities contributed little to the development of European colonies or to the historical processes that are 'relevant' to understanding the present, thus making indigenous societies implicitly, if not explicitly, irrelevant. It is a neat and tidy solution but one which erases the economic activity of Indigenous nations, giving primacy to Europeans in North America. It is important to question such a perspective in two ways. First, by asking how socially and economically complex were Indigenous nations in North America prior to

[1] Economic history research has focuses primarily on the post Dawes period and allotment. See, by way of example, Carlson 1978, Dippel 2014, Frye and Parker 2021 and Miller 2015, among others. There is a broader literature by early American historians.

[2] The terms primitive as a descriptor of hunter/gatherer is itself a colonial artifact. Our knowledge of surviving hunter/gatherer societies are of those who existence has been deeply affected by the colonial world and need not necessarily reflect pre-contact societies. Primitive is a term which should be retired as a general descriptor.

1492. Second, if Indigenous economies were more than mere hunter/gatherers, then we need to ask to what extent Europeans benefited from those assets. What was the extent of capital asset transfers from Indigenous nations to European settlers and colonies?

This paper studies the economic history of Indigenous societies that created the America of 1492. When Europeans arrived, the land was neither empty nor pristine. In reality, indigenous communities had been engaged for centuries in land management and, in large areas of the country, settled agriculture. Indeed, greater recognition needs to be given to the fact that settled agriculture and large towns was the reality for much of the Eastern half of the future United States prior to the arrival of Europeans. This was a region of independent crop development and diffusion, of such plants as squash, sunflower, marshelder, as well as others now lost, as well as production of crops such as maize from south America (Laskow 2022; Smith 2006; Watson 2020). That Indigenous nations cultivated and settled land (Doolittle 2004; Scarry and Scarry 2005) was not lost on colonial migrants. Coughlan and Nelson (2018) show convincingly that colonists in the South Carolina Piedmont chose to settle any land that had previously been cultivated by Indigenous communities, regardless of how far in the past, over land that had never been cultivated. As another example, we can think about tobacco. Tobacco was not a crop imported from Europe. Indigenous communities grew tobacco in what became Virginia and Virginia's colonial wealth came from tobacco.[3] European migrants were not starting from nothing. Indeed, Bacon's Rebellion (1676-1677) was about access to Indigenous land and even if Bacon failed, eventually, as Carlos, Feir and Redish (2022) argue, American institutions were crafted to advantage European and White Americans over the rights and land of Indigenous communities. Ignoring this reality ignores an important legacy of Indigenous nations.

No single paper can elaborate on everything in Indigenous history. The issue of asset transfers and the impact of Indigenous societies on the development of colonial and revolutionary America into the present are open questions. Here, I focus on indigenous communities prior to the arrival of Europeans and on those nations/communities not engaged in settled agriculture. As I argue through a series of case studies, these Indigenous nations, nominally hunter/gatherer, had developed socially, politically, and economically complex organizations and institutions to take advantage of the gains from specialization and trade, and minimize some of the problems such as inequality. In particular, I document the economic and

[3] Markets existed before Europeans arrived. It is not unlikely that Indigenous communities as well as European migrants produced tobacco for the European market.

social complexity of trade for three nations or communities: The Chumash of California; The Blackfoot of the northern Great Plains; and coastal Alaskan communities. Although the nature of the archaeological evidence makes dating to a precise year difficult, the case studies focus on the roughly 500 years prior to contact (1000-1500 CE), contemporaneous with late medieval and early modern Europe.[4] This paper adds to a small literature on the pre-contact economic history of Indigenous societies exemplified by the work of Noel Butlin (1993) on the Aboriginal economy in Australia and by that of Sumner La Croix (2019) for Hawaii.

Knowledge of these and other Indigenous nations is a product of many decades of archaeological research and, importantly, a result of technologies such as ^{14}C dating techniques, x-ray fluorescence, liDAR, and the work of paleobotonists and palynologists, all of which has expanded knowledge beyond what was possible even fifty years ago. The result is a richer and more fine grained analysis of the lives, societies, and economies of Indigenous communities. In terms of structure, I begin in the next section with a discussion of context for the paper and the case studies. This is followed by three sections each focusing on a particular nation or community. Section six then summarizes and concludes with some possible avenues for future research.

Context

Economic History Literature - Erasure of Indigenous America Pre-Contact

Despite a rich historiography in the history and ethno-history literatures, standard North American economic history textbooks or histories of American Capitalism take as a starting point the founding of European colonies: Spanish, French, English or Dutch. While there might be some mention of Indigenous nations, the focus is on the growth and development of the United States and Canada as an interplay between a land made fruitful by migrant settlers, combined with strong common law property rights to protect individual investment in land and resources, in infrastructure and, in some parts of the region, enslaved peoples. Yet the land was neither empty nor, in many regions, undeveloped; rather there was a transfer, voluntary or forced, of land, capital assets, and knowledge from Indigenous ownership to non-Indigenous ownership (Carlos, Feir, and Redish 2022). In essence, our textbooks document the economic history of Europeans and their institutions in North America.

[4] In their writings, archaeologists often refer to the period before contact as 'pre-history'. I do not use that term in this paper. It seems somewhat presumptuous to believe that history starts with Europeans records in North America.

A perception of hunter/gatherer/fisher communities as less 'developed' is commonplace. Galor et al. (2022, p. 1) outline the standard definition of the Neolithic Revolution - the transition from hunter-gatherer to agriculturalists - as transformative: it fostered social stratification, the emergence of non-food producers dedicated to arts, science and technology and ultimately to civilization. By implication, hunter-gather societies have no social stratification, arts, science, technology or civilization.[5] A contrasting argument has been made by David Graeber and David Wengrow (2021). They ask what do we see if we do not constrain ourselves to see people along a preset trajectory from hunter/gatherer/fisher to agriculturalists to arts and technology?[6] As already noted, settled agriculture described economic activity for many if not a majority of communities, east and south from the Missouri and Mississippi rivers basins (Doolittle 2004; Scarry and Scarry 2005). On the west coast, Indigenous communities managed pelagic and on-shore fisheries with some engaging in active mari-culture (Lepofsky et al 2021). But as I argue below, the hunter/gather label conceals often complex social and/or economic organizations: some socially stratified with elites and priestly castes, and some not, but many deliberately producing large surpluses from specialization for trade (Bamforth 2022; Brink 2008).

Along with stages of growth formulations or narratives, another construct that distorts how we view societies is the division of global economies into center and periphery - with regions beyond the periphery ignored (Wallerstein 2004).[7] In such a view, Europe is generally the core with trade routes of various kinds emanating outward to a periphery. By way of example, Figure 1 depicts a standard 13th century world system (Google, Wikipedia). To state the obvious, this map does not include the Americas, because the Americas had not yet been 'discovered'. The Americas, however, did exist. While Africa and Australia are shown, they lie outside the world system, even though we know there were great empires in Africa and the Americas at this time. Such framing obscure peoples, economies, technologies, and accomplishments that lie outside Europe or Eurasia.

To make the same point in a different context, consider the globalization literature with its focus on the expansion of European trade across the Mediterranean and along the Silk road

[5] Difficult as it may be to imagine, Indigenous technology was not necessarily inferior to European. Indigenous and European technologies have been found contemporaneously in late nineteenth century archaeological sites in the American west and in some early twentieth century sites Ontario (Ray 1974; 1978; Carlos and Lewis 2010; Newton 2018).[5]

[6] Bigelow (2020) makes a similar critique of European ideas regarding the stages of human progress.

[7] World Systems Theory or Analysis is used more extensively in Sociology yet it often underpins global history in the economic history literature when talking about a core and its reach. This is also related to dependency models, for example Polyani.

to China, and in the aftermath of the great voyages of discovery, on the sea routes to India and Asia and the Americas. The globalization literature is problematic not because it ignores the Americas prior to 1492 but because its Eurocentric focus creates a distorted view of the Americas before and after 1492. This is a very broad statement but the argument can be seen in a few examples. In *The European Miracle*, Jones (1981/2003/2012) examines the interplay between 'environments, economics and geopolitics in the history of Europe and Asia'. Here, the 'discovery' of North America is described in terms of the acquisition of 'ghost acreage' with the result that "the average area of land available per capita in western Europe in 1500 had been 24 acres, and the Discoveries raised this to 148 per capita, a six-fold gain (82)." Essentially, North America is just an empty land waiting to be developed by European migrants.

In *Power and Plenty* (2007), Finlay and O'Rourke examine the pattern and structure of 'world trade' in the second millennium, delineating seven world regions by historical and cultural bonds: Western Europe, Eastern Europe, North Africa and South West Asia, Central or Inner Asia, Southeast Asia, East Asia; a world not very different from the thirteenth century world systems map delineated in Figure 1. Despite dividing Eurasia into seven regions, Finlay and O'Rourke exclude the Americas and Australia (and generally ignore sub-Saharan Africa), arguing that the Americas and Australia did not engage in trade with other regions and had no external trade until Europeans arrive.[8] I am not arguing that the Finlay and O'Rourke should have written a different book, but rather noting they are writing in a particular tradition.

To take one final example, de Zwart and van Zanden (2018) in their monograph on the global economy, 1500 to 1800, acknowledge not only the existence of the Americas but document its vitality, specialization, and urbanization prior to 1500. Faced, however, with incorporating these economies into the post-contact world, they argue for the Caribbean, and by inference for the whole region, that "native Americas (sic) succumb[ed] en masse to European violence and diseases" and the area "repopulated by Europeans, Africans and later Asians" (90). At odds with their descriptions of specialization and urbanization in the Americas, the authors write that these societies "which had known (almost) no money or market exchanges previously" (90) would come to be transformed into capitalist market economies. They, thus, reaffirm a traditional narrative regarding the primitive nature of Indigenous societies.

[8] The authors also argue that because the Americas constituted only 10% of global population, it can be ignored. If, however, the authors took the top end of their range, population in the Americas would have constituted 45%. Today, the Americas constitute just over 10% of global population.

Seeing indigenous economies as non-market has a long tradition. Gift giving and reciprocity are portrayed as an aspect of Indigenous exchange used to support non-market relations (Mauss, 1925; Sanchez, 2022). Yet, as Carlos and Lewis (2014) argue these institutions can equally be viewed as capital markets in that such activities allowed for borrowing in period one (receiving a gift) and lending in period two (giving a gift), thus providing an insurance market for those whose food supply was variable. Johnsen (1986) argued that ceremonies, such as potlatches or ceremonial distribution of gifts, were a means of reducing conflict and preserving resources or resource sites. Gift giving, reciprocity, and redistribution within related communities, socially or geographically, reduce the threat of starvation in the event of a poor hunting or harvest season or smooth distribution in the face of uneven hunting/fishing locations. Undoubtedly an ethic of generosity, reciprocity and redistribution played a larger role than in western societies, nonetheless, the mutual obligations incurred created an insurance policy across time and space and may have provided greater protection to needy families than afforded many European households.

Trade, which will be discussed in detail in the three case studies, was not something introduced to the Americas by Europeans. Figure 2 describes known colonial era trade routes across the Great Plains, with people and goods moving from home regions to major market fairs or rendezvous.[9] That these trade connections predate the arrival of Europeans is documented by the movement of artifacts and trade goods. Of course, rendezvous were not only trade centers but also political, social, community and cross-community gatherings, building trust and marriage alliances between groups. The point is that trade and markets existed well before the advent of Europeans in North America and, as I discuss in the context of the Chumash and the Blackfoot, trade was not merely the passing of one item along a chain of people, but also the result of specialization in production for intraregional and interregional trade. Some, as did the Chumash, even used money to facilitate trade.

Archaeological Data – Indigenous Presence

People migrated out of Beringia 25,000 years ago and moved slowly down the American continent, either walking along ice-free routes or sailing along the coast, reaching Southern Chile and sites in North America around 14,700 BCE, and the Great Plains of North America around 13,500 BCE (Bamforth 2021).[10] There is, therefore, a long history of people, families,

[9] Many of these rendezvous were also reported in the journals and diaries of explorers, for example, Lewis and Clark.

[10] North America was not peopled from the east (Raff 2022; Bamforth 2021:40).

and communities living across the Americas with their associated economies, experiencing times of abundance and times of droughts, floods, war, famines. America was also a continent with civilizations: Olmec (1400-400 BCE), Maya (150-900 CE), Inca (1438-1533 CE) and Aztec (1300-1521 CE) are the best known, ranking alongside those in Egypt, Mesopotamia and China, with great monuments, large cities, art, domesticated plants (corn, beans, squash, cotton), hieroglyphic writing, calendar making, social stratification and hierarchy. In North America, at its apex in the twelfth century, at least 20,000 people lived in the mound city/state of Cahokia along the Mississippi (Mann 2005). Large cities with complex hierarchies, social stratification and monuments are very visible manifestations of a society. Yet, the majority of people in the Americas (as in Europe, Africa and Asia) before 1500, lived in smaller communities, some settled, and some mobile.

Knowledge about Indigenous communities, societies and polities comes from a number of sources: Indigenous communities' oral histories, traditions and folklore, colonial records, and archaeological data. Each source describes differing aspects of the Indigenous past. Although I focus here on what the archaeological data tell us, it is important to recognize that all sources should be contextualized within a nation's own oral history, tradions, folklore, and language (Dowd 2022; Michalopoulos and Xue 2021).

Archaeology is the study of human history through its material remains: buildings, lithic and bone tools, pottery, archaeo-faunal remains, midden piles, industrial debris, and sometimes wood, seeds or compostable remains. Experimental archaeology allows us to understand better how remains of tools, for example, were crafted and used. The archaeological record, as with all records, is comprised of what remains to us today. Over the past four hundred years, European/American villages, towns, cities, roads, canals, dams, highways, airports, harbors, golf courses, and farms have obliterated Indigenous sites.[11] Weather patterns, droughts, floods, sea level changes can also erase a community imprint, bury or submerge a site, while artifact hunters impinge on the integrity of a site. There is, therefore, a sample selection bias in terms of what is preserved and what is lost. For instance, we know that more densely populated areas today were more densely populated prior to European arrival (Carlos, Feir, Redish, 2022) but these are also regions where archaeological remains have likely been lost.[12]

[11] Written records have also disappeared over time through deliberate destruction, fires, wars, looting, flooding or mold.

[12] Federal law now requires archaeological examination of sites prior to development but rarely allows for long-term excavation.

As with other fields, archaeology has expanded and refined its data collection expectations; excavations to be meticulously laid out and various levels/strata carefully documented and photographed; larger artifacts removed and the soil sifted for smaller pieces of broken pottery, flakes, bone, etc. Assiduous documentation is necessary because once a site has been excavated it cannot be put back into its original state. Archaeological data/artifacts show changes over time in a particular location with different strata providing evidence on older and younger but do not necessarily tell the research how old. An artifact, or its shape and design, can suggest or confirm connections with other regions, either through the movement of goods, or people, or ideas. Yet, the very nature of the discipline with a focus on what is visible raises an issue termed the tyranny of architecture (Ben-Yoseph 2008). If the footprint defines the size of the settlement and the potential complexity of the community, then, often by inference, societies without fixed dwellings were not complex.

Over the past few decades, new technologies, statistical tools, and interdisciplinary work have expanded understanding of the past. Of particular importance was the emergence of ^{14}C dating in the mid-twentieth century. ^{14}C is created in the upper atmosphere when cosmic rays hit ^{12}C. ^{14}C is unstable and over time it shed its extra neutrons to return to stable ^{12}C. All living things take on carbon from the atmosphere, some as stable ^{12}C and some as unstable ^{14}C. At death, however, the levels of ^{12}C are set but ^{14}C continues to decay. Willard Libby determined that the decay function was stable– with a half-life of 5,730 years, thus providing an approximate age for faunal remains such as bone, wood, plant fibers (Kirch 2012, p. 106). Continued work has refined the tool.[13] X-ray fluorescence can determine the origin site for lithic remains such as obsidian, copper, meteoric iron, amber or marine shell, thus tracing the extent of movement or trade from the source site to where it was found (Atlas of Canada plate 14). LiDAR, or ground penetrating radar, enhances the discovery of sites without visible remains, or can illuminate the extent of settlement without excavation. Paleobotonists working with pollens, seeds and grains in lake sediments document climate changes both locally and more globally.[14] Even as archaeologists debate aspects of their field, the amazing field work and analysis of the last fifty years, in particular, has deepened our understanding of the history of Indigenous nations.

[13] For example, marine and terrestrial remains do not absorb ^{14}C at the same rate. Mason and Ludwig (1990) deduce a Bering Strait correction of 400+/-100 years. Perhaps measured against the sweep of time, four hundred is not too long, but in historical terms four hundred years is the difference between 1600 and 2000.
[14] https://www.annualreviews.org/doi/abs/10.1146/annurev.earth.28.1.1

The case studies discussed in the next three sections are based on archaeological evidence published over the last forty years. My focus here is on the role of specialization and trade and the diversity of social and political organization. Although the production of trade items might require complex social organization, this did not always result in complexity of social stratification. These case studies document the vibrancy, complexity, and dynamism of communities in pre-contact North America from roughly 1000-1500 CE.

The Chumash of Southern California

The Chumash of southern California are recognized as an economically and socially complex society with a 10,000-year history in the region.[15] The many groups comprising the Chumash occupied three main regions: the northern Channel Islands of San Miguel, Santa Rosa and Santa Cruz and Anacapa (only one square mile), the coastal region, and the interior; occupying portions of what are now San Luis Obispo, Santa Barbara, Ventura, and Los Angeles counties, extending from Morro Bay in the north to Malibu in south as shown in Map 3. [16] The Chumash are well-documented firstly because of early written descriptions, in particular, the Spanish expedition of Juan Rodriguez Cabrillo in 1542, and secondly due to protection of Chumash sites on the Channel Islands which now form the Channel Island National Park.

Socially and politically, the Chumash appear to comprise a hierarchy of loosely integrated groups, each with its own chief and defined geographical area, but with strong social and economic ties throughout the territory (Arnold 1992, p. 66). Indeed, the density of villages and population attests to access to resources. By the time of the first Spanish Settlement, the Chumash population was estimated to be between 15,000 to 25,000 people in an area of about 20,000 km^2. They, along with some Pacific Northwest coastal groups, had the highest population density north of central America perhaps as high as four to nine per km^2.[17]

Described as hunter/fisher/foragers, such a descriptor does not capture the complexity of economic activity in the five hundred years before the arrival of the Spanish. This was a region with a rich resource base overall but with unequal access to resources across communities. Those residing along the mainland coast had greatest access: meat from large

[15] The material in this section is mainly derived from the extensive work of King, Gamble, and Arnold.
[16] The four southern islands of San Clemente, Santa Catalina, Santa Nicholas and Santa Barbara and the adjacent mainland were inhabited by Gabrielino Shoshonean people independent of the Chumash, though probably connected through trade.
[17] A density of more than one person per km^2 in the region occupied by the Chumash stands in contrast to a density of less than one person per 100 km^2 in Canada's boreal forest.

terrestrial mammals - deer, elk, bear - an extensive and plentiful array of fish and shellfish, seeds, nuts and grains, and reeds.[18] Inland areas had, perhaps, greater access to deer and other land mammals, freshwater fish and shellfish, but no marine products. The Channel Islands were the least well endowed. As islands, these communities had access to marine mammals, otters, fish and shellfish, but no large terrestrial mammals and less rich plant life. Nuts, such as acorns, grasses and seeds, various bulbs and plants were important components of the diet. Acorns, in particular, were a highly nutritious staple food and, once the toxins were leached out, could be ground into flour. Indeed, as paste, acorns could be stored for years. These Chumash communities did not, however, merely live off the land, they managed their resources using fire, for example, to create larger grassy areas for deer and to promote growth of seeds and nut bearing trees (Gamble 2008).[19]

Such differences in resources between communities could have led (and perhaps at certain points did lead) to conflict, but by 1500, the archaeological record and early Spanish records document not conflict but specialization and trade across the communities. Specialization was perhaps greatest on the Channel Islands.[20] The islands are, at the closest point, thirty-eight miles from the mainland. Until the middle of the first millennia, the extant boat technology used reeds to make small coastal vessels making connections between the islands and mainland problematic.[21] Then the archaeological record shows the emergence of a new technology – the *tomol* or plank canoe measuring six to seven meters in length. This was a sophisticated ocean going vessel with a carrying capacity of two tons of cargo or twelve passengers. The *tomal* improved coastal and island trade and pelagic fishing.

By the beginning of the second millennium CE, these vessels were made in specialized workshops on the islands. [22] A *tomol* was constructed from planks of planed redwood, as illustrated in Figure 4. A plank canoe may not, on the face of it, appear a very sophisticated product. However, redwoods do not grow on the Chanel Islands. These canoes were crafted from trees carried down the coast from northern California. If the islands had no redwood, they had major outcroppings of higher quality cherts (stone for tools) than found on the mainland. The redwoods were cut and planed into planks with lithic tools - stone or clamshell adzes -, holes drilled, and planks tied together with the fibers of red-milkweed. Finally, the boat was caulked with heated asphaltum blended with pine pitch; asphaltum was mined from solidified

[18] Reeds were a building material used for baskets and containers but also boats.
[19] See also the extensive work by Stephen J. Pyne on the role of fire as a tool.
[20] The archaeological record for the islands is very clear.
[21] Reed boats could become waterlogged.
[22] The discussion on plank canoes comes from Arnold 2007.

coastal bluffs within the Barbareño Chumash territory on the mainland. It is estimated that a *tomol* required 500 person-days of skilled labor to construct. The archaeological record shows not just the construction of an occasional *tomol* but, by the eleventh century, sites on Santa Cruz Island were the location of specialized production workshops with teams of workers. The production of *tomal* appears to have been supported by wealthy families or groups on the mainland who purchased these canoes – ownership being a sign of wealth.

The islands also had abundant *Olivella*, abalone, and mussels.[23] *Olivella biplicata* is a small predatory sea snail whose shell is comprised of very hard enamel. Along with the *tomol*, islanders specialized in the production of two other non-consumption commodities, micro-drills crafted from the high quality cherts and *Olivella* shell beads (Arnold 1992, p. 66). Again the archaeology points to specialized micro-drill production sites with teams of workers.[24] The shells were first ground, shaved, and polished into beads of specific sizes and then holes drilled to create stings of beads of similar size and quality, a time- and labor-intensive activity. Various types of beads were created. Barbier (2019) found it took 24.4 hours to make 100 Saucer beads relative to 39.3 cupped beads. These cupped beads were used as money.[25]

The value of a bead string was determined by its length and degree of fineness of the beads. Cupped beads (see figure 5) were a standardized and not easily counterfeited commodity which make them useful as a local currency. They were used for transactions amongst different Chumash groups, and perhaps for some exchanges with outside regions (Arnold 2001; Gamble 2020; King 197). They were a medium of exchange and a store of value and evidence of status when worn as jewelry. Mortuary rituals took money out of circulation as strings of beads were often interred with the owner which helped maintain price stability. Shell bead money has a long history among the Chumash. Gamble (2020) argues that shell bead money may have been in circulation as long as 2,000 years ago but dates the cupped shell beads to about the mid twelfth century. Beads traded out of the Chumash area have been found not only up the Californian coast but also in Oregon, and western Nevada.[26]

Team production and specialization on the Channel Islands was mirrored by changes in coastal and inland groups. Inland Chumash communities became more specialized in the production of seeds, acorns and greens, expanding these production areas for exchange with

[23] Chert is a hard, fine-grained sedimentary rock composed of microcrystalline or cryptocrystalline quartz, the mineral form of silicon dioxide
[24] Based on the quantity of particular remains at sites.
[25] Gamble 2020, p. 11.
[26] For illustrations see https://scitechdaily.com/an-ancient-economy-chumash-indians-used-currency-2000-years-ago/

coastal communities. Among coastal communities one sees greater social stratification with wealthy elites and a priestly caste. The archaeological evidence says that these changes were entrenched by the mid twelfth century.

Arnold (1992) argues that a climate event, which changed the temperature of surface waters of the Pacific Ocean over decades, required community-wide adjustments. Resource pressure could have led to conflict and out migration from the Chanel Islands, but Arnold posits instead that the climate change allowed for the emergence of elites in the more densely populated coastal regions who used their resources to organize and then purchase expensive plank canoes from the Islands, which became, in turn, a status symbol of the wealth of the elites. Tensions that could have been created by the resulting income inequality were alleviated by an organized schedule of feasting. These feasts brought communities together, maintaining social contact across groups, and redistributed resources across the regions.[27]

In summary, specialization and intra-regional trade, no doubt with some trade outside the region resulted in higher standards of living for all three regions (Carlos and Lewis 2014). The archaeological and colonial records indicate specialization and highly organized intensification of production with dedicated workshops where non-food commodities were traded for food and other items. Even though an ostensibly hunter/gatherer/fisher culture, the Chumash created a currency to allow for greater ease of complex exchange across the various regions of the Chumash region. Society was politically and socially stratified, with the wealthier coastal elites and a priest caste organizing a calendar of feast to redistribute wealth to maintain social order.[28] These social and economic structures were in place five-hundred years before the first Spanish arrived on the coast of California.

Blackfoot, Bison, and Industrial Production of Pemmican: Swift meatpackers of the Great Plains

The Great Plains of North America stretch East from the Rocky Mountains across Alberta, Saskatchewan, Montana, North and South Dakota, Wyoming, Nebraska, Colorado, Kansas, New Mexico, Oklahoma, and northern Texas in the United States - an area of over half a million square miles.[29] Given the size and scale of the Great Plains, not surprisingly climate varies west to east and south to north. For the northern half, the prevailing winds come across the Rocky Mountains from the Pacific, dropping precipitation, generally as snow, in the mountains.

[27] This is also Johnson argument for the function of the potlatch among groups on the Pacific northwest coast.
[28] These feasts reflect a taxing of the elites by themselves to redistribute resources to other groups.
[29] The best source on the history of the Great Plains is Bamforth 2022. This section draws heavily but not exclusively on work by Bamforth and the extensive work of J. W. Brink and co-authors.

Regions on the leeward side of mountains lie in a rain shadow, with precipitation of only 12-19 inches annually.[30] In the southeast, prevailing winds come from the Gulf of Mexico; in the southwest, from northern Mexico and the American Southwest. Temperature also varies dramatically south to north; particular combinations of temperature, winds, and moisture generates tornadoes, wind and dust storms, or golf-ball size hail storms, depending on the region. Areas of low precipitation and high winds can quickly turn small lightening fires into infernos.

The Great Plains are one of the world's great grasslands with different grasses (tall, short, mixed) dominating in different climatic zones. These grasses provide forage for a range of large animal species - deer, antelope, elk, moose, and bison. Following the herbivores, predators abound: large cats, wolves, foxes, coyotes, raccoons, badgers and skunks, plains grizzly bears and humans. There are also a wide range of smaller mammals – rabbits, squirrels, picas, prairie dogs, chipmunks, mice and beaver – and reptiles. Drainage systems are home to a variety of fish and freshwater shellfish, migratory and resident birds and raptors. The grasslands are also home to a range of plant life, available for forage and gathering. Roots, reeds, leaves, stems and flowers such as dandelions, wild onions, bergamot, cattails, prickly pear, wild strawberries, and wild asparagus were used for food, medicines, and clothing. In sum, the Great Plains provide an abundance of resources (Bamforth 2021).

Yet, for all the diversity of wildlife, the bison "stands apart." In vast herds, they dominated the landscape both physically and spiritually. Bison were not merely an important source of protein, clothing, tools, and trade goods, but importantly were the center of the spiritual and social life of many communities. In the 1500s, it is estimated there may have been 25-30 million bison on the Great Plains before being hunted to extinction at the end of the nineteenth century (Taylor 2011). Figure 6 documents the declining bison range for its range over the past three centuries; the black dots represent remaining herds (Feir, Gillezeau and Jones 2022).

Bison are individually large animals: a modern bison bull averages 2000lbs and, although cows are smaller, averaging 950 to 1,100lbs. Despite their size, they are powerful, fast, agile, and aggressive, achieving speeds of 30-40 mph over short distances and can run for hours at somewhat slower speeds. As a result, individually and collectively they are dangerous animals (Bamforth 2021, p. 34). They move across their range, following the rains and the

[30] Many, if not most, of the major rivers in the Great Plains are fed through the spring run-off of winter snow rather than rainfall per se.

grasses, coming together into large herds during the rutting season and breaking apart into groupings of various sizes for the rest of the year. Despite the enormous size of the bison population and the fact that there was a seasonal migration pattern, the vastness of the Great Plains could make it difficult to locate them. Once found, a single animal, small or large herd had to be tracked, contained, and killed without stampeding the animals either away or, worse, towards the hunters.[31] Additionally a hunter had to be skilled enough to place the arrow so that it pierced the hide and vital organs without hitting bone.[32]

Even with bison herds in the tens of millions, by the end of the fifteenth century, many on the eastern Plains were farmers living in settled agricultural communities growing maize, beans, squash and plants lost to history. Without domesticated mammals, these communities had to hunt for meat: deer, antelope, elk, or bison.[33] Relative to a deer or elk, a single bison kill could produce a substantial quantity of meat, but as in all hunting the meat has to be to transported back to camp or residential location. The archaeological record shows that if a kill occurred a long way from the residential location, hunters might only take choice cuts of meat and leave the rest; a boon for predators – wolves, coyotes, plains grizzly bears, raptors. If residential communities require access to meat protein on a regular basis, they needed either to organize effective hunts or to have access to a reliable source of meat.

Bamforth (2011) argues that there were two quite different community-based forms of bison hunting on the Great Plains. The first conducted was by some of the eastern Plains farmers living in permanent towns. They would amalgamate annually for an extended bison hunt. While they could not rely on a herd returning to a particular location, they knew the general migratory pattern and would spread out over a wide area. Once found, fire, or cairns, along with groups of encircling hunters were used to drive bison into surrounds where they were trapped and killed. The bison were then butchered and processed on site and the processed meat carried back to the towns. For decades, these sites were not recognized as community-based kill sites, in large part because many were used only once and, as a result, did not create a permanent archaeological footprint. In contrast, the second form of community-based hunting left a deep footprint.

Perhaps the quintessential image of bison hunting is shown in Figure 7; bison being driven through corridors of rock cairns to a cliff face by people waving and shouting. These

[31] If feasible, a bison or small herd could be run into an arroyo and killed from above.
[32] Piercing the hide was a function of the sharpness of the arrow head. While obsidian arrowheads were extremely sharp (and expensive), they were prone to shatter upon hitting a bone (Pettigrew 2021).
[33] Deer, elk and antelope respond to hunting by changing behavior and moving greater distance from hunting communities and changing their behavior (Pettigrew 2021).

kill sites, or buffalo jumps, are found in only a small part of the northern bison range – Alberta, Saskatchewan, Montana, Idaho and Wyoming. The image of bison rushing to their deaths belies the sophistication of the activity. These were not merely kill sites but, as discussed below, sites for the industrial processing of bison meat to a form – pemmican - that had a long shelf-life. These sites are, in essence, the equivalent of 19th century Swift meatpacking plants. The hunting, killing and processing of bison was carried our not by farmers but by hunter/gatherer communities.

Here I focus on one site - Head-Smashed-In, in southern Alberta.[34] Archaeological data record that this jump was first used over 4,000 years ago and intensively for roughly the last 2,000 years, no doubt because bison annually grazed somewhere in the nearby Pelican Hills. Even if in the region, the bison had to be located and carefully driven to the cliff face. See Figure 8. A herd needed to be 75 to 100 animals to create sufficient forward momentum such that when the leading animals realized the danger they could not easily change directions and the momentum of the herd behind pushing them over.[35] The archaeological footprint at the site is immense as the photographs in Figure 9 document. Head-Smashed-In has deposits tens of meters thick at the bottom of the cliff, containing millions of bones and "over a million projectile points" (Bamforth 2011, p. 8). Head-Smashed-In is important not because it was a kill site used by local Blackfoot communities, rather the scale and archaeological evidence dictates that this site specialized in pemmican production. Pemmican is a mixture of pounded, dried bison meat mixed with bone grease and marrow, and, frequently, with berries.[36] Pemmican is light, easier than meat to transport, and importantly supplies about 3,200-3,500 calories per pound - the daily caloric requirement for an adult male during a northern winter (Colpitts 2014; Carlos and Lewis 2010).

Production of pemmican starts with removal of the bison hide from the dead animal.[37] Hides themselves was valuable: as covering for teepees, clothing, armor, and trade. Each hide would have been carried away from the site to a location where it could be scraped down and cleaned. Each carcass was disarticulated and each activity repeated over a hundred times; meat was dried by cutting it into strips and hanging it from rails or smoked/roasted in pits. Pit roasting required a pit, lined with slabs of rock. The meat was placed in the pit, covered with

[34] Head-Smashed-In is a UNESCO World Heritage Site and home of a Museum of Blackfoot Culture, located outside Fort MacLeod Alberta Canada. It is being actively excavated.
[35] I thank Jack Brink for this and points to follow (personnel correspondence).
[36] Berries actually increased the shelf-life of the pemmican.
[37] It is important that this occurs quickly after death. Hides maintained body heat and if not removed bacterial decay would quickly set in.

more rock and left to roast - fire was placed either in the bottom or the top of the pit on more stones. Fuel came from dried bison dung.[38] When dried, meat was pounded into small pieces and ground. Dried bison meat, however, is too lean to be nutritious. To be a nutritious food, it needed to be mixed with bone marrow and bone grease. It is here that the scale of the operation becomes apparent.

Releasing bone marrow or bone grease is arduous and labor intensive; accessible fat had to be harvested from the carcass; bones had to be split and boiled and the bone grease can be skimmed from the top of the boiling pan. At Head-Smashed-In this process created a 100,000 m^2 processing area adjacent to the massive mound of dead bison. An ongoing excavation by a team from the Royal Alberta Museum which has - over eight years - uncovered a 273 m^2 area (nearly 3,000 square feet) which included, among other features, 41 pits and 42 hearths; of the pits, eighteen seems to have been boiling pits and seventeen roasting pits (Brink and Dawe 2003: 88). [39] These boiling and roasting pits are not merely holes in the ground but the physical manifestation of a complex production process and social organization among Blackfoot communities (Brink 2008; Zedeño, Ballenger and Murray 2014).

To stone boil, a pit was dug and was lined with a water-proof hide, then filled with water and shattered bison bones.[40] In a nearby location, stones were heated in a fire and, when sufficiently hot, placed in the water; cool rocks were removed to be reheated. Hot rocks were added until the water boiled and the grease floated to the top. The extent of investment in pemmican production is captured by the rocks used to heat the water. Rock at the actual processing site was sandstone and. although local sandstone slabs were used to line the bottoms and sides of roasting pits. it was not used in the stone boiling process because the sandstone often disintegrated into gritty sand that then incorporated into the bone grease. The Blackfoot used river rock found some miles away and carried uphill to the boiling site. Brink and Dawe (2003) estimated that the ratio of river rock to local stone in the excavated area was 6 to 1 and an even scattering of fire-broken rock under the soil.

Hundreds of people hours went into the production of pemmican each year from locating the bison, driving them to the kill site, butchering, capturing bone grease, and processing. The following rough estimation illustrates the magnitudes involved. For simplicity

[38] The almost constant wind in the region made pit roasting preferred to open fires.
[39] The kill site shows signs of repeated burning, presumably to remove the smell of rotting carcasses which would attract local carnivores such as wolves and grizzly bears (Brink 2008, p. 218). Over centuries, the constant winds have covered the site in meters of soil.
[40] A spring at the base of the cliff provided the necessary water (Brink 2008, p. 182). Shattering fresh bison bones is very difficult.

let's assume a kill of 100 bison. Such a herd would generally comprise cows, sub-adult bison and calves but rarely adult males. An adult cow average 950lbs, sub-adult cows at least 800lbs, 1.5 year olds 650lbs and six month old calves about 350lbs (Brink 2008, p. 168). The combined weight, of course, depends on the composition of the herd. A 100 animal herd with 50 cows, 30 calves, 5 sub-adult cows and 15 one and two-year olds would generate a total live weight of 77,000lbs. Of course, not all of this could be used. The norm today is about three/fifth the live weight, however, these communities used more of the animal.[41] If 75% of the animal was used, this generated 57,750 lbs of bison available for consumption – some as meat and some as pemmican. Determining how much pemmican is produced is more difficult because it depends on the amount of bone grease/fat rendered. Modern recipes suggest four pounds of meat to one of fat, so roughly 7,500 lbs of pemmican if enough grease was available and all the meat was used for pemmican . This is, of course, an upper bound. Even if halved, this site produced significant quantities of pemmican, and Head-Smashed-In is just one of a number of such kill sites in the northern plains. Others we currently know about are Gull Lake (Manitoba), Vore in the Black Hills, and Roberts Ranch jump on the Colorado/Wyoming border.

The processing site, as seen in its footprint, delineates a highly organized industrial production facility from the drive lines to dried meat and grease production. At a fundamental level, plains hunters understood bison ecology and the ecology of the region in which they lived. What is less visible and sometimes invisible is the social organization that allowed for this production. Blackfoot oral history tells that of various communities coming together communally (Brink 2008). However, no archaeological evidence of visible habitation has been found at Head-Smashed-In.[42] Yet such a congregation of people, possibly in the thousands, required high levels of social organization and complexity to manage the site: food, cooking, water, human waste. Management on this scale is not captured by the term mere hunter/gatherer community.

In *Pemmican Empire*, Colpitts (2014) explores the interaction of trade, technology, environment, climate and resources to understand the role played by pemmican in the expansion of the Hudson's Bay Company trade into western Canada in the nineteenth century.[43] He persuasively argues for the centrality of pemmican to fuel both posts and the men

[41] In the current cattle industry, the standard is that 60% of animal live weight converts to take home food. Indigenous butchers could have used up to 75% live weight (Brink, personal correspondence).
[42] At another site, over 1,000 teepee rings were found. If each teepee housed even six people, the gathering could number over 6,000 people.
[43] The Northwest Company operating out of Montreal and the Hudson's Bay Company operating from York Factory Hudson Bay amalgamated in 1821 under the name of The Hudson's Bay Company.

who undertook the physically arduous journeys to and from the Arctic to Lake Winnipeg, Hudson Bay or Montreal every year. By the nineteenth century, pemmican was factory-produced with Blackfoot, Cree, and Métis supplying the inputs, in essence continuing a trade that began centuries earlier. For Colpitts, the accounts and ledgers of the Hudson's Bay Company document the size, scale, and reach of the pemmican trade, its production and consumption. In earlier centuries, archaeological remains at Head-Smashed-In and other northern kill sites document the scale of production for home consumption and trade.

Pemmican is perishable leaving little archaeological evidence. What has been found is the counterpart from the trade in pemmican; what the Blackfoot received in exchange. Although food remains are rarely found, some corn survived along with pottery and funerary items emanating from farming settlements along the Missouri along routes schematically in Figure 2. How pemmican was transported; who transported; and how long it took to reach the Missouri, are all unknowns, as is whether trade and exchange were centralized at particular locations or independent traders acted as middlemen between these communities. The fact of interregional trade, however, is clear.

Bison was, as Bamforth so aptly wrote, an all-purpose technology. Beyond the meat and pemmican, sinew was used for thread, hides for teepees, scapulae as hoes and other long bones made into tools (Bamforth 2022, p. 329). Scapulae wear out quickly and so there would have been a constant demand for replacements with some, no doubt, coming from local hunting trips, trade with neighboring communities, and some from these kill sites. Bison hides had many uses, as noted earlier, for shelter and robes. Another use is as armor - documented in later rock art, with depictions of a horse covered in bison hide armor to deflect arrow heads. If bison hides were used to deflect arrow heads from killing a horse, bison themselves must also have been difficult to kill.

In summary, if the archaeological record leaves little imprint of the impact of this trade on the lives of the Blackfoot and the agricultural communities with which they traded, economic theory can guide us here. No doubt the Blackfoot originally made pemmican for their own consumption as those in agricultural communities would have farmed and hunted to meet their own needs. The scale and scope of site tells us that at some point the Blackfoot and other northern nations began to specialize in the large scale production of pemmican for trade with the large agricultural communities of the Missouri River basin. The Blackfoot received corn, pottery and funerary items while the agricultural communities spent less time hunting and more time farming, enjoying through trade a share in the protein rich bison. This interregional trade allowed both communities to consume beyond their own production possibility frontier, while

community-wide pemmican production worked to reduce tension between groups over kill sites. Specialization and interregional trade allowed both groups to enjoy to a wider range of products and a higher standard of living.

Alaska and Trade across the Bering Sea

Alaska and Arctic Canada are remote, rugged, and sparsely populated extensions of the continent.[44] In the previous two sections, I discussed the intraregional trade of the Chumash and the interregional trade of the Blackfoot. Here I discuss the international trade of the Bering Sea communities which was part of a global trading chain that extended into Siberia, China, and the Mediterranean. If Alaska is remote from much of North America, it is adjacent to northeast Eurasia (Figure 10). Alaska and the Aleutian Islands carve an arc that focuses east; the natural geographic affinity of the region as a sphere running through the Sea of Okhotsk, along the Kuril Islands north to the Kamchatka Peninsula to the Chukotka Peninsula (the closest point to Alaska) and east along the Siberian coast. At its narrowest, the distance between the Seward and Chukotka Peninsula is only 55 miles. In the middle of the Bering Strait lie two small islands, Big Diomede and Little Diomede, due south of which lies St Lawrence Island, *Sivuqaq*, with documented archaeological connections to the Chukotka peninsula.[45]

Owen Mason (2020, p. 317) writes that the "Bering Strait was a complex stew of hybrid cultures," the origins of which may be only imperfectly understood. However, the range of languages (and people) speak to the movement or migration of communities and cultures over centuries.[46] Alaska's remoteness should mean that more historical sites survived but archaeological work here faces other challenges. The geography and winter climate severely hampers excavation, while storms and spring run-off erode or wash away coast line and, today, rising oceans levels present another threat.[47]

Any discussion of trade across the Bering Sea must address the question of transportation. Walking across the Strait in winter is no doubt possible though limited daylight, and the dangers of sea ice make such a route dangerous. Whether emerging independently in

[44] The Alaskan landmass for example covers 570,641 square miles - twice the size of Texas and over three times the size of California – but with a population in 2020 of roughly 750,000. In 1900, the census population was 65,500 with ten percent non-Native.
[45] Big Diomede is Russian and Little Diomede is US territory. No archaeological work has been conducted on these Islands.
[46] The material here is based, in large part, on Mason's extensive work. See also Gillispie 2018 for an overview of Alaska's cultures.
[47] Additionally, sites may have been disturbed by artifact hunters.

the Bering region or an imported technology that spread into the region, local skin boats were noted by early European/American whalers.[48] Although the organic nature of the materials used makes it difficult to document construction sites, walrus skins boats were constructed on St. Laurence Island into the twentieth century (Braund 1988).[49] Walrus skin boats require a wood frame (ribs and keel) and, as with the Chumash, St. Lawrence Island boat makers were dependent on trees swept out to sea during spring runoff of major rivers, such as the Yukon and Kuskokwim, and caught at the eastern end of the island. Tree stumps were cut and planed for the curved keel and ribs and the resulting hull covered with female walrus skin.[50]

A 1973 photograph captures a walrus skin being prepared.[51] First the walrus was stretched on a large wooden drying frame. Then a person would separate the inside and outside of the skin using a stone adze. Once separated, the divided skin was spread over the boat frame and stitched together with twisted strands of sinew from walrus or seal. Sinew works well because it swells when wet, closing the stitching holes. Although skin boats can get waterlogged with prolonged immersion, they just need to be taken out of the water to dry and, perhaps, oiled. *Umiapik* were used for hunting walrus and bowhead whale in open ocean and presumably for social and trade contact between communities, or migration. [52] The boats were 18 to 26 feet in length, light, easy to repair, resistant to and maneuverable in sea ice, with a carrying capacity of upward of 6,000lbs.[53]

Direct evidence of the use of ocean going vessels can be inferred from a series of migrations in the second millennia as documented through archaeological remains. Though there were undoubtedly prior migrations. In the Birnirk migration in the eleventh century, people moved from Eastern Siberia to the Chukotka Peninsula, across the Bering to the Seward Peninsula, and then north along the Alaskan coast. This was followed by a Thule Panuk Migration in the twelfth century with movement along the Arctic Coast from Siberia reaching Greenland by the middle of the 13th centuries (Friesen 2016 689/685). People also moved down the coast to Kamchatka and perhaps even the bottom of the Aleutian Islands (Mason 2020).[54]

[48] Hornell (1946) argues that skin boats probably originated in Asia in the first millennium BCE and spread (Braund 1988, p. 210)
[49] Braund's dissertation documents in detail the methods used in crafting such a vessel, along with photographs of the process.
[50] Male skins, the Islanders argued, were often too battle scarred, thick and more fragile (Braund 1988).
[51] It is unimportant whether the technique was still used or staged for the photographer, it demonstrates a non-iron technology.
[52] The Inuit term is *umiaq/umiapik*, sometimes called a 'women's boat'; and *angyaq/angyapik* in Siberian Yupik.
[53] *umiapik* were more resilient than wooden hulled American/European boats.
[54] Possibly up to four different groups moved: Birnirk, Puniuk, Birnirk/Punuk and Thule Punuk. The name 'Thule' was coined by two Danish explorers and refers to a mythic location in the land of the midnight sun (Mason 2020: 309).

These were seaborne migrations and regardless of why these groups moved - climate change, resource pressures -, these migrations tells us that seaways and a viable seafaring technology existed. Such migrations also carry information, knowledge, and products as people are absorbed into existing communities, or dominate existing communities (Mason 2020, pp. 335-339).

Unlike the Blackfoot bison communities and the Missouri-based agricultural settlements with their different resource bases, or Chumash communities with quite different skills, the resource base on either side of the Bering Strait with a focus on fishing and marine mammal hunting both from shore and ocean were very similar. However, variability in the abundance of resources was an issue depending as it did on local ocean currents, climate, and wind which determined the movement of mammals, fish and krill (the main food source for bowhead whales). Some locations were more stable. For example, a combination of current and upwelling created a rich bowhead feeding ground on the south shore of the Chukchi peninsula where a "polar Stonehenge" at Whale alley with over 50 bowhead skulls, 30 mandibles, and standing rocks reflect whaling success (Mason 2020, p. 312). There is enough evidence of trade in marine mammals - whale meat, blubber, oil, baleen, seal oil –to show the movement of such items across the Strait which would alleviate period of scarcity. Whale bone was used to fashion tools, blades, forks, fishing weights and harpoon heads does survive. (Rasic 2016).[55]

Some artifacts or evidence of artifacts found in archaeological sites point to trade not merely across the Bering Sea in response to resource variability but to trade connections between the west coast of Alaska and Siberia and a more global trade. These are bronze and iron artifacts and beads. Metal was not unknown in North America. There was extensive metal working in Mesoamerica in gold, silver and copper used to create jewelry, and plate, and household items such as needles (Bigelow 2020), some of which moved north in trade into southern North America (Bamforth 2021).

Copper, however, was also mined in a number of well-documented sites in the northern part of the continent. One site is the Coppermine River in the Northwest Territories and Nunuvut which was first mined in the 6000 BCE. Another lies at the head of Lake Superior; copper mining here dates to 4000 BCE. A third site is the Kletson Copper site dating from 1000

[55] Whale bones were also used for house frames.

CE in the Wrangell and St. Elias Mountains (Atlas of Canada, vol 1, Plate 13).[56] Copper from this site was used both for prestige items such as various forms of jewelry and for tools. Cooper (2012) argues that control of this copper source, or control of the supply, led to wealth, prestige, and social complexity and permanent social inequality among the Ahtna in whose territory lay the main sources. Theirs was a stratified hunter-gatherer Athabaskan society consisting of nobles, commoners, and slaves.

The copper at Kletson was mined as placer nuggets in stream beds which were then cold-hammered into thin sheets, annealed, and formed into both utilitarian and prestige items with no evidence of smelting or foundry operations.[57] To date, copper artifacts have been found at 78 sites, some extensively excavated and some not, but only one copper item was found in over half the sites: six sites had fourteen or more items, with two having 138 and 170 items (Cooper 2012). The artifacts comprise jewelry (neckbands, ear or lip ornaments, bracelets) and tools (awls and drills, projectile points, knives and needles).[58] In only one village, *Dakah De'nin's* Village, were no flaked stone tools found (Cooper 2012, p. 557 citing Shinkwin 1979). Although experimental research suggests that annealed projectile points could be used more often than stone because they were less likely to break on impact and thus reduce the time in projectile point manufacture, they do not dominate the architectural record. Perhaps because of limited supply or perhaps because lithic technology was as good or perhaps better than currently understood.

When we speak about an absence of metal in North America, we generally mean foundry iron. Iron itself, however, was not unknown. Meteoric iron was present in Greenland and there are known supply routes emanating across the eastern Arctic (Atlas of Canada, Vol 1, Plate 13). As with copper, this too was cold hammered and formed into harpoon heads and other projectile points. Jolicoeur (2020) documents the presence of iron artifacts at sites across the Eastern Arctic but these meteoric iron tools/artifacts do not appear to have traded outside the region, nor do they dominate, with iron and stone harpoon heads not merely being found together at a site but dating from the same period.

Metal has been found in Alaska. In a meta-study, Dyakonov and co-authors (2019) document the spread of copper, bronze (copper and tin alloy) and non-meteoric (or foundry) iron through Northeastern Russia and Alaska. Figure 12 shows the spatial distribution of these

[56] There are at least 54 copper sites in the Yukon and Alaska but the highest concentration is in the Wrangell and St. Elias mountains (Cooper 2012: 569. Figure 2 shows the distribution of archaeological and geological sites.
[57] Antler rakes were used to comb the stream beds.
[58] Awls used to punch holes was the most common tool artifact. One set of tools appears to have been specific to snowshoes. Projectile points and copper knives could, of course, be used as spear heads to hunt or to raid.

artifacts at archaeological sites across the region.[59] The range of Kletson copper is shown in the ellipse and foundry sites shown in (red) triangles. Bronze casting or foundry sites date from the second millennium BCE and have been found along the major rivers in the Yakutia region due east of Chukotka. This technology had spread north up the major rivers from Asia taking a millennium to reach the Chukotka peninsula. Cast bronze items, however, traded across the Bering Strait not merely to coastal communities but also inland (Dyakonov et al 2019:356).

Foundry iron has been traced to metallurgical centers near Lake Baikal before the technology spread north into the Yakutia region and later to Chukotka, again dating to the first millennium (Dyakonov et al 2019, p. 363). It appears that the artifacts and then the technology travelled along the Lena and Amur Rivers, possibly also along the Okhotsk coast, or from the Sea of Japan (Dyakonov et al. 2019, p. 373). The artifacts comprise drills, gravers, and some knife blades. Although a few iron axes have been recovered, most of the foundry iron is present as small pieces or as small engraving tools used to carve walrus tusks; something more difficult to do with stone burins.[60] In contrast to the Yakutia and Chukotka regions, there is no current evidence of any metal smelting facilities in Alaska.

There are a number of points that must be made. First iron, even in small quantities, was used in North America prior to the arrival of European on the east coast (Cooper et al. 2016). There were, however, some problems. The most severe was that, at this time, iron was a frangible metal. It shattered. Ray (1978) and Carlos and Lewis (2010) document how the Hudson's Bay Company London directors spent over four decades trying to understand why Indigenous traders in sub-arctic Canada refused to buy any iron product with a blemish, even though no issue could be found with that item in England. Indigenous traders told the factors that such products would not withstand a northern winter because a blemish led to frost wedging and, as a result, axes and hatchets shattering and guns exploding.[61] The intensity of the Arctic winter limited iron use. What this meant was that Alaska rather than being a port of entry for iron implements and iron foundry technology into North America in the centuries before the arrival of iron technology with the Europeans was, in fact, the terminus of a Bering Strait trade in iron.

These iron artifacts are not the only evidence of a long-distance trade across northern Asia into Alaska. Kunz and Mills (2021) report on the discovery of eight undecorated glass

[59] Jolicoeur (2020) focuses on the widespread use of metal copper and meteoric iron in the Eastern North American Arctic 300-1300 AD. See his Figure 2 for sites with surviving metal artifacts.
[60] Even if the tool itself did not survive, tool handles with narrow slots, suitable only for iron tips, have been found. Most metal tools were undoubtedly reused and reworked until little metal was left (Cooper et al 2016).
[61] Traders at the Bay posts also experienced the same phenomenon.

beads (shown in Figure 13) in three Alaskan sites on the Noatak River, which connects the coast to the interior. The river discharges into Kotzebue Sound by Sheshalik, a known trading center just north of the Seward Peninsula. Beads formed an important and even essential component of trade in the eighteenth century. In the Hudson's Bay Company trade, beads were high quality Venetian Murano glass beads or Chinese beads imported into England by the East India Company. Indeed, the selectivity of Indigenous traders in their choice of beads by size and by color has been well documented and beads in the wrong color or the wrong size remained unsold and sent back to England (Carlos and Lewis 2010).

Kunz and Mills note that the style and physical characteristics of the beads show them to be Venetian. We should not think of beads as only a product for trade with Indigenous communities. Indeed, their manufacture in Murano and in other glass making areas tells us that there was an extensive European market for this product. The spun glass beads were found along with copper bracelet and bangles, part of a bangle fragment, and iron pendants. Although the glass beads themselves cannot be radiocarbon dated, the plant fibers wrapped around the overlapping ends of the bangle found in the same strata and close to the location of the beads could be.[62] Radiocarbon dating gives a range of results, with the authors arguing for a fifteenth century dating. While this is almost concurrent with the arrival of the Spanish in the Caribbean, it long predates the arrival of any European contact in Alaska or the possibility of trade goods moving across the continent from the east coast to Alaskan coastal communities. Rather, Mills and Kunz posit a route (traced out in Figure 14) from Italy which they name the 'snow road'. This putative route mirrors that of the iron foundries north of Lake Baykal and up the Lena or overland to the Chukotka peninsula. Whether one should place the weight of an international trade on eight glass beads found in three sites is a reasonable question. However, given these beads are about 0.5 centimeters each, the fact that they were found at all, is itself an amazing discovery.

By the first half of the second millennium Alaskan communities were part of the long-distance trade perhaps from Italy but certainly part of a trade from northern China and Japan. Any assertion that the Americas were never part of a cross continental trade is incorrect. The bronze and iron artifacts and glass beads found in these Alaskan sites document such a trade. Without a doubt, however, the volume of trade was small. We know from modern empirical work on trade volumes that the volume of trade is largest among nearest neighbors, and that the volume of trade is positively related to a country's GDP or population size. Communities

[62] Venetian glass bead-making was a closely-held guild secret until the early 16th century.

in Alaska and on the Chukotka peninsula were small with communities spread across a wide area. Some comprising, perhaps, two or three families and other ten to twenty families.[63] Even today, communities in Alaska outside Anchorage and Juneau remain small. The climate, the resource base, the population size attenuated the scale of local production, the surplus and the resulting volume of trade. The size of communities limited the scale of trade across the Bering Sea and the scale of trade with nearest neighbors, other small Athabascan communities living in the interior of Alaska. Perhaps the fact that after five to ten centuries we can find evidence of this long-distance trade should ask us to consider what else we have missed or misunderstood.

Conclusions

Although they often acknowledge the existence of pre-contact nations, the reality of that existence has generally been ignored by economic historians. When not ignored, designating Indigenous societies as primitive or mere hunter-gatherers erases the reality of Indigenous economies, constructing an assumption of North America as a pristine and empty land, one made productive by Europeans and their skills and institutions. But neither the term primitive nor hunter-gatherer captures the reality of pre-contact North American economies and both should probably be retired as incomplete stereotypes. There were organized complex agricultural communities with settled populations, who had opened and cleared land, domesticated plants, crafted irrigation systems, and determined the best rotation and fallow practices for a given region. These actions were not lost on colonial settlers (Coughlan and Nelson 2018). By ignoring this reality, we, in effect, transfer the capital investments made by these groups to Europeans. Not all communities were farmers. There were hunter/gather/forager communities. The reality was that many had dynamic and complex economies; some socially stratified and other more egalitarian. These communities are often missed due to their low intensity footprint.

In this paper, I discussed three non-agricultural Indigenous communities – the Chumash of California; the Blackfoot of Southern Alberta; and the Alaskan maritime communities of the Bering Strait region – focusing on specialization and trade based on comparative advantage.in the five hundred years before the Spanish arrived in the Caribbean. These three communities reflect very different regions of North America, each with its own opportunities and constraints. These economies were neither static nor unchanging; rather, the archaeological evidence

[63] Mason 2020.

describes complex economic and social relations. Intraregional trade among the Chumash allowed the development of skill/craft -based specialization, such as building sophisticated ocean-going boats, or the 'minting' of shell bead money. Trade, here, led to or was generated by social stratification with elites and a priestly caste. At the same time, the Chumash developed institutions such as a defined calendar of feasts designed to redistribute resources across groups or regions.

Among the Blackfoot, the evidence describes community-wide hunting strategies for bison and the evolution of a complex technology for bison preservation or pemmican production. Pemmican production required sophisticated social organization to manage the industrial scale of production and the labor requirements that embodied. Pemmican was traded inter-regionally to agricultural communities along the Missouri, perhaps for corn or other consumption goods but also for pottery and other items. The complex production site at Head-Smashed-In and other such kill sites belies any simplistic idea of mere hunter-gatherers describing, rather, dynamic social and production activities by combined Blackfoot communities and using trade to increase standards of living and to acquire goods that were not produced locally.

The maritime communities of the west coast of Alaska were fishing/gathering communities in a harsh environment and most closely resemble the stereotype of hunter/fisher/gatherer communities but these communities were never autarkic or unchanging. Mason (2020) describes this region as a "complex stew of hybrid cultures" that came about through international migration across the Bering Sea. Although these coastal communities were small, coastal and ocean whaling or sea-mammal hunting required social organization bringing together small communities with the resources shared or used in trade. The archaeological data shows that Alaskan maritime communities traded inland and across the Bering Strait. Trade did not just equilibrate local resource surpluses or deficits but allowed these communities to be part of a trade route stretching from Siberia to China and to the Mediterranean. Italian glass beads and bronze and iron artifacts testify to a trade that dated well before the arrival of Europeans on the East coast.

Indigenous trade routes, markets and rendezvous locations formed the backbone of road and water systems and market hubs for Europeans and Americans in the centuries after contact. We might talk of colonists and their descendants exploring North America, in reality they were shown the continent by named and unnamed Indigenous guides and communities. Extensive trade relations and markets, developed and refined complex technologies and production processes, and developed social, political, and economic institutions describe the reality of the

Indigenous world before contact and in all probability generated standards of living that were comparable to many in Europe.[64] Knowledge of this world is the product of archaeology, plant scientists, and chemists – to name a few - in conjunction using new technologies. North America before 1492 was not a pristine and empty land. Indeed, we should also ask how much of the country they built became the unmeasured bedrock of colonial American growth.

[64] Carlos and Lewis (2010) show that in 1740 the standard of living for Cree in the Hudson Bay hinterland was roughly equal to the highest wage workers in Europe at the time. European wage workers had better housing and more alcohol and tobacco but Indigenous has better food and clothing.

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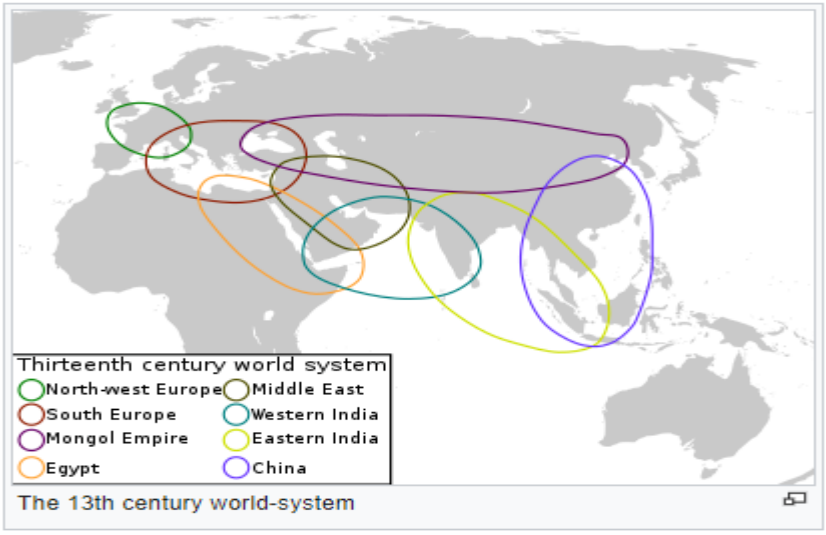
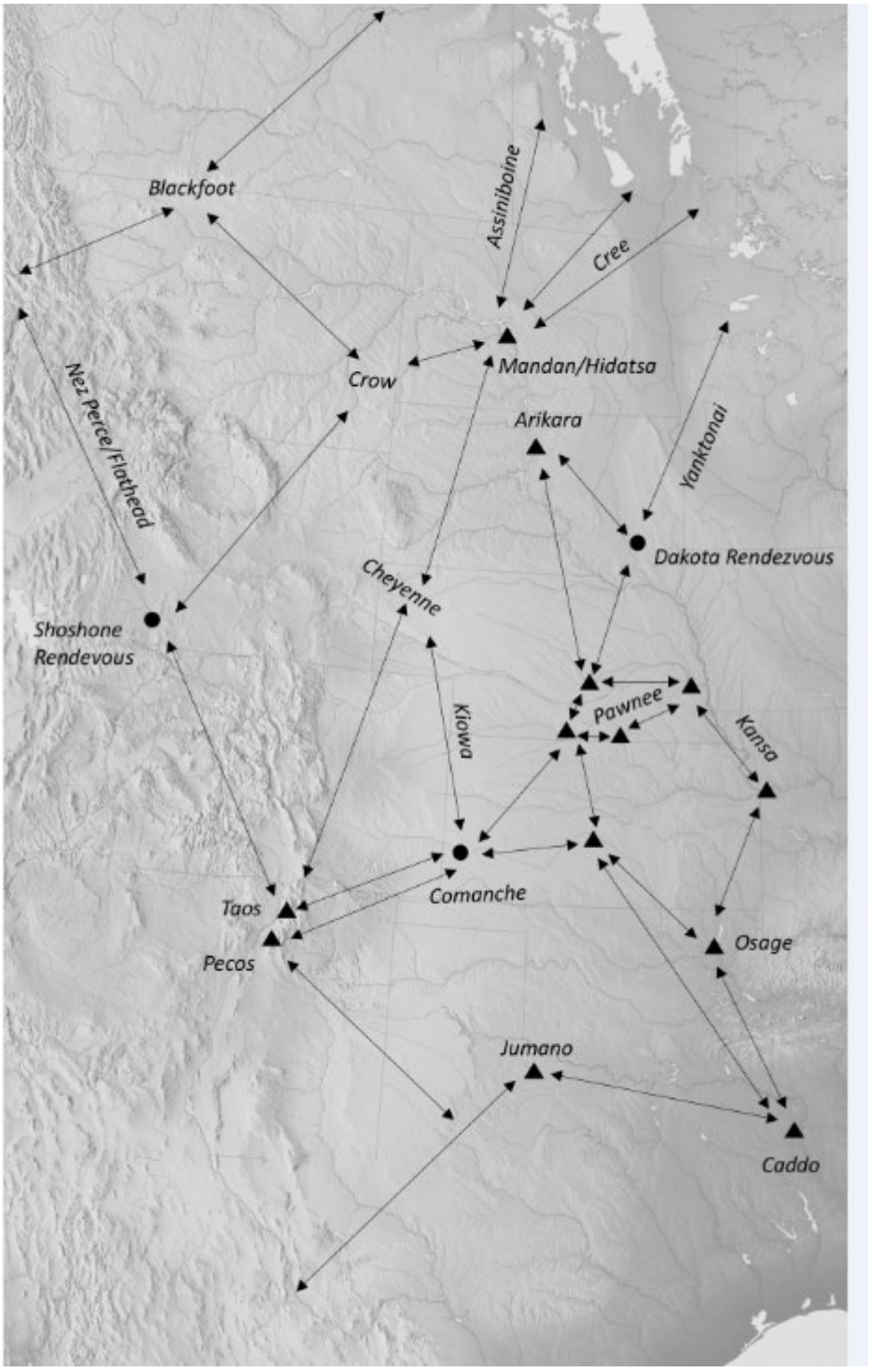
Figure 1 Thirteenth Century World-System Illustration



Source: https://www.researchgate.net/figure/The-eight-circuits-of-the-thirteenth-century-world-system-based-on-Abu-Lughod-1989-34_fig1_302425081

Figure 2 Indigenous Trade Networks across the Great Plains in the Colonial Era



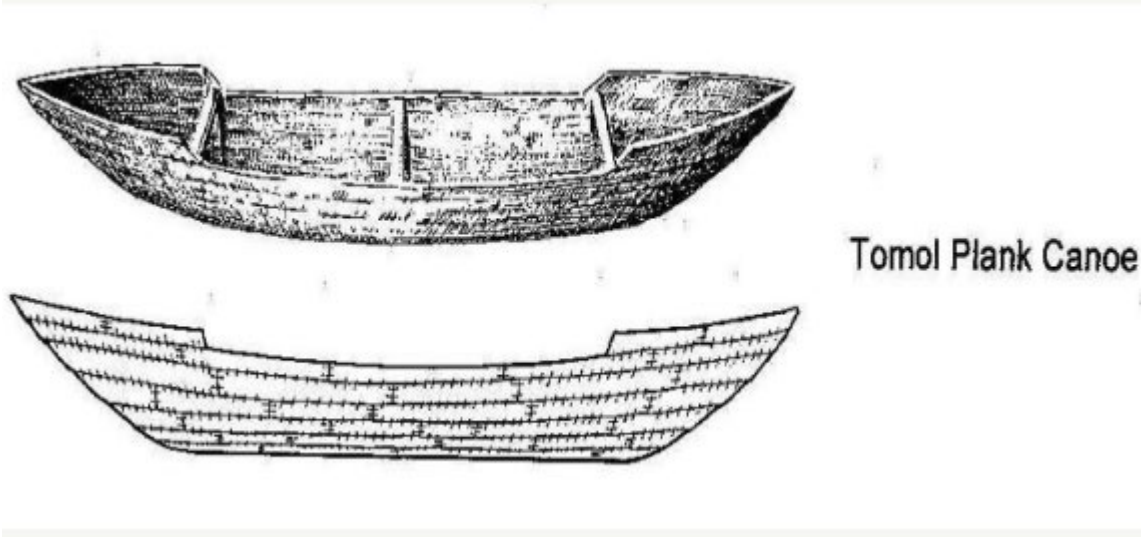
Source: Bamforth (2021: Figure 11.6) – With permission of the author

Figure 3: Chumash Villages: Coast and Channel Islands

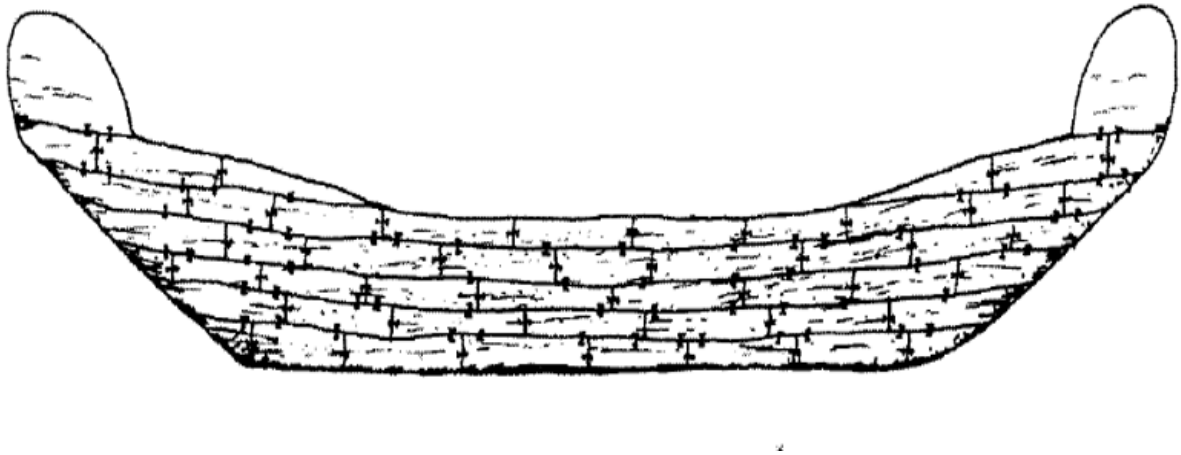
Source: https://upload.wikimedia.org/wikipedia/commons/8/8b/Chumash_villages.svg

Notes: Circles filled in white signify regional "capitals." Superscript crosses indicate mission villages. Adapted from map compiled by Chester King (1975) from the notes of John P Harrington. https://escholarship.org/content/qt8833s5k5/qt8833s5k5.pdf This file was derived from: USA California location map.svg

Figure 4: Chumash Tomol or Plank Canoe



Source https://www.parks.ca.gov/?page_id=24433



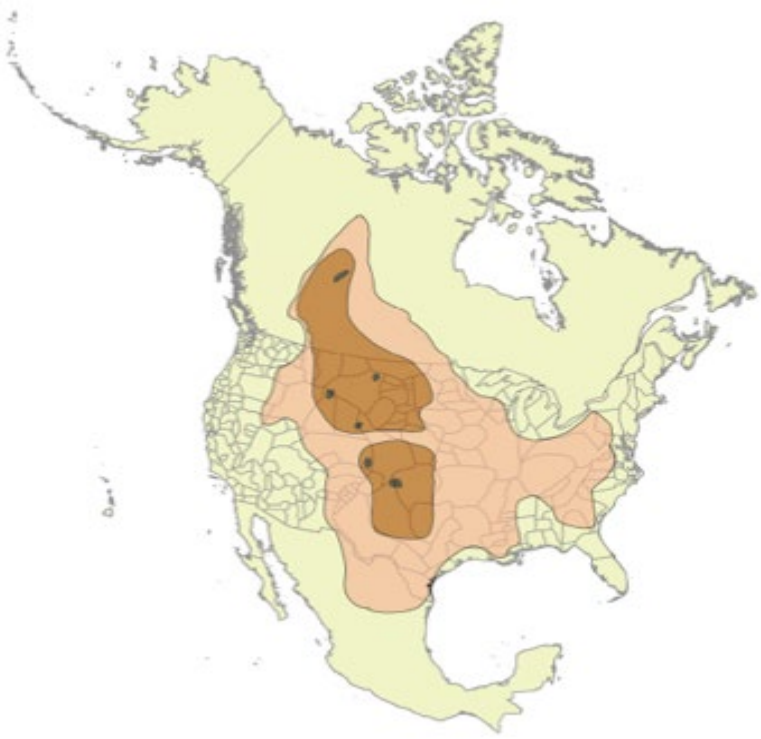
Source: Arnold 2007

Notes: Canoes had an average length of 20-23 feet or 6-7 meters. There is some speculation in the literature that they were the result of journeys by Polynesians to the west Coast of America. Tomol are an independent invention. Hawaii was settled after the introduction of the tomol by the Chumash. See La Croix (2019) for timing of settlement in Hawaii.

Figure 5: Chumash Cupped Beads

Chumash cupped beads from purple dwarf olive sea snails (*Olivella biplicata*). Image credit: Lynn Gamble / SBMNH Collection.

Figure 6: Bison Range Pre-Contact and Post-Contact with Europeans



Source: Feir, Gillezeau and Jones (2019)
Notes: This is a digitized version of the map by Hornaday (1889) illustrating the original range and decline of the North American bison. The orange illustrates bison range in 1730, tan the range in 1870, and the black dots denote the herds remaining in 1889 which were ranched in captivity. Tribal boundaries are displayed for the continental United States.

Figure 7: Stylistic Bison Jump

Source: Historical Atlas of Canada Vol 1. Plate 10

Figure 8: Head-Smashed-In Buffalo Jump

Head-Smashed-In Buffalo Jump © Maureen J. Flynn

Source: https://whc.unesco.org/en/list/158/

Figure 9 – Photographs of the archaeological Site

Source: Jack W Brink, *Imagining Head Smashed In: Aboriginal Buffalo Hunting on the Northern Plains*. Edmonton: Athabasca University Press, 2008.

Figure 10: Arctic Regions

Source:

Notes: The red line shows the climatological limit of Arctic for 50F isotherm July.

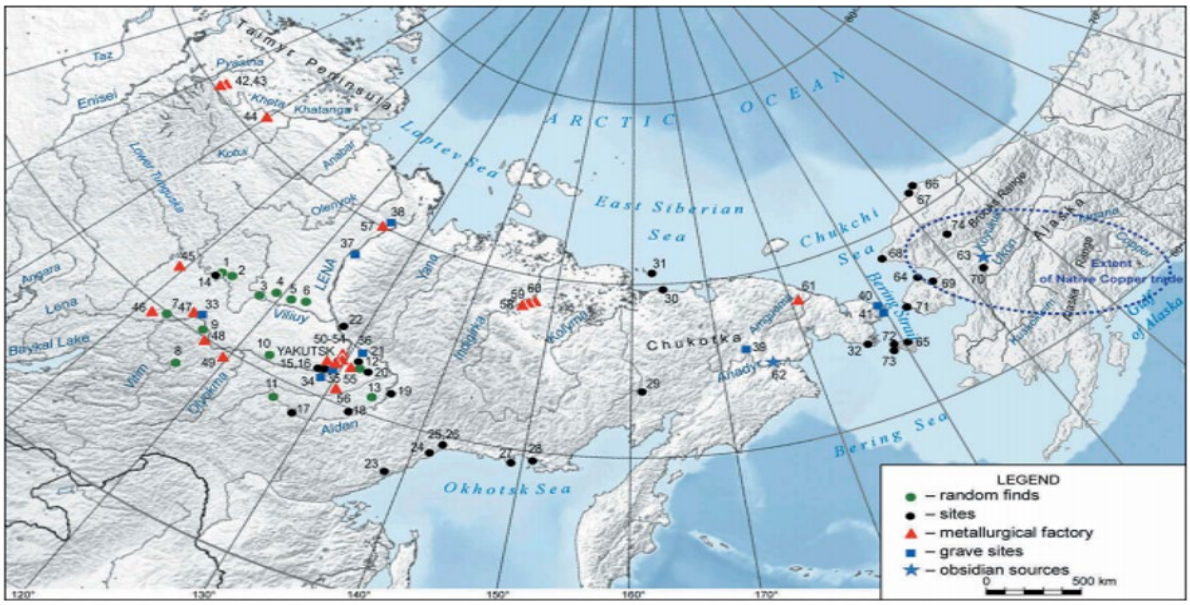
Figure 11: Preparation of a walrus hide and boat

PLATE 20. Woman splitting female walrus skin, Gambell, 1973. At this stage, only one-half of the large wooden drying frame is utilized.

55

Source: Braund, Stephen R. *The Skin Boats of Saint Laurence Island, Alaska*. Seattle and London: University of Washington Press, 1988. Plates 11 and 30.

Figure 12 Spatial Distribution of Bronze and Foundry Iron

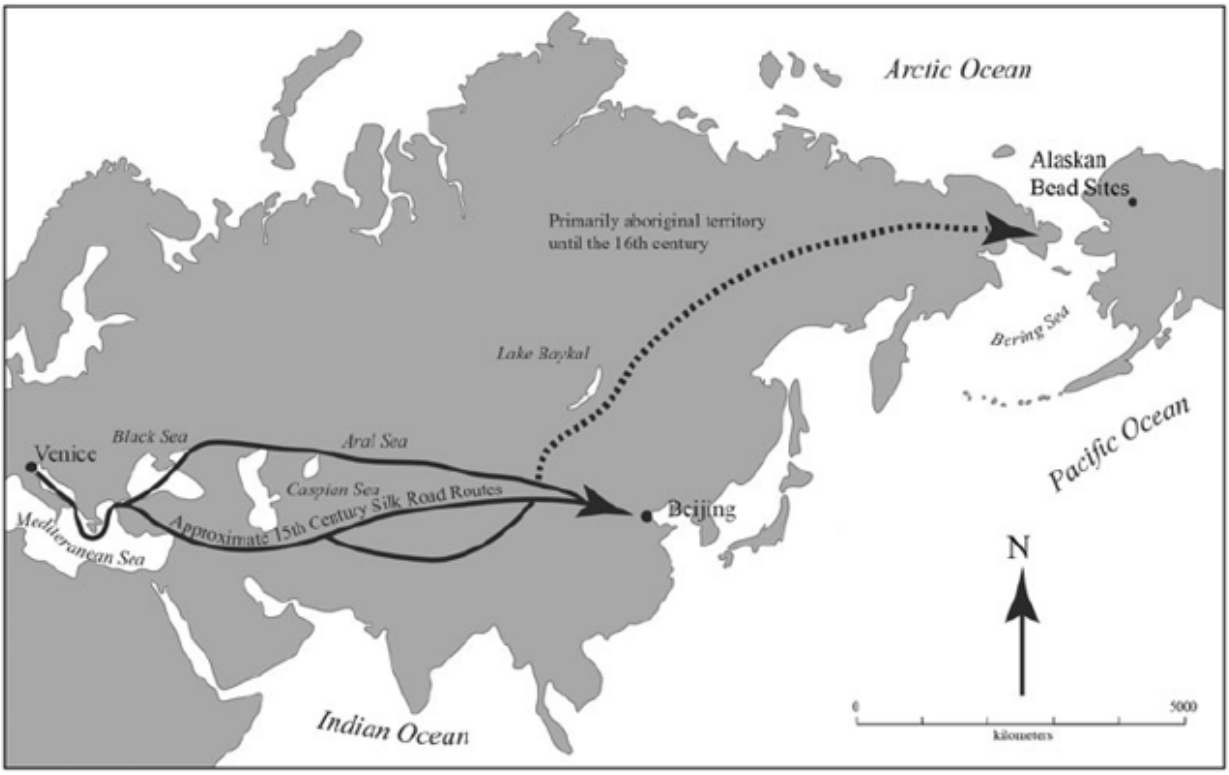


Source: Dyakonov et al (2019)

Figure 13: Venetian Glass Beads Found in Alaska

Source: Kunz and Mills (2021: 397) Figure 1.

Figure 14: ‘Snow Road’ to Alaska



Source: Kunz and Mills (2021) Figure 7.
Notes: The dotted line traces out a likely 17,000 km route by which beads from Europe arrived in Alaska in the fifteenth and sixteen centuries.