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Thoughts on the origin of Andean caravanning in Archaic transhumance.

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I would like to say that my interest in caravans and transhumance was first stimulated by Herman Melville (2011:31 [1851]), who, in telling the tale of Moby Dick, observes, "But who could show a cheek like Queequeg? which, barred with various tints, seemed like the Andes' western slope, to show forth in one array, contrasting climates, zone by zone." But that is not true. I began to think and write about prehistoric use of the Andes' steeply pitched environmental zones before I met Queequeg and, in fact, I have never been able to read Melville's book all the way through. However, whether one observes the zones of the Andean slopes first from the deck of a whaling ship, or from the window of a DC-6b, as I did in 1960, the zonation of environments from desert shore to naturally irrigated puna is striking and immediately informative.

The first human inhabitants of the Andean region must have seen early that, seasonally, most habitats of the Andes had resources for human use but, conversely, that only a few situations were suitable for year-around habitation. As population density rose, Early Archaic inhabitants must have observed that life was better if all or parts of the group moved to complementary zones of differential productivity in a system of seasonal transhumance. Usually this meant changes in altitude, as much or more than, "sideways" movements. Perhaps some members of the group, such as the elderly, the very young, and those that cared for them, stayed in base camps or oases that could support year-around habitation by reduced populations (Jolie et al. 2011:296). After initial colonization by free-ranging migratory bands, in the so-called Paleoindian Stage, the Archaic Stage saw a progressive "settling in" of regions that could support a larger population by stringing together complementary, probably seasonal, zones of production.

Until the development of agriculture and storage systems this would be the logical and obvious adjustment to rising population where resource zones were closely juxtaposed in the mountainous tropics. The Central Peruvian Andes, from the lowland tropical forest of the Upper Amazon, in the East, through the Ceja de la Montana rising to the puna grasslands and high forests (now largely disappeared) fed by the discharging montane glaciers, to the seasonally green intermontane valleys, and down the western slopes and valleys that flow to the cold, productive upwelling waters of the Humboldt Current, present a myriad of possibilities to those who are willing to move a short distance laterally. The sun follows the stars and rainfall, north and south, between the Tropics or Cancer and Capricorn, producing strong seasonality of precipitation, while the rain-shadow effects of the high Andes and Humboldt Current interact with the moving westerly and easterly wind belts to produce complicated and ever-changing Postglacial climate zones. Few regions on Earth display such a complicated mosaic of resources.

After initial settlement about 12,000 radiocarbon years ago, with its concentration on hunting and gathering the most energetically efficient large animals and concentrated plant foods, the Archaic foragers might simply have followed the seasonal migrations of prey animals such as guanaco, and the progression of maturing fruits, seeds, and tuberous calorie storage from zone to zone, up and down, higher valley to lower valley. Somewhere and sometime, in the ensuing several thousands of years, following prey animals changed to directing the movements of controlled herds and carrying of seeds,

fruits and tubers to new habitats, thus causing selective, adaptive genetic changes in the plants. The agro-pastoral “revolution” was more a slow and progressive evolution that took place through hundreds of human generations, as Central Andean peoples, at least in Peru, learned the best way to manage their zones of production—and it has always involved the movement of goods on human and animal backs along caravan routes governed by terrain, availability of water, and forage and human food.

When we enticed John Murra to Cornell, after Allan Holmberg’s unfortunate death, it became obvious to John and me that his vertically arranged archipelagos of resource zones, characteristic of later Andean civilization, had developed out of the seasonally transhumant way of life that I was studying, in Archaic times, in the Callejón de Huaylas of North-Central Peru. The location of this intermontane valley between the Cordillera Negra, with its easy access to the Pacific lowlands to the west, and the better-watered Cordillera Blanca to the east, is strategic. The Rio Santa has abundant perennial water and it is only a few hours walk to the surrounding puna grasslands, as well as to several important passes across the continental divide. Postglacial Archaic hunter-gatherers were well situated for deer and camelid hunting in the immediate environs and above. The passes through the Cordillera Blanca lead to a transitional flora and fauna and then, quickly, to the Amazonian or Neo-Tropico zone. This is a region of very high biological diversity. As I indicated long ago (Lynch 1967a, 1967b, 1971), the Callejón is an especially propitious region for those practicing seasonal transhumance between lower, seasonally dry sectors of the Rio Santa Valley and the high montane pastures. This pattern probably remained essentially the same after pastoralism involving domesticated animals became important.

Domestication of the camelids may well have preceded sedentary agriculture in the Andes or, quite likely, coincided with root crop cultivation. As archaeologists, we look first for a sharp change in the age structure (at death) in the animal population represented in our collection of bones. A high proportion of juveniles or newborn might indicate slaughter of unneeded males in a captive herd. In modern times another cause of alpaca and llama death in the first 40 days after birth is enterotoxemia and diarrhea. Practically unknown in wild free-ranging herds, these pathogens (*Clostridium* spp.) proliferate in the mud and filth of rainy season corralling. Another, weaker sign of pastoralism is a simple increase in the ratio of camelid to cervid bone in the same archaeological site, signaling a concentration on the animal to be domesticated. Wing (1977) and Wheeler (Pires-Ferreira et al. 1976) report this in sites on the Puna of Junín (Peru) beginning as early as 7500 BP. Another approach is to study microscopically observable differences in the structure of leg bones, which might differentiate highly stressed wild individuals from poorly fed captives whose freedom of movement was restricted.

Wild guanacos defecate in communal places, where their dung, still used in high altitude tuber cultivation, can be collected as easily as from corrals. Vicuñas form small herds and are quite territorial. Guanacos form larger and sometimes migratory herds, especially in the summer, and migrate seasonally, at least in the Southern Andes, moving regularly between lower valleys in the winter and summer pastures on the high mesas.

In the early, even accidental, stages of domestication it makes little difference whether guanaco hunters followed the natural herds or pastoralists herded their guanaco-llamas between summer and winter pasture. Guanacos have traditional wallowing places as well as defecation locales, where they can be conveniently surrounded and captured or killed. Surround hunting was practiced as late as Inka and early Colonial times. Captive animals that were not immediately needed for food could, quite easily, have become corralled herd animals.

At about the same time as I was winding down my investigations in Peru, when the Maoist *sendero luminoso* was making life hazardous, especially for gringo archaeologists and tourists, Lautaro Núñez and I became aware of the similarity of our thought and work, his in the Chilean Atacama and mine in Peru. Núñez enticed me south to work in his deserts, punas, and mountains, where, among other things he was studying Archaic transhumant systems and caravan routes, still very much alive, that tied together oases such as Pica, San Pedro de Atacama and Tilomonte with the resources of Tulán, the Precordillera, and even the higher regions of Bolivia and Argentina—crossing international frontiers willy-nilly to the chagrin of modern politicians. When I arrived in Chile in 1976, Lautaro was already talking about the ideas that were to be formalized and published in his famous paper (Núñez and Dillehay 1978; see also Núñez 1975, Núñez et al. 1975; Lynch 1975) on the “movilidad giratoria” of the caravan routes. He began to actively investigate the seasonal migrations of pastoralists, ancient and modern, up and down the Quebrada Tulán, from the Salar de Atacama to the Chilean and Argentine puna. It was becoming obvious from the work of Núñez, that transhumant Archaic hunters gradually had become pastoralists, horticulturalists, and caravan traders (Núñez et al. 2006, Núñez et al. 2007; Latorre et al. 2013).

In the 1980's my students in San Pedro de Atacama assured me that high value imports from Bolivia were still coming by caravan, along the old trails, rather than the motor roads that were carefully watched by the *carabineros* (Molina, R. 2010, 2014; Molina, G. 2012). The imports included products that I, of course, knew nothing about, including narcotics, small arms such as old Smith and Wesson revolvers, and even the llamas themselves. The first two were necessary for the happiness of the Chilean people, while the llamas were for re-export to North America. Chile was certified free of “hoof and mouth disease,” so the quickly nationalized camelids could enter the United States without a period of quarantine. The caravaners being experts on livestock diseases, Bolivian hoof and mouth disease never entered the United States, where llamas were popular as guard animals for sheep and pack animals in federal forests and parks, where sharp-hooved equids had been prohibited in an effort to reduce trail erosion.

While working from my bases in Arica and San Pedro de Atacama, I preferred my trusty 1981 Chevrolet C-20 pickup truck for transporting students, although the *carabineros* were unsure of the safety of my method. The student workers had all been instructed to read Isaiah Bowman's *Desert Trails of Atacama*, so I think they understood and appreciated bouncing around in the back of my truck. Motor roads had not been completely improved in the Atacama region but we usually managed to get to where we wanted to go, without depending too much on “shank's mare,” to which even the back of the truck usually was preferred. Sometimes, especially in the barren and remote Punta Negra basin, to the south of the Salar de Atacama, we resorted to truck caravans, borrowing, for security, a mining company four-wheel-drive truck or Land Cruiser with radio.

The present accidentally mimicked or continued past patterns in other ways as well. Whether traveling between the southern Second Region and the Arica Free Zone--where La Blanquita (as we called my *camioneta*) had to spend most of the year, for lack of having paid import taxes--or following the desert trails of the Atacama itself, I found myself stopping to camp for the night in my accustomed, favored locations, some undoubtedly used by ancient transhumant people and more recent caravaners. One was along the Rio Loa, approximately equidistant from Arica and San Pedro, where water and shelter at a reasonable altitude were always to be found.

Population centers were to be avoided by us *forasteros* to the region. We discovered several ancient campsites in this way, while seeking the same shelter and water, as at one important campsite, just off the Pampa de Oxa, along the trail to Timalchaca, where we enjoyed watching the wild guanaco, as they descended in the evening off the pampa. In earlier times their ancestors would have been hunted from this camp. This sheltered spot had been used recently as a corral, but also yielded artifacts from the Earliest Archaic times, including a fluted projectile point base and rock-shelter paintings of camelids.

In a canyon of the Rio Frio, south of the Salar de Punta Negra, we discovered the route of the Inka Road and sheltered in an Inka Tambo, which provided a beautiful view of the sun setting on the 5000-meter heights of Volcan Lulluillaco. This favored campsite clearly had been used by caravans preceding the Inka presence. After our several stopovers in the early 1980's, Lautaro Núñez and Calogero Santoro, a few years later rediscovered the Inka Tambo in their own archaeological survey for a mining company, in which they "collected" the clipboard that I had used to map the site, which they kindly returned to me in San Pedro. Other campsites around that Salar have been in sporadic use for thousands of years, such as the tip of the Punta Negra itself and a *tambo* at the base of the Barrancas Blancas, where fresh water springs can be found. There was even a grave marker for an unfortunate caravaner who had died on the trail, which is not unique in the prehistory of the Atacama Desert, as several caravaners "empampados" have been excavated in recent years (Cases et al. 2008; Knudson et al. 2012; Pimentel et al. 2011).

Persis Clarkson may tell you more of the important routes throughout the Tarapacá Desert where she and Luis Briones have studied associated geoglyphs, rock art, and sites (Clarkson and Briones 2001). The Pampa Tamarugal has several important traverses, along which we know now from Santoro's (Latorre et al 2013) and Valenzuela's (2004) work, there are not only the fairly recent petroglyphs showing the way but exceedingly ancient campsites and work stations left by probably transhumant hunters and gatherers that started to integrate a wide range of ecosystems from the Pacific coast to the high Andes.

In short, whether we call it seasonal transhumance by Archaic hunter-gatherers or archipelagos of resources united under Inkaic influence, or even in Tiwanaku times, the most efficient use of the many but scattered Andean resources will always involve movements of the people themselves or transportation of the goods by participants in the system. The broad outlines of this system were learned several millennia ago, and then refined through time and experience. Out of historical interest if nothing else we should learn about and preserve the caravan routes, even though often they cross political boundaries and sometimes get in the way of modern economic "progress" or even state security. As the discussions of this group will probably show, caravans, I suspect, not only cross political/national borders but can be difficult to administer by those who would control them and the transfer of goods from one resource center to another.

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