

Yumbo Demographics Before and After 1532

The Yumbos were the late prehispanic inhabitants of the western flank of the Andes in Pichincha province, northern Ecuador, and have been the subject of my archaeological research for the past several years. This paper looks at the declining Yumbo population following Spanish contact and it attempts to reconstruct and interpret their demographic history on the basis of the archaeological record as well as ethnohistoric and epidemiological data. The roles of infectious disease, missionary expansion, political control and economic regimes are factored in to propose some hypotheses regarding the fate of this northern Andean cloud forest nation that may or may not be entirely extinct.

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Introduction

The Western Pichincha Project, an archaeological exploration of the western flank of the Andes in northern Ecuador's Pichincha province, is a long-term research effort under my direction. Various previous articles and papers, including a few presented at these Midwest meetings, as well as a lengthy monograph (Lippi 1998) published two years ago in Ecuador summarize many of the results of the project to date. **[Show book and approximately 12 slides of project region and surveying strategy.]** This paper begins with a demographic summary first presented in that monograph and interprets those figures in terms of the available ecological, ethnohistoric and epidemiological records to shed some light on the fate of the Yumbo Indians, the principal indigenes of the research area centuries before today.

The Demographic History of the Yumbos

Census figures and estimates of Yumbo populations come down from various primary sources during the Spanish colonial period, and they have been cited by Salomon (1997) or other scholars. In my monograph on the archaeology of Western Pichincha and Yumbo culture history (Lippi 1998: 68-74), I compiled all known population figures pertaining to the Yumbos. This resulted in a 2½-page table (Ibid.: 69-71) in that monograph with numbers referring to specific settlements, areas or the entire region. It should be pointed out that approximately two thirds of the entire Western Pichincha research region was occupied by the Yumbos, while the western third of that region was occupied by the lowland Niguas

(Lippi 1998: 50, 324). The geographic boundary between Yumbos and Niguas corresponds roughly to the 1,000 meters above sea level line, which approximately demarcates the foot of the Andean Cordillera.

[Table 1] The earliest figures that are known come from an estimate made for 1560 only for the northern Yumbos, twenty-eight years after the conquest. From an estimate by the *visitador* of 4,000 tribute-payers for several northern Yumbo towns, I came up with a figure of 14,000 people by using the typical Andean conversion factor of 3.5 persons to each tribute-payer. This factor has been reliable throughout the Andes and is confirmed for Western Pichincha, where counts are often given together in approximately that ratio for tribute-payers and persons.¹ In order to calculate the entire Yumbo population for 1560, it was necessary to do some manipulation that may inspire less confidence than the conversion from *tributarios* to *ánimas*. I calculated the rate of depopulation from 1560 to the next available figures, which happen to pertain to 1582. That rate was found to be 76%, so I worked backward from the southern and central Yumbo population estimate of 1582 (2,742 people) to come up with an estimate for 1560 of 11,425 southern and central Yumbos. The implicit assumption was that all Yumbos experienced roughly the same rate of depopulation; I will return to consider that assumption shortly. Combining 11,425 with 14,000 and rounding off yields approximately 25,000 people. Putting this estimate together with the other census data for the Yumbos over time, I constructed **Table 2** to estimate depopulation rates for Yumbo territory.

¹ For 13 instances from the late 1500s for which tribute-payer and inhabitant counts are given together, the ratio varied from 4.2:1 to 3.0:1 with the average being exactly 3.5:1.

In my original calculations appearing in the monograph, I then argued that the population at the time of the Spanish conquest of the Andes, 1532, was probably close to the value for 1560. My reasons I gave at the time were the influx of Inca refugees from the highlands into the western montaña that may have offset somewhat Yumbo depopulation and relatively little contact between the Yumbos and Spanish. In hindsight, I now believe that conclusion was erroneous and that the method used for calculating the 1532 population of the Yumbos was not particularly trustworthy. In fact, I will also abandon 1532 as the baseline for reasons that will become obvious below.

Before moving on, I want to present some figures on population density, since estimates of density in different environments often have proven useful in trying to improve overall population estimates. That part of Western Pichincha that was occupied by the Yumbos as opposed to the Niguas, who occupied the piedmont and coastal plain west of the Yumbos, is approximately 4,200 km². That Yumbo region is described in ecological terms as being about one third cloud forest (low montane humid forest) and about two thirds subtropical rainforest (pre-montane very humid forest). If I stay for a moment with the 1560 estimate of 25,000 Yumbos, then the density works out to 6.0 persons/km². I have not located any other density estimates for other cloud forest habitats in South America, but I believe Denevan's (1976: 218-225) estimate for Amazonia is relevant. He calculated average *várzea* population density at the time of first Spanish contact at 14.6 persons/km² and *terra firme* density at 0.2 persons/km². I was not particularly disturbed that the cloud forest density for Western Pichincha appears to be much higher than for Amazonian *terra firme* since Western Pichincha is much less extensive and had close ties with the nearby

and densely populated northern Andean highlands. A value intermediate between *terra firme* and *várzea* densities seems entirely reasonable, though it is not possible to calculate just what the correct density might be.

All of the above calculations were completed a few years ago for the monograph. I now want to reconsider some of the assumptions and attempt a new series of estimates.

Factors Relevant to Extrapolating Yumbo Depopulation

It is well known among anthropologists, geographers, and historians who have studied Native American depopulation that a variety of factors resulted in differing mortality rates throughout the Western Hemisphere. Initial population density had a very significant bearing on epidemic virulence since contagion vectors are much stronger with denser populations. For that reason, we might expect less disease impact on the Yumbos than on their highland neighbors and trading partners. Nonetheless, the frequency and intensity of exchange between those two regions certainly would have accelerated the introduction—if not the rate of virulence—of infectious disease into the *montaña*. It is also important to keep in mind that the severity of epidemics tended to diminish over time as population densities continued to decrease. By the early 1600s it appears that epidemics were having less impact as densities dropped below 1 person/km². One must also consider that the virulence of infectious diseases lessened on subsequent appearances of diseases since many of the survivors had some resistance to them.

Another important factor, judging from various studies done of the Spanish realm, was the dominant type of Spanish institution, the three principal categories considered in such studies being *encomiendas*, missions and slavery. Both mortality rates and ethnocide were substantially less in areas of *encomiendas* (Newson 1995: 10). Salomon (1997: 29-31) has compiled records regarding the partitioning of both the highlands and the western montaña of Pichincha into cross-cutting *encomiendas* very soon after the establishment of Quito around 1534. The establishment of Catholic missions did not get underway until the 1570s (Ibid.: 50). Though Yumbos were occasionally forced to work in gold mines, in small *obrajes* or on road construction projects, there is no mention of systematic or widespread slavery within the region. The early decades under *encomiendas* might have mollified the effects of depopulation since population density would have been lower than around missions or areas of forced labor.

The southern Yumbos, under the authority of Dominican friars after 1570, were forced into *reducciones*, a practice not carried out among the central or northern Yumbos. It is also well known that the *reducciones* often resulted in increased mortality to disease due to the elevated population density. So it is quite possible that the southern Yumbos may have died off at a slightly faster rate than those farther north. The only known evidence that may be pertinent includes the census figures from the southern *reducción* of Cansacoto. The population of Cansacoto first increased as the forced relocation took effect in the 1580s, but then it leveled off at around 150-160 persons until 1606, if we are to believe the available figures (compiled in Lippi 1998: 72). How successful the Dominicans were at making all southern Yumbos move to the new settlements is very questionable. Clearly,

the *reducciones* of the southern Yumbos did not result in very large settlements. This is no doubt in part due to the fact that depopulation had already been high before the *reducciones* were established and because it was easy enough for the Yumbos to flee deeper into the forests to avoid Dominican authority.

Some diseases were more likely to spread faster and more virulently through the cooler and drier regions of the highlands while others were more virulent in the moister rainforests. For example, typhus is transmitted by a type of louse more commonly found in heavily clothed highland peoples than in nearly naked montaña peoples. On the other hand, malaria, which may or may not have been endemic prior to the coming of the Spanish, and yellow fever both spread rapidly through rainforest areas but had little impact in the cool highlands, which are too cool for the host mosquito. Since the major seaports were the principal points of entry of the Old World infectious diseases carried by ships from Spain, epidemics often began in Cartagena, Guayaquil or Lima and spread inland from there.

These and other factors make the matter of reconstructing aboriginal populations very complex. However, they give us clues about how to tweak the data rationally rather than simply on the basis of gross, implied assumptions. With these caveats in mind, we can move on to consider the earliest history of epidemics that most likely affected Yumbo population and culture before 1560. Our task here is to take the population estimate of 25,000 for 1560 and extrapolate it back to 1532 or even slightly earlier, since it is clear that epidemics spread into Ecuador ahead of the Spanish who first brought them to the

hemisphere. The common epidemiological distinction is maintained here between epidemics (local or regional outbreaks of infectious disease) and pandemics (continental outbreaks, which often began in the Antilles, passed to Mesomerica and continued through Central and South America). Pandemics occurred early as population densities were still high and the incidence of immunity was extremely low. Epidemics of various kinds frequently broke out later and then many diseases "settled in," or became endemic. At such time, a new strain of an old disease or the introduction of a totally new disease could set off a later epidemic; this happened in Ecuador, for example, with diphtheria in the 1600s, yellow fever in the 1700s and cholera in the 1800s.

These various epidemics will be presented in the following section, but the pertinent question here is to what extent they exacted a death toll among the Yumbos. In order to answer this very difficult question, I will begin by considering population densities and depopulation rates in neighboring highland regions.

Northern highland pre-contact populations have been estimated by Knapp (1984), based on estimates from other scholars as well as his own data, and by Salomon (1980). Greg Knapp (1984: 339) estimated the population for the Caranqui area, including some major chiefdoms, at 155,000 people. Using his Map 8 (Ibid.: 313), the area of his study can be calculated at approximately 2,800 km², which gives a population density of about 55 persons/km². Since the population fell to 16,800 by 1560, he estimated a depopulation ratio from 1532 to 1560 of 9.2 : 1 (Ibid.: 340). Given the ethnohistorical record for the Caranqui area as well as archaeological evidence for very abundant moundbuilding and

raised fields, it is expected that the density for this area would have been among the highest for all of the northern Andes. We must expect a significantly lower density for the Yumbos, even though it is likely, based on the southwestward expansion of the platform moundbuilding complex and of certain general ceramic similarities, that they had important dealings with the Caranqui and many Caranqui may even have settled among them. The fact is that the western *montaña* is simply not capable of sustaining as high a population as the exceedingly rich Andean basins.

Frank Salomon (1980: 84-85) argues against high estimates for el Valle de los Chillos, immediately southeast of Quito. He rejects claims for this fertile agricultural zone that give very high densities and estimates that the pre-contact density may have been on the order of 20-40 persons/km². Given an area for the valley of approximately 750 km², the total pre-contact population may have been 15,000-30,000. This fell to 5,000-10,000 (density of 6.5 –13.3 persons/km²) by 1559. Salomon's estimate for pre-contact numbers is based on a depopulation ratio of 3:1, which is what C.T. Smith (1970) purportedly found for the Central Andes; actually, Smith came up with an estimate of 3.5:1. If I modify Salomon's estimates using Smith's actual depopulation ratio, then the population estimate increases to 17,500-35,000 and the density estimate increases to 23.3-46.7/km². El Valle de los Chillos was known for its fertile soils and, again, it must be expected that Chillos population density was greater than found for the Yumbos.

Both of these sierra population centers had frequent trading contact with the Yumbos. If diseases from the highlands were quickly and repeatedly introduced into the western

montaña, but at the same time the population density of the western *montaña* was lower, how would one calculate the rate of depopulation there?

An ecological approach would involve the calculation of human carrying capacity of the cloud forest given a particular subsistence system. Though no figures have been found that are directly comparable, Carneiro's (1961) classic study of Kuikuru subsistence in central Brazil showed that a village of 145 persons remained fixed for about a century primarily by the cultivation of manioc in the surrounding forest in a 4 km radius. While it would appear from Carneiro's comments about the ease of cultivation and the tremendous crop surplus that the population was well under the carrying capacity, his figures give us a density of 1.1 persons/km². Yumbo density has been estimated for 1560 at nearly six times that value, though we cannot be sure to what extent the Yumbo were nomadic cultivators rather than semi-sedentary ones like the Kuikuru. Perhaps the only clue is the presence of so many *tola* (earthen mound) complexes in Yumbo territory, which might suggest a relatively sedentary population, if the mounds were associated with settlements rather than simply being more or less empty civic or ceremonial centers.

Correlating Yumbo Depopulation with Colonization and Epidemics

[Table 3] In order to try to gauge the depopulation ratio prior to 1560, I attempted to determine how closely post-1560 depopulation correlated with known epidemics in the region. If there is some significant positive correlation, then a gross estimate of pre-1560 epidemic effects could be made. The first step in the procedure was to compile a list of known epidemics that ravaged the northern Andes or, more particularly, the Quito area.

The Quito area is of greatest relevance here since a series of mountain passes immediately west of this area constituted the points of contact between highlanders and Yumbos (Salomon 1997; Lippi 1998). Two recent compilations of such epidemics have been made by Linda A. Newson (1995) and Noble David Cook (1998). Using these two sources, which corroborate each other to a high degree, I created Table 3 to show epidemics that probably had at least some impact on Pichincha province. The list includes seventeen separate periods of high contagion, though in fact some of those periods saw two or more piggybacked infectious diseases.

Perhaps the most infamous and horrible pandemic of all, one which impacted Ecuador as well as most of New Spain, was the smallpox outbreak that began in the Caribbean in 1518 and spread through the Andes roughly from 1524 to 1527. This first introduction of the horrible pox preceded the actual arrival of the Spanish in the Andes and is most likely the disease that killed Huayna Capac and several members of his family, including Ninan Cuyuchic, the son that Huayna Capac first designated as his heir. It seems quite clear that this pandemic hit the Inca Empire in two ways, both directly through death and indirectly by setting the scene for the civil war between Huáscar and Atahualpa. The death rate from this pandemic is estimated at various places in Mesoamerica and the Andes as varying from 50% to perhaps 90%, though it is possible that other factors, including the Aztec and Inca conquests, are included in those numbers. There is no question that the pandemic was catastrophic and widespread.

The second major onslaught of Old World infection was the measles pandemic that reached the Andes by 1532 and had deadly impact throughout much of the Andes through 1533. There were regional epidemics of a few diseases prior to 1531—probably including oroya fever, Peruvian warts, influenza, pneumonic plague, and pleurisy—along parts of Central America and the north Pacific coast of South America, but it is uncertain whether these diseases reached the Yumbo region.

Following a few years with no known epidemics, there was a third pandemic that included northern Ecuador and ran from 1541-1546. This pandemic was also very lethal since either typhus fever or pneumonic plague made its initial appearance and ravaged the population for about five years. Then there was a second smallpox epidemic around 1560 and, following another hiatus from infectious disease, a major outbreak of three infectious diseases—smallpox, measles and influenza—in the late 1580s. The 16th century apparently ended with the stage set for a new gamut of infections striking in the 1600s, though by then population density was quite low and the mortality rate was also diminished.

[Table 4] Proving that a correlation exists between arrival of an epidemic and accelerated depopulation is not cut and dry since the census figures available do not cover short periods focused on one particular epidemic or another, as can be seen in Table 4, which intercalates the available census figures with the epidemics. There is only a single period for which population estimates were close enough together in time that the population change can be linked almost directly to a major onslaught of epidemics, and that is the

period from 1585-91. We have census estimates for 1582 (immediately before the epidemics) and 1591 (at the tail end of the epidemics), giving us our closest approximation to a measurement of the direct effect of disease on mortality. During that brief nine-year period, the Yumbo population appears to have plummeted by more than a third, giving the highest recorded average annual depopulation rate, 4.3%, recorded for Western Pichincha. It should be noted that the annual rate is merely an average value for comparative purposes and does not accurately represent the compound depopulation rate of a geometric progression.

If six of the nine years between the censuses were epidemic years and if the total depopulation during those nine years was 39%, then it seems quite reasonable to assume that most of that figure, let's say 30%, pertains to the six years of epidemics. That would give an average loss of somewhere around 5% of the population for each year of epidemic.

Since this comparison suggests that the census figures do indeed respond in some substantial way to regional epidemics (as should be expected) and even suggests a depopulation rate, it is now possible to proceed with an attempt to estimate the pre-contact, pre-epidemic population for the Yumbos.

Estimating the Prehispanic Population of the Yumbos

To come up with an estimate of prehispanic Yumbo population, let's begin by replacing the average depopulation rate with a precise calculation given the figures that are available

and assuming that population growth (or decline) is best represented as a geometric progression (e.g., Tintner 1953: 51). **[Figure 1]** The standard formula is as follows:

$y_n = ar^{n-1}$, where y_n is the population to be calculated, a is the known population, r is the annual rate of population change, and n is the number of years.

In order to find r (the annual rate of population change), the population values for 1560 and 1582 (25,000 and 6,123, respectively) can be used in this formula. The yearly depopulation rate then comes out to be approximately 0.93 (or, in other words, a 7% loss per year). This is higher than my previous estimate of 5%, but let's proceed with some calculations to see how this works out. When r is set at 0.93 and plugged into the same equation to calculate the population change from 1560 back to 1524, then the initial population for 1524 comes out to be approximately 115,000. This provides a density for the Yumbos prior to face-to-face contact and the first epidemic of 27.4 persons/km². This density is approximately half that calculated for the Caranqui and at the low end of the range calculated for Los Chillos. That seems quite high for the *montaña*, especially when one considers that it is twice the density found by Denevan for the Amazonian *várzea*. This figure of 115,000 based on a yearly population decline of 7% is most likely much too high.

The likely source of error is the 1560 estimate by Padre Hernando de Villanueva. Upon returning to Salomon's (1997: 58) discussion of this number, we find that it is not the result

of a census taken in 1560 but rather is an estimate made in 1612 in which Villanueva assumed there had been a Yumbo depopulation of 4:1 since 1560. In other words, way back in 1612 Villanueva was already playing the sort of guessing game that we are now engaged in trying to estimate depopulation ratios. It is risky enough to make such an estimate, but to base our modern estimates upon his equally suspicious ancient estimate just compounds the uncertainty. This is probably the chief source of error in our calculations leading to the estimate of 115,000 Yumbos.

We could use Smith's (1970) estimate of a 3.5:1 depopulation rate; however, that is only an estimate that may or may not be valid for Los Chillos or for the Yumbo region. An alternative way to calculate the depopulation rate would be to move ahead in time past the Villanueva estimate to arrive at estimates that are based on actual *visitas*. There is also a risk in doing this because, as Salomon (1980: 186) points out, the *visitas* did not result in precise censuses but are estimates based on samplings. Nonetheless, such figures should be more reliable than Villanueva's intuition.

For the period from 1582-91, assuming the census figures are reasonably reliable, the rate can be calculated and is found to be nearly the same—0.94 (6% loss per year). If this rate is applied to the period from 1560-1582, the 1560 population can be calculated to be approximately 22,400 Yumbos. This is not too different from the original estimate of 25,000. However, it is almost certainly wrong to use $r = 0.94$ for 1560-1582 since most of that period (20 of 22 years) was apparently epidemic-free, whereas the other $r = 0.94$ holds for a period (1582-91) that was mostly fraught with epidemics (6 of 9 years). The r

value for 1560-82 cannot be calculated based on available figures. All that can be reasonably concluded is that r must be greater than 0.94 and, therefore, the Yumbo population in 1560 must be lower than 22,400 (or the previous estimate of 25,000).

[Table 5] Even though there is no mathematical solution for determining the depopulation rate since r cannot be determined exactly, for the sake of argument let's posit an r value for 1560-82 of 0.98. A depopulation decline of only 2% per year during this period of turmoil seems conservative. The calculation produces a 1560 Yumbo population of 9,350, which is certainly a moderate or, more likely, pusillanimous estimate. Remember that it is possible that the actual 1560 population is as high as 22,400, though that seems excessive.

Let's now calculate the 1524 population based on $r = 0.94$ for each epidemic year and $r = 0.98$ for each non-epidemic year. The result is 23,925, which yields an average population density for the Yumbos prior to contact of 5.7/km². Quite of bit of calculating was done to arrive at this figure, which turns out to be very close to the original estimate in the 1998 monograph. However, the method of deriving this second estimate was different, so a rough correspondence between the two results is satisfying.

It was then decided to use a third method to compute the baseline Yumbo population, this time coming up with what I consider a more liberal estimate to balance the conservative estimate of 9,350 previously obtained. This one is based on a feebler premise, which is that the western *montaña* average population density prior to Spanish contact may have

been approximately half of what was found for the Amazonian *várzea*. This is a somewhat intuitive estimate based only on a qualitative comparison of the *várzea* and western *montaña* habitats. Pre-Columbian *várzea* occupations included large riverfront towns surrounded by cultivated areas of tropical forest and both agricultural and fishing methods were very productive given the annually rejuvenated soils and exuberant aquatic fauna. Even though the Yumbos undoubtedly had some zones of relatively dense populations, probably around the many platform mound complexes of their territory, it is highly unlikely that a region relatively poor in fauna and fish and having large areas of very rugged terrain could have supported a population approaching that of the Omagua and other *várzea* inhabitants.

[Table 6] Denevan's (1976: 218-225) calculation of *várzea* density was 14.6 persons/km². Therefore, I would suggest a Yumbo maximum density at roughly 7-8/km². If we take 8 as the maximum for the entire Yumbo region of 4,200 km², then the maximum Yumbo population may have been approximately 34,000 people. For lack of any exact mathematical prediction, this rough ecologically-based estimate is probably the best we can do until the archaeological project has progressed to the point of providing better population estimates. I then take this somewhat generous estimate of 34,000 Yumbos and work through time using what I consider reasonable *r* values to see if we arrive in the vicinity of the census figures for 1582 and later. The *r* values are adjusted downward slightly from the previous method since more people will need to die in this model. Playing slightly with the figures, it can be seen in Table 6 that a population decline from 34,000 in 1524 to a little over 6,000 in 1582 can easily be accounted for using reasonable values for

r (0.98-0.93). While this estimate of 34,000 is probably too high, it is not by any means preposterous.

I have actually used other methods besides these three to try to estimate the baseline Yumbo population, but there is no point in including them here. The fact is that manipulating the figures results in changes of only several thousand people, which suggests to me that the three estimates of 25,000; 23,925 (which I probably ought to round off to 24,000); and 34,000 are probably all in the ballpark. We may never know more precisely than this how many Yumbos there were. Future archaeological surveying of a more systematic nature than has been possible so far may provide additional input to refine the estimates, or perhaps not. Yumbo population prior to Old World epidemics and Spanish contact was very likely somewhere between 22,000 and 30,000, giving an average population density across the cloud forest and subtropical rainforest region of about 5-8 persons/km². Perhaps we should be satisfied with such an estimate.

What Became of the Yumbos Who Did Not Succumb to Disease?

There may be some merit to this range of 22,000 to 30,000, but it should be remembered that additional complicating factors have some bearing on the actual population figure. Although this territory was occupied at least since about 1500 B.C., occupations were occasionally interrupted due to volcanic activity. In fact, it appears that there was abandonment of much of Yumbo territory on at least two occasions in less than 2,000 years. That such hiatuses interrupted normal population growth and expansion seems

highly probable, but the magnitude of this effect cannot be determined. Moreover, this tendency to downsizing and re-grouping may have been more than offset by an early post-conquest migration by Incas and possibly Caranquis into Yumbo territory.

Other factors in the decline of Yumbo population might include death through armed conflict or forced labor and decline in fertility or vitality. Salomon (1997: 34-37) has compiled some documents attesting to rebellion within Yumbo territory in the early decades following the Spanish conquest. Apparently the largest such rebellion took place around 1539 in the *encomienda* of Gonzalo Díez de Pinera, whose lands included certain central and southern Yumbos towns such as Mindo, Ñambe, Topo y Cocaniguas. The Cabildo of Quito sent in fifty soldiers to put down the vigorous rebellion. One account tells of the Spanish leader meeting a Yumbo chief at a fort where two thousand Indian warriors were gathered. One of the soldiers clarified (Ibid. 35-36) that the resistance included warriors from Otavalo and Quito as well as Yumbos. It is not clear how many, if any, of the Indians were killed in this rebellion; Some apparently fled and the Indian leaders then came forward to seek a peace pact, though why two thousand soldiers would surrender to fifty is not clear. The two Spanish versions of this episode are vague and seemingly incredible.

Most other "rebellions" in Yumbo territory were small-scale, local uprisings that continued sporadically until about 1570 (Ibid.: 36), and the death toll was almost certainly not very substantial.

There is some mention of armed conflict between Yumbos and Niguas, especially regarding the “Cansacoto war” of 1548. Cansacoto was a southern Yumbo town that later became a Dominican mission and *reducción* settlement. Word has it that the Niguas of Cocaniguas (on the Yumbo-Nigua border) attacked Yumbos of Cansacoto because they were too submissive to the Spanish *encomendero* (Ibid.). There are also a couple of reports of free Indians attacking acculturated Indians or of executing a chief who appeared to friendly to the Spanish (Ibid.). To what degree there was fighting and death among Yumbos or between Yumbos and Niguas cannot be determined.

Another factor that is currently impossible to comment on, except to acknowledge that they may have come into play, is the possible decrease in Yumbo fertility and vitality. Certain diseases may have resulted in chronic health problems, including fertility, and the upheaval associated with these epidemics and Spanish dominance may also have lowered the will of the Yumbos to marry and procreate. Such reactions have been common among indigenous peoples throughout the world when faced with severe population loss and cultural disintegration.

The *encomienda* system may have had limited impact on the Yumbos early on because the *encomenderos*, to a large degree, spent very little if any time at all in the Yumbo portions of their concessions. If Yumbos were instructed to put themselves at the service

of absentee landlords who were completely unfamiliar with the territory, then they certainly had the ability to escape this servitude by fleeing their homes and heading to more remote areas within the western rainforests. Beginning with the coming of Catholic missions in the 1570s, this process of flight may have been accelerated as the friars, monks and clerics settled within Yumbo territory and established a more or less continuous presence and were more demanding of the Yumbos. However, judging by what historical records are available, this impact on the Yumbos waxed very gradually and may not have been too significant until the mid- to late 1600s. Salomon (1997: 84) found Indian testimony around 1655 that many Yumbos fled from Spanish settlements out of fear of being forced to labor in the mines of the region. It is also fairly well documented for Mindo, an important central Yumbo town, that the Catholic parish there gradually disappeared due to the declining native population. By 1670 the maintenance of the mission was no longer viable due to "extreme depopulation" and this trend continued right on through to about 1900. It is quite likely that tribute abuses by the series of priests plus road building projects that forced the Mindo Yumbos to leave their homes and work in a neighboring area accelerated the flight of Indians from the ancient Mindo settlement. It is highly likely that this situation was repeated to one degree or another in various other Yumbo towns.

What exactly became of the Yumbos who fled from the Spanish authorities? While some may have dispersed in the cloud forest region not too far from Quito, it is more likely that the general movement of fleeing natives would have been westward toward Nigua territory. Spanish presence in the Andean piedmont and the coastal plain was even less than in the western *montaña*. The primary limiting factor would have been the willingness of the

Niguas, occasional trading partners and occasional foes of the Yumbos, to accept this refugees into their territory. There may also have been migrations southward into Sigchos territory or northward into the Intag region, probably inhabited by Caranqui colonists. Such north-south migrations would not necessarily have helped the Yumbos escape Spanish domination; a westward migration would have been more effective. There is at least one historical reference (Salomon 1997: 80) to montaña Indians that sought refuge near “Palenque” on the Daule River on Ecuador’s central coastal plain. Assuming that many Yumbos did manage to settle among the Niguas or perhaps among other coastal groups such as the Campaces to the south, it can only be assumed that they became absorbed into Nigua or Campas culture, which themselves declined and mostly disappeared over the course of the 17th and 18th centuries.

Financial and work burdens on the Yumbos did not become significant until about twenty years after the division of their territory into *encomiendas*. By the 1550s there is evidence provided by Salomon (Ibid.: 38) of the implementation of tribute on Yumbos as well as the establishment of workshops for the commercialization of textiles. Both of these developments furthered the acculturation of pacified Yumbos and strengthened Spanish dominance, which before that time had been ephemeral and tenuous. While there is no reason to believe that there was any measurable increase in Yumbo population decline due to this economic burden (following upon tribute imposed by earlier Inca oppressors), the effect of these economic measures was to hasten the demise of traditional Yumbo culture and the cultural absorption of the Yumbos into colonial Spanish—American society.

For those Yumbos that avoided Spanish dominance and found new territories to occupy, there would have been significant changes in their traditional social and political relations. Some Yumbo communities undoubtedly disappeared for good while others fused to form new ethnic groups.

Salomon (1997:) has hypothesized that the Tsáchila ("Colorados") are one such group that resulted from historic-period ethnogenesis in the 1700s following severe Yumbo depopulation. The Tsáchila may well have been remnant groups of Yumbos and/or Niguas that came together and occupied the southern Yumbo territory prior to migrating somewhat southwest towards Santo Domingo, where they are found today. This hypothesis runs counter to the beliefs of some (e.g., Jijón y Caamaño 1941:110, Navas de Pozo 1990:55) that the Tsáchila are descendants of the Campaces that occupied the central coast of Ecuador or of others (especially Karsten 1988 [1924]: 56) that the Tsáchila originated in the central highlands of Ecuador. An effort is currently underway to determine if the Tsáchila have any oral tradition or knowledge of petroglyphs that have been discovered by this archaeological project in the area of their abandoned settlement of Cocaniguas. If it is found that certain archaeological remains in that area can be tied directly to the Tsáchila, then some progress will be made on this front of determining the origin of the Tsáchila.

A final devastating blow to the Yumbos, as well as to Spaniards who had settled in Yumbo territory was the 1660 eruption of Guagua Pichincha. This resulted in an ash fall of a few inches over the city of Quito, immediately east of the volcano and covered nearly all of Western Pichincha with the same. The 1660 tephra layer is visible throughout most of the region and easily recognizable, in most cases just several centimeters below the modern ground surface. While this was by no means the most substantial volcanic eruption to affect the Yumbo region, it did apparently cause the

temporary abandonment of much of this region. Just how long that hiatus lasted may be suggested in part by archaeological evidence. Throughout the entire Western Pichincha research region, very little foreign pottery was found, and all of it (with the exception of some examples of obviously modern earthenware) was of the same type, which I have identified as Panama Polychrome **[Figures 2-3]** (as described by Goggin 1968: 163-165). This is a Spanish-type *majolica* (known as *delft* in northern Europe) that has a bright orange paste and a glazed white finish with polychrome painting primarily in green, black and yellow.

It seems astounding that only a single type of non-local pottery would be found in the entire region, but some knowledge of the history of Spanish settlement and earthenware manufacture dispels a little of the mystery. It has been suggested by Goggin (*Ibid.*) that this was made in Lima during the 17th century, but Lima seems unlikely as the point of origin since the *majolica* has been found to date only in Panama and Ecuador. No glazed European ceramics were made in Ecuador, according to Kennedy Troya (1990: 56-57),

until 1767. That suggests strongly that Panama was the place of manufacture of Panama Polychrome and that it was something of a unique product in the area, most Spaniards apparently getting by with native-made ceramics. It is entirely reasonable to assume that the Panama Polychrome sherds found in Yumbo territory were used by the Spanish of the 17th century and not the natives. The primary Spanish presence in Yumbo territory by actual residents rather than visitors was of the missionaries.

The absence of any other majolicas in Western Pichincha is difficult to explain, though one plausible account is that the eruption of Guagua Pichincha in 1660 put an end to most non-native settlement in Yumbo territory until fairly recent times. When Ecuador began manufacturing its own majolica, there were very few Spaniards or mestizos living in Yumbo territory who might have used it there. So the solo appearance of Panama Polychrome in Western Pichincha may be due to its early "monopoly" in Ecuador and the subsequent abandonment of most of the region prior to the introduction of other majolica wares.

This does not really bear directly on the matter of Yumbo abandonment of their territory due to the volcano. At best, it suggests that Spanish settlement in the region was interrupted in an important way for a long time. Historian of the Merced Order in Ecuador, Monroy (1935: 164-66) wrote about the devastation caused by the 1660 eruption, of how the haciendas and sugar mills were destroyed. For the Yumbos, who were not dependent on the infrastructure that the Spaniards required, the hiatus was probably much shorter. Several centimeters of volcanic ash would have been quickly washed away in

mountainous areas and they could have returned before too long (a few months or years?) to re-establish themselves. Nonetheless, it is likely that some Yumbos would have taken this additional disruption of their lives as an excuse to emigrate permanently.

Looking for Vestiges of the Yumbos in Recent Times

While the emergence of historic-period ethnic groups, possibly including the Tsáchila, may have occurred in Yumbo territory, it is highly likely that many Yumbo peoples gradually were absorbed into the emerging Ecuadorian mestizo and mulatto cultures as decades and centuries went by. It seems quite certain that Yumbos were on the verge of cultural extinction by the end of the 19th century, yet certain oral traditions about contemporary Yumbo descendants have been found among a very small number of contemporary mestizo inhabitants of the region. Four Yumbo communities, including one that is abandoned and lost, have some semblance of local oral tradition that deserves our attention here.

Salomon (1997:) again led the way by finding an informant in the town of Nanegal who had taken it upon itself to learn and pass on some of this local oral tradition. I subsequently befriended the same individual and heard the same stories recounted. Adán Ortiz says that the indigenous town of Nanegal was found a few kilometers to the south of its current location and that it was moved in 1906 to its present location after the "last Yumbo chief" of Nanegal, Ramón Nachillón, and his wife Manuela Acosta donated land for

a new town. Ortiz says that this couple always dressed in traditional Yumbo clothing. It was also told by Ortiz that an elderly inhabitant of Nanegal, Tomás Jurado, was the grandson of this last traditional Yumbo couple. I once attempted to interview Sr. Jurado, but he was in his nineties and claimed not to remember anything about his roots. He died in July, 1996, reportedly almost 100 years old.

After having heard the story of Nachillón and his wife on a few occasions, I had the opportunity to meet a grandson of Tomás Jurado and got quite a different story. Vicente Molina told me that his great grandparents referred to by Ortiz were not Yumbos but actually were migrants from Colombia. He believes they left Colombia to escape war. Molina claims that his great grandfather called himself "*cacique*" because he was an informal community leader but that he was not Yumbo and never dressed as if he were. These two distinctly different versions are hard to assess; it was clear that Molina did not hold Ortiz in very high regard, and it is also possible that Molina may not have wanted his family to be identified as Indian; I have no way of knowing for sure.

There are two very large boulders in the Alambí River next to Nanegal that are known as "La Yumba" and "El Yumbo" and Ortiz says that there was a Yumbo story about these one-time lovers. There is a village a few kilometers from Nanegal that is today known as Santa Marianita but whose traditional name as recently as the 1970s was Yumbos.

Pachijal is a tiny settlement near the Pachijal River and in an area that must have been near the border between Yumbos and Niguas in ancient times. A few people living in the area recounted that Pachijal is an old Yumbo village that never completely disappeared and that some inhabitants are descended from Yumbos as well as Spanish. One of these that formerly lived in Pachijal lived most of her life in Mindo, where she is known as Mama Chepa and is considered the granddaughter of the last Yumbo chief of Mindo. I also attempted to interview her in the late 1980s, but she was very old and was suffering from dementia.

The father of one of my excavation workers in Mindo was an elderly man who is now in his nineties and who lives in one of the only traditional barbarcoa structures that I have seen in all of Western Pichincha **[slide]**. He is also the last man in Mindo to make the traditional baskets (chalias) from bamboo. Neither this elderly man, Ricardo Arias, nor his son, Héctor Arias, a very good worker of mine, could provide any information about traditional life in Mindo. A local hacienda owner (now deceased), César Garzón Thomas, has written a family history about Mindo. His own grandfather purchased most of the Mindo valley in 1902 after a series of natural catastrophes had left it completely uninhabited, and he eventually donated land for a new town and a private school. In this history, Mindo had all but disappeared by the late 1800s and nothing was known of its prior inhabitants.

Sensing that there was more to be learned about the history of Mindo and that there might be Yumbo vestiges (other than archaeological ones) to be found, I enlisted the aid of three

ethnographers and ethnohistorians from Quito to undertake a study of the area. Despite a concerted attempt lasting a few weeks and involving lots of interviews as well as archival studies, they were not able to find any more information about the Yumbos than what we had previously learned.

The final town for which there is some oral tradition is that of Cocaniguas, a Yumbo-Nigua border settlement in the south of the region. This town was abandoned during the historic period and has never been positively identified, though we made a concerted effort to locate it and there are lots of stories of people having come across ruins of this town in the rainforest. The most interesting of these stories was obtained by a local businessman and politician in Santo Domingo de los Colorados, who has cultivated a good relationship with many Tsáchila elders. He recounts the story that the Tsáchila lived in Cocaniguas as recently as the mid 1800s but that they abandoned the settlement because of an epidemic. It was at that time that they settled southwest of there near Santo Domingo. **[5 slides]** The Tsáchila still live in the vicinity of Sto. Domingo where they occupy eight small reserves and are trying to maintain what little land they have left to them as well as what survives of their traditional culture.

While many stories exist about the famed Cocaniguas, to date its whereabouts is unknown, as is the history of the Tsáchila. They are certainly the best candidates we have for a surviving population of Yumbos, or perhaps Yumbo-Niguas, but only intensive

archaeological work combined with ethnographic studies will shed some light on the enigma of the Tsáchila.

References Cited

Athens, John Stephen, II

1979 *El Proceso Evolutivo en las Sociedades Complejas y la Ocupación del Período Tardío-Cara en los Andes Septentrionales del Ecuador*. Colección Pendoneros no. 2, Instituto Otavaleño de Antropología, Otavalo, Ecuador.

Cook, Noble David

1998 *Born to Die: Disease and New World Conquest, 1492-1650*. Cambridge University Press, Cambridge, England.

Goggin, John M.

1968 *Spanish Majolica in the New World: Types of the Sixteenth to Eighteenth Centuries*. Yale University Publications in Anthropology no. 72, Yale University Press, New Haven, CT.

Jijón y Caamaño

1941 *El Ecuador Interandino y Occidental Antes de la Conquista Castellana*, Tomo II, Editorial Ecuatoriana, Quito.

Karsten, Rafael

1988 [originally published in 1924] *Los Indios Colorados del Oeste Ecuatoriano*. En *Tsáchila: Los Clásicos de la Etnografía Sobre los Colorados (1905-1950)*, editado por José E. Juncoso, pp. 55-78, Abya-Yala, Quito.

Kennedy Troya, Alexandra

1990 "Apuntes sobre Arquitectura en Tierra y Cerámica en la Colonia." En *Cerámica Colonial y Vida Cotidiana*, coordinado por Jaime Idrovo y Alexandra Kennedy, pp. 35-59, Fundación Paul Rivet, Cuenca, Ecuador.

Knapp, Gregory

1984 *Soil, Slope and Water in the Equatorial Andes: A Study of Prehistoric Agricultural Adaptation*. Ph.D. dissertation, Department of Geography, University of Wisconsin—Madison.

Lippi, Ronald D.

1998 *Una Exploración Arqueológica del Pichincha Occidental, Ecuador*. Museo

Jijón y Caamaño, Pontificia Universidad Católica del Ecuador, Consejo Provincial de Pichincha, Banco Interamericano de Desarrollo, Quito.

Monroy, Joel L.

1935 *Los Religiosos de la Merced en la Costa del Antiguo Reino de Quito*. Editorial Labor, Quito.

Navas de Pozo, Yolanda

1990 *Angamarca en el Siglo XVI*. Abya-Yala, Quito.

Newson, Linda A.

1995 *Life and Death in Early Colonial Ecuador*. University of Oklahoma Press, Norman, Oklahoma.

Salomon, Frank

1980 *Los Señores Etnicos de Quito en la Epoca de los Incas*. Colección Pendoneros no. 10, Instituto Otavaleño de Antropología, Otavalo, Ecuador.

1997 *Los Yumbos, Niguas y Tsáchila o "Colorados" Durante la Colonia Española*. Ediciones Abya-Yala, Quito.

Smith, C.T.

1970 "Depopulation of the Central Andes in the 16th Century." *Current Anthropology* 11(4-5): 453-464.

Tintner, Gerhard

1953 *Mathematics and Statistics for Economists*. Rinehart & Co., Inc., New York.

Figure 1. Population growth (or decline) formula

$$y_n = ar^{n-1}$$

y_n	the population to be calculated
a	the known initial population
r	the annual rate of change
n	the number of years

$$\log y_n = \log a + (n-1) \log r$$

Table 1. Estimating 1560 Yumbo Population

Step	Calculation	Tributarios	Conversion Factor	Animas	Area (km ²)	Density (/km ²)
1	northern Yumbos, 1560	4,000	3.5	14,000		
2	northern Yumbos, 1582	1,750	3.5	3,381		
3	northern Yumbo decline			10,619		
4	% decline, 1560-1582			76% (actual)		
5	southern/central Yumbos, 1582	761	3.6	2,742		
6	% decline, 1560-1582			76% (est.)		
7	southern/central Yumbos, 1560	3,174	3.6	11,425 (est.)		
8	All Yumbos, 1560	7,174	3.5	25,425 (est.)		
9	All Yumbos, 1560 (round off)	7,140	3.5	25,000 (rounded)		
10	Yumbo population density			25,000	4,200	6.0

Table 2. Yumbo Depopulation

(as estimated in Lippi 1998, Table 3.3)

Year	Yumbo Population	Population Density (/km ²)	% Decrease During Period	Ave. % Decrease Per Year	% Decrease Since 1560
1532	??	??	??	??	n/a
1560	25,000 (est.)	6.0	??	??	n/a
1582	6,123	1.5	76%	3.4%	76%
1591	3,752	0.9	39%	4.3%	85%
1649	3,000	0.7	20%	0.3%	88%
1780	944	0.2	69%	0.5%	96%
1900	0	0	100%	0.8%	100%

Table 3. Chronology of Early Epidemics in Northern Ecuador (2 pages)

Years	Disease(s)	Comments
1524-27	smallpox	began in Caribbean in 1518, devastating all over; pandemic
1530-31	various diseases	mostly in Central America, may have reached north Andes
1531	oroya fever and verruga peruana	north Pacific coast of S. Am.
1532-33	measles	very virulent pandemic
1541-46	typhus or pneumonic plague	also livestock epidemics and possible intro of malaria in 1540s
1558-62	smallpox	Quito area devastated
1585-91	smallpox, measles and influenza	major outbreak in Quito in 1587 pneumonic plague possible too pandemic
1604	unidentified	prevalent around Quito
1606	diphtheria	prevalent around Quito

1611-12	measles, typhus and scarlet fever	prevalent around Quito
1614	typhus, diphtheria	prevalent around Quito
1618	measles	severe throughout Ecuador
1630-34	typhus	mostly in south Colombia
1639	typhus	severe in Quito
1645-49	diphtheria and measles	prevalent around Quito
1740	yellow fever	spread from Guayaquil
1743	yellow fever	spread from Guayaquil

Table 3 continued

Table 4. Intercalation of Epidemics and Depopulation Figures

(including only epidemics which certainly reached the Yumbos)

Epidemic Year(s)	Epidemics	Yumbo Depopulation	Census Year	Depopulation within period	Depopulation per year
1524-27	smallpox				
1532-33	measles				
1541-46	typhus or pneumonic plague				
1558-62	smallpox	from unknown to 25,000	1560	unknown	unknown
1563-84	apparent hiatus in epidemics	from 25,000 to 6,123	1582	76%	3.4%
1585-91	smallpox, measles and influenza				
1592-1603	apparent hiatus in epidemics	from 6,123 to 3,752	1591	39%	4.3%
1604	unidentified epidemic				
1606	diphtheria				
1611-12	measles, typhus and scarlet fever				
1614	typhus and diphtheria				
1618	measles				
1619-1638	apparent hiatus in epidemics				
1645-49	diphtheria and measles	from 3,752 to 3,000	1649	20%	0.3%
1650-1739	little information on epidemics				
1740	yellow fever	from 3,000 to 944	1780	69%	0.5%

Table 5. Revised Estimate of Baseline Yumbo Population (assuming r values for epidemic and non-epidemic years and working backward in time) "Conservative Estimate"

Year	Yumbo Population	Ave. Depop. Rate (r) per yr.	Population Density (/km ²)	% Decrease During Period	% Decrease Since 1524
1900	0		0		
1780	944	n/a	0.2	100%	100%
1649	3,000	0.991	0.7	69%	96%
1591	3,752	0.996	0.9	20%	87%
1582	6,123	0.94	1.5	39%	84%
1560	9,350	0.94	2.2	35%	74%
1558	9,950	0.94	2.4	6%	61%
1546	12,425	0.98	3.0	20%	58%
1541	15,915	0.94	3.8	22%	48%
1533	18,330	0.98	4.4	13%	33%
1532	19,500	0.94	4.6	6%	23%
1527	21,140	0.98	5.0	8%	18%
1524	23,925	0.94	5.7	12%	12%

Table 6. Revised Estimate of Baseline Yumbo Population (assuming initial population density and working forward in time)

"Liberal Estimate"

Year	Yumbo Population	Ave. Depop. Rate (r) per yr.	Population Density (/km ²)	% Decrease During Period	% Decrease Since 1524
1524	34,000		8.1		
		0.93		35%	35%
1533	21,995		5.2		
		0.98		22%	49%
1546	17,260		4.1		
		0.97		33%	66%
1560	11,610		2.8		
		0.97		47%	82%
1582	6,123		1.5		
		0.94		39%	89%
1591	3,752		0.9		
		0.996		20%	91%
1649	3,000		0.7		
		0.991		69%	97%
1780	944		0.2		
		n/a		100%	100%
1900	0		0		