

Chapter 8

The group number fixation effect

When the competitive exclusion effect has run its full course, the group number is one and a single "exclusive" group remains in the social sphere. This exclusive condition may persist as a relatively stable, or at least enduring, configuration, or it may rapidly break down and the group number rise again. Whether we call any given case enduring or transitory is essentially an arbitrary matter depending on the temporal and social resolution of the data and the speed or slowness of the other social changes to which we compare it. Nevertheless, we can consider the factors that tend to make the condition of exclusivity persist, and those that tend to make it break down, and establish a few qualitative generalities about the process.

The phenomenon of the persistence of a single exclusive group may be called the "group number fixation effect," by analogy to the genetic phenomenon in which the elimination of all but one variant of a trait "fixes" that variant of the trait in the population until a new variant is introduced from outside by interbreeding or from within by random mutation (Dobzhansky et al. 1977). There is an important difference between the social analogy and the genetic model, however. Genetics deals primarily with the reshuffling and differential propagation of existing variants, such that some become more common and others less. The variants themselves arise so rarely that the process of their generation can usually be neglected. When selection drives all but one variant out of the system, then, "fixation" occurs simply because there is no ready source of new variants. Genetic fixation does not need to be maintained or further explained; it persists automatically until the system is disturbed from outside by the introduction of a new variant or from within by the random but

extremely rare spontaneous generation of a new variant by mutation.

The fixation of an exclusive social group, on the other hand, is not automatic and does require the action of some force to maintain it, because the raw material for the multiplication of groups is always present. Viable mutations arise rarely, but experience teaches us that social groups split apart and move around easily and often, for any number of reasons. When a group remains the only one in a social sphere, we can infer that some process is inhibiting the fission of the exclusive group and the introduction of new groups from outside, or is acting to restore the group number to one rapidly whenever it does rise.

In terms of the equilibrium group number model, fixation means simply that the equilibrium group number remains one, which in turn means that the sum of the psycho-rational curve and the competitive exclusion curve has a minimum at one. The two curves interact to produce their sum, of course, but basically fixation occurs when the psycho-rational curve remains as it was when competitive exclusion occurred or moves to the left, and/or the competitive exclusion curve remains as steep as it was when competitive exclusion occurred, or grows steeper. There may be cases in which one curve shifts to favor an increase in group number but is overruled by an opposing shift in the other curve, but the logic of the arguments still works in the same way. To explain the persistence of a group number of one, we must explain the persistence or leftward shift of the psycho-rational curve, and/or the persistence or steepening of the competitive exclusion curve. To explain a rise in group number after an episode of competitive exclusion, we have to explain a rightward shift of the psycho-rational curve, and/or the reduction in slope of the competitive exclusion curve.

The group number may remain one for any of various reasons. First, the

conditions that originally lead to competitive exclusion, usually a steep competitive exclusion curve, will often remain in force even after the competition has driven all but one group to extinction. Unless the population of the single group has declined, the productivity of the territory has increased, or the lifestyle expectations of the people have changed, if a new group appears in the social and ecological niche, the parameters of demand and supply will still be the same and will still contribute to a steep competitive exclusion curve. In fact, in many cases the conditions that lead to unmet demand and competition may actually continue increasing in severity after competitive exclusion has driven the group number to one, simply due to the continued growth of the regional population. Without some compensating changes in technology, territory, or natural conditions, the typical rising population will tend to push the competitive exclusion curve steeper and steeper over time. The steepness of the competitive exclusion curve, however, is also influenced by the degree of difference in competitive ability between the groups in the social sphere. If the differences in competitive ability are about the same when new groups arise, or if unmet demand was the principal factor that made the competitive exclusion curve steep, then the same competitive exclusion process that initially reduced the group number to one will tend to recur and restore the group number to one if it rises for any reason.

Second, the competitive ability of the exclusive group relative to any possible new arrivals may be increased beyond even the level that initially allowed it to competitively exclude its former neighboring groups, simply by virtue of its having won the competition. Specifically, such an exclusive group will generally be unusually large, giving it both more military and more economic power than most potential competitors. It will also already control all the resources in the area, making

it difficult for a new group to establish an initial foothold. In addition, the very process of successful competition will often have increased the competitive ability of the exclusive group through its adoption of competitively useful traits from or in response to its former competitors, through imitation, absorption of members of the other groups, or effective responses to challenges posed by other groups. Because of these mechanisms, an exclusive group may have an usual "hybrid vigor" born of the combined virtues of many of the groups that originally competed in the social and ecological niche. The unusually high competitive ability that an exclusive group may have acquired by virtue of its success may contribute to an even steeper competitive exclusion curve, in effect making the group even more able to competitively exclude new groups from the outside than it was originally.

Third, the unification of all the people in a social sphere into a single group may reduce the variability in some traits that might otherwise encourage fission into multiple social groups. When everyone participates in a single social structure and culture, the people will be more similar to each other than when they participate in multiple social organizations and cultures. In a monoethnic setting, the lines along which fragmentation might most easily take place may be fewer and less pronounced, and the options perceived as possible features to be adopted by a new group may be more restricted, than in a multiethnic one. This argument follows the genetic analogy, suggesting that fixation may persist because new groups may arise rarely. In terms of the equilibrium group number model, the relative homogenization of people in a single group may tend to shift the psycho-rational curve further to the left. Specifically, individuals may be less inclined to form or join a splinter group because the gains to be had from splitting off into a group similar to the one they are leaving may seem small relative to the risks of fission.

On the other hand, there are several parallel reasons why the group number may not remain at one for long. First, sometimes the conditions that lead to the original competitive exclusion may not worsen or even remain constant. Population or individual expectations may decline, reducing demand relative to supply, or innovations in technology or changes in natural conditions may increase supply relative to demand. In the absence of information to the contrary, it may be reasonable to suspect that the competitive exclusion curve would relax, simply because its steepness during the competitive exclusion process was an extreme case. The random variation of population and conditions should be expected to generally shift extreme values back towards more typical ones, which may not be sufficient to hold the group number down to one.

Second, the competitive ability of the exclusive group may decline. When a group is exclusive, some of the traits that originally allowed it to succeed at the expense of other groups may not be exercised. Random variation, lack of practice, forgetfulness, and so on may allow these traits to drift away from their original highly competitively able states. To dredge up a maligned old term, an exclusive social group may become "decadent" or lose its competitive edge through the lack of challenges by other groups. The result would be to reduce the difference between the originally superior competitive ability of the exclusive group and the competitive ability of any new group that might appear from outside the social sphere, lowering the competitive exclusion curve and possibly shifting the optimum group number to a value higher than one.

Even if the absolute competitive ability of the exclusive group does not change, the relative differences in competitive ability will be small if the exclusive group splits

for any reason, simply because members of both groups will share most of their cultural traits. The effect of fission of an exclusive group is the same as that of decadence in the face of new groups from outside: the difference in competitive ability between the groups is small, reducing one component of the steepness of the competitive exclusion curve and possibly allowing the optimum group number to rise above one.

Third, the very unification of all the people in a social sphere into one group may increase the likelihood of the group splitting up. I argued earlier that an exclusive group benefits from a homogenization effect that reduces the magnitude of differences which might encourage fission. However, the original presentation of the equilibrium group number model in Chapter 2 based much of its argument on the apparent tendency of people to divide their social world into multiple groups using grosser or subtler criteria depending on the heterogeneity or homogeneity of the people around them. The unification of all people into one group shifts the focus of their competition away from the other groups that have been extinguished to subgroups within the exclusive group. While the differences on which fission might be based may well be relatively more subtle, they may still be sufficient and in fact may seem more salient than ever once there are no external groups to compete with. This shift in focus effectively moves the psycho-rational curve to the right, without directly affecting the competitive exclusion curve.

The fission of an exclusive group in which the material correlates of group membership have become relatively homogenized will be prone to occur along lines of subtle differentiation which may not be very evident in the archaeological or even ethnographic record. At least initially, the groups might be expected to differ along

political or ideological lines, and only gradually to develop broadly visible differentiating features. In many cases there may be a limited number of symbols such as flags or features of personal appearance that would explicitly mark membership in the newly differentiated groups, but the bulk of the material culture will be very similar and the distinguishing items rare and hard to detect. Sometimes the apparent condition of fixation may be a fiction created by archaeologist's inability to recognize group numbers higher than one in the absence of the marked differences in material culture that probably take some time to develop.

The net balance of the factors discussed above, that is, whether the group number remains one or rises, is probably an empirical matter controlled by the historical particulars of any given case. One generalization, however, is that where the principal factor that caused the competitive exclusion curve to be steep was high unmet demand, then a group number of one may tend to persist relatively longer because the conditions that lead to it are defined by population, technology, and natural resources and so are relatively fixed, or at least slow to improve. This stability resulting from unmet demand may be even more pronounced if demand continues to rise relative to production, typically due to a growing population. On the other hand, when the principal factor was marked differences in competitive ability between the groups, the group number may not remain at one for as long, because new groups from outside or the relatively similar groups that would arise from the fission of the exclusive group may be more closely matched than those that originally competed to exclusion, and the resulting competitive exclusion curve may not be steep enough to return the group number to one.

Another generalization is that many of the forces that tend to maintain the group

number at one will generally be strongest during the process of competition and immediately after the competitive exclusion effect has led to the monoethnic condition. The forces maintaining monoethnicity may tend to gradually decline after the group number has been reduced to one, as population, demand, and supply factors shift for any number of reasons, as the exclusive group declines in competitive ability through disuse and random variation of the traits that originally lead it to success, as competition encourages the exclusive group to split up, and as increasing homogenization within the exclusive group makes any resulting splinter groups ever more closely matched in competitive ability. As time passes, opportunities will continually arise for new groups to appear from outside or for the exclusive group to split, while the forces that tend to combat the multiplication of groups may be both weakening due to reduced differences in competitive ability, changing economic circumstances, and the declining competitive ability of the unchallenged exclusive group. Specific cases may vary, but in general the exclusivity of a single group may be expected to become more fragile over time. An intruding group or a fission of the exclusive group that might be easily squashed to reduce the group number back to one shortly after the competitive exclusion effect took place might lead to a lasting group number greater than one if it were to occur some time later.

Unlike the other "effects" of the equilibrium group number model, the fixation effect is less an expectable outcome of certain conditions and more a condition with various possible explanations. Fixation is a useful concept in that it defines a condition that can at least theoretically be shown to exist or not, and which then guides consideration of why it occurred for as long as it did, and why it finally broke down.

Chiribaya monoethnicity

The Post-Algarrobal phase Chiribaya appear to have been the exclusive occupants of the coastal Osmore valley for over one hundred years following the disappearance of the last Ilo-Cabuza people. Though probably true, this simple claim is surprisingly difficult to document.

The ending date for any social group is typically difficult to establish with precision archaeologically, especially if the group dropped to a small size, because the material remains from the last years of its existence will be scarce. In the case of the Ilo-Cabuza pottery style and the social group that is supposed to have produced and used it, I have estimated the ending date from the two latest radiocarbon dates associated with the style (Appendix C). The one-sigma error terms of these two dates both reach up to around AD 1250, which I choose as the conventional ending date. This procedure is a reasonable but rather arbitrary one, and the date could easily be a century or more off in either direction.

Similarly, the ending date for the post-Algarrobal phase Chiribaya is not known with precision. The six latest available radiocarbon dates for Chiribaya contexts fall between AD 1250 and 1300, while the one-sigma error bars for two of them reach well past AD 1350 (Appendix C). The strong clustering of these dates suggests beyond much doubt that the Chiribaya style was indeed present in force at least until the last years before AD 1300. Two of the late dates are from the coastal Osmore (Hv-1091 and Beta 51073, both from Loreto Viejo), so the Chiribaya style evidently lasted this long not only in other areas, but also specifically in the coastal Osmore valley. Since some Chiribaya occupation probably occurred after the deposition of the latest material

recovered for radiocarbon dating, it is reasonable to suspect that the true ending date was a bit later still, although simply using the error bars, as noted earlier, is a somewhat arbitrary way to quantify this reasonable supposition. Moseley and his colleagues (Moseley 1990; Moseley et al. n.d.; Moseley and Richardson 1992; Moseley and Tapia 1991; Satterlee 1992) have suggested convincingly on the basis of geoarchaeological evidence that the Chiribaya in the coastal Osmore and the spring settlements along the adjacent coastline vanished shortly after their agricultural base and some of their settlements had been severely damaged by a massive flood and accompanying mudslides in an El Niño event that they tentatively date around AD 1350. Based on these lines of evidence, I have set a conventional ending date for the Post-Algarrobal phase Chiribaya at around AD 1375, although like the Ilo-Cabuza ending date, this estimate could also be perhaps seventy-five years off in either direction. The estimated ending dates of the two traditions, then, suggest that the Chiribaya group was indeed the only one present in the coastal valley for a time, but the possible errors are so large that the duration, at least, of this exclusive occupation is in considerable doubt.

Another way to show that the Chiribaya had occupied the valley exclusively would be to find consistent stratigraphic superposition of Post-Algarrobal phase Chiribaya midden over Ilo-Cabuza midden, but only rarely the reverse. Although the PCCT excavations were specifically designed to seek examples of such chronologically important superposition, the only convincing cases that were found in excavation showed the Algodonal Early Ceramic to be much earlier than the Late Intermediate Period styles. None of the Late Intermediate Period styles were found in good superposed contexts, either domestic or mortuary, although there were hints that some of the Ilo-Tumilaca domestic material at El Algodonal might be below some of

the Chiribaya deposits.

Several sites found during the site survey offer limited chronological insights, especially those in which occupation or mortuary debris was associated with the reclaimed fields irrigated by the main Osmore canal. These reclaimed fields are useful in this context because they were located on quaternary river terraces elevated well above the valley bottom, and so were also good places for domestic settlements. Moreover, many of these terraces seem to have been prone to disastrous mudslides from the steep slopes above them, and on some terraces, some of the reclaimed fields were clearly rebuilt after most or all of the terrace had been covered by mud. The rebuilt fields are easily identifiable by their sharper contours, better preserved stone retaining walls, piles of construction debris around their margins, and their slightly depressed elevations relative to the unreconstructed, mud-blanketed fields around them. These repeated destruction and construction events offer a series of chronological moments to which pottery-bearing debris can sometimes be associated.

The ideal evidence would be repeated examples of Ilo-Cabuza pottery associated with the construction of covered fields, with only Post-Algarrobal phase Chiribaya pottery associated with the reconstructed fields. Naturally, the data are not so clear cut. Table 8-1 lists the reclaimed field sites that are most promising for chronological purposes. While Chiribaya sherds and burials were visible at three of the sites, definite Ilo-Cabuza sherds were not found at any of them. Since most of the visible material probably dates to after the last major mudslide at any given site, the absence of Ilo-Cabuza sherds and presence of Chiribaya material tends to support the claim that the Ilo-Cabuza group was gone before the last round of mudslides and rebuilding, while the Chiribaya remained alone in the valley. However, given that the Ilo-Cabuza

Site	Recut	IT	IC	ITC	PF	Ch	Ch tomb	ES	Interpretation
182	-	-	-	-	P	-	-	-	Possible Ilo-Tumilaca/Cabuza component, inconclusive.
200	-	Y	-	Y	1	1	-	-	Probable Ilo-Tumilaca component, possibly before fields. Possible later Chiribaya component.
204	Y	-	-	-	-	-	-	-	Inconclusive.
208	Y	Y	-	Y	-	1	Y	-	Probable Ilo-Tumilaca component, possibly before fields. Possibly later Chiribaya burials.
215	Y	*	-	*	*	Y	Y	Y	* Only in deeply covered stratum. Ilo-Tumilaca component covered by mudslide, fields built, covered again, rebuilt. Chiribaya tombs probably intrusive into latest fields, possible Chiribaya occupation and probable Estuquiña occupation may postdate agricultural use of fields.
233	Y	-	-	-	-	-	-	Y	Estuquiña occupation on fields may postdate their agricultural use.

Site: PCCT site survey number; see Appendix F.

Recut: Fields rebuilt in part of area after being covered by a mudslide.

IT: Ilo-Tumilaca sherds.

IC: Ilo-Cabuza sherds.

ITC: Ilo-Tumilaca/Cabuza sherds that cannot be identified more precisely.

PF: Non-diagnostic Pasta Fina sherds. Pasta fina is a paste type typical of Ilo-Tumilaca/Cabuza sherds.

Ch: Chiribaya sherds. None were more precisely identified at these sites.

Ch tomb: Chiribaya style rectangular stone-lined tombs.

ES: Estuquiña sherds.

Y: Definitely present.

P: Possibly present.

1: One example present only.

Table 8-1. Reclaimed field sites with diagnostic ceramics and/or rebuilt fields.

population was evidently very small relative to the Post-Algarrobal phase Chiribaya population, the absence of Ilo-Cabuza material from the very small numbers of surface sherds on these site must be taken as less than conclusive.

What the table does show is consistent with the Ilo-Tumilaca style as an early variant, and Chiribaya as a style that lasts until much later, just as the radiocarbon dates indicate. At site 200, an area of habitation remains at the lowest part of the

terrace, closest to the river and most distant from the canal, includes numerous Ilo-Tumilaca and indeterminate Ilo-Tumilaca/Cabuza sherds. This area was also divided into rectangular fields like the rest of the quaternary river terrace. There is no evidence of domestic structures, and the midden is patchy and highly variable in depth. It seems more likely that the fields were built over the remains of an earlier habitation, scraping away midden in places and filling with it elsewhere, and destroying any cane wall trenches, stone-lined storage pits, or other features, than that the fields were abandoned early in the Late Intermediate sequence and reused for residential purposes that left only a scatter of domestic debris and almost no stylistically later material at all.

Site 208 is similar, with an Ilo-Tumilaca component that might predate the fields. The very small amount of Chiribaya material is probably due to a small number of looted tombs. I suspect that when fields and Chiribaya tombs are found in the same place, the tombs are probably later intrusions that were built after the fields were abandoned. Given the impressive effort the Chiribaya expended to preserve the bodies and goods of the dead in well constructed, sealed tombs, usually placed in sandy ravines or hillsides with no other apparent use, it seems unlikely that these tombs would be placed in fields subject to frequent irrigation and the obviously resulting decay. The tombs are rectangular, a form I believe to be typical of the post-Algarrobal phase Chiribaya in contrast to the cylindrical tombs of the Algarrobal phase Chiribaya and Ilo-Tumilaca/Cabuza groups, so it is unlikely that they predate the fields. That leaves the Chiribaya building tombs in abandoned fields, presumably long after the Ilo-Tumilaca group that lived there before the fields were built had vanished. Whether their Ilo-Cabuza descendants were still around cannot be resolved with this information.

Site 215 yields the same conclusions but with more convincing evidence. At this site, all the Ilo-Tumilaca and Ilo-Tumilaca/Cabuza material below the elevation of the canal is found in a thin stratum exposed in the scarp at the river's edge. This stratum is some three m below the present field surface on the terrace. The implication is that an Ilo-Tumilaca domestic or mortuary site was located on the terrace and was covered by one or more deep mudflows, on top of which the reclaimed fields were constructed. These fields in turn were partially buried at least once, and only the central portion was rebuilt. No Ilo-Tumilaca/Cabuza material is associated with the destroyed or rebuilt fields, so the Ilo-Tumilaca/Cabuza group may have been small or gone by the time of the last mudslide. Within the area of rebuilt fields are numerous looted Chiribaya style rectangular tombs. These tombs are unusually deep, but most of the depth is below the capstones, all of which would have been within fifty cm of the rebuilt field surface. The Chiribaya tombs were probably not buried by mud and then unwittingly farmed over, but rather were probably intrusive into the final use surface of the rebuilt fields. As I argued above, roughly contemporary fields and tombs mean that the tombs probably postdate the abandonment of the rebuilt fields. The same area is also marked by habitation debris and cane wall stubs, indicating a domestic occupation that unfortunately is not in clear stratigraphic relationship to the looted tombs. The surface scatter includes Chiribaya material that may relate to the occupation or the looted tombs, and Estuquiña material that is almost certainly associated with the domestic occupation. Although the chronological placement both of the final disappearance of the Ilo-Cabuza group and the first appearance of people using Estuquiña pottery are still vague, site 215, like site 208, places the Ilo-Tumilaca style early in the Late Intermediate sequence and appears to show the Chiribaya tradition continuing on alone later.

The weight of the radiocarbon and stratigraphic evidence, though somewhat ambiguous, nevertheless argues that the Chiribaya group did indeed occupy the valley exclusively for some time, possibly several generations or longer. Following the first generalization about the fixation effect, this finding is not surprising. In Chapter 7, we concluded that the principal factor that caused the competitive exclusion curve in the Late Intermediate Period coastal Osmore to be steep was unmet demand for resources, rather than particularly marked differences in competitive ability between groups. The data are not fine enough to resolve trends in population within Post-Algarrobal phase Chiribaya times, but it appears that the population of the valley was quite large, and it is reasonable to suspect that it took a considerable period of growth during the Post-Algarrobal phase to reach that size. With unmet demand as the principal component of intense competition in the valley, and with population and hence unmet demand continuing to grow even more, it is not surprising that whatever processes lead to the Chiribaya group's success in competitively excluding all the other groups continued to function and maintained the Chiribaya as the exclusive group in the valley.

On the other hand, it may be in this period that the equation of pottery style and social group is least reasonable. The second generalization from the fixation effect is that the exclusive group may become more susceptible to competition from outside groups or to fission as time passes. It is precisely in the later Post-Algarrobal phase that the Chiribaya might be most expected to break up into rival political groups with similar material cultures, and it is also this period for which our temporal and stylistic resolution is perhaps the poorest for the entire Late Intermediate Period. It is quite possible that Chiribaya pottery in the coastal Osmore valley represented more than one social group, and it is both especially likely to have done so and especially likely to

have escaped detection doing so during the Post-Algarrobal phase. There is no evidence to suggest that the Post-Algarrobal phase Chiribaya were not a single social group, but the model warns us that this point would bear further verification.

The Estuquiña pottery style and the people that made it were present in the middle Osmore valley throughout much of the Post-Algarrobal phase, yet they seem to have penetrated into the coastal Osmore valley only in small numbers and only right near the end of the Chiribaya tradition. Setting aside the possibility that the people who used Chiribaya pottery split up into more than one social group, the Chiribaya as a whole seem to have excluded the Estuquiña people successfully for over 150 years in what may be an example of enduring fixation. When the Estuquiña style does appear in the coastal valley, it is found mixed in with the grave goods of the latest Chiribaya tombs at San Geronimo (Jessup pers. com.) and San Geronimo II (PCCT 128, Owen 1991b; Appendix F), which suggests that the Estuquiña pottery users were contemporary and perhaps congenial with the last Chiribayas. Estuquiña material also appears on top of the rebuilt fields of sites 215 and 233 (Table 8-1), which places the Estuquiña style very late in the Late Intermediate Period sequence, after the last of the big mudslides, and suggests that the users of Estuquiña ceramics preferred sites that had recently been used by the Chiribaya, or were still in use by them. Either the Chiribaya themselves adopted Estuquiña pottery after a long period of resistance, or the Chiribaya shared the valley with Estuquiña people after a long period of social group fixation.

Moseley, Tapia, Satterlee, and their colleagues (Moseley et al. n.d.; Moseley and Richardson 1992; Moseley and Tapia 1991; Satterlee 1991, 1992) have suggested that the Chiribaya declined and disappeared shortly after they had been severely weakened

by a huge flood that wiped out agriculture and settlements on the entire valley floor and the intake to the main Osmore canal, and accompanying mudslides that destroyed sites on the valley walls, elevated river terraces, and in some coastal spring systems. Such an event would have had complex repercussions, since the disaster itself and the hardships that followed would eventually have resulted in declines on both sides of the supply and demand equation, that is, in population and demand, as well as agricultural productivity. The data and the model together suggest that the disastrous El Niño event may have reduced the Chiribaya competitive ability sufficiently to break down the condition of fixation and allow a new group marked by Estuquiña pottery to share the valley with the Chiribaya after the flood. Moreover, the apparently intimate and peaceful relations between the two groups, as indicated both by mixed grave lots and shared site locations, suggests that competition was not severe, that is, that unmet demand was low by the time the Estuquiña pottery users arrived. Perhaps the Chiribaya population had been significantly reduced, while the coastal valley's agricultural potential recovered relatively well.

In terms of the equilibrium group number model, in the later aftermath of the flood it is possible that the slope of the competitive exclusion curve was reduced both by the weakening of the Chiribaya group's competitive ability, which would have made the difference in competitive abilities between the Chiribaya and Estuquiña groups less, and also by the reduction in unmet demand due to a relatively greater drop in population than in productivity. The equilibrium group number shifted up to at least two. If we include the coastal spring sites in the social sphere, then the evidence of San Miguel and Gentilar settlements (Penman and Bawden 1991) in these coastal pockets would increase the group number even further in the late Late Intermediate Period. The Niño disaster may have shifted the coastal Osmore and the adjacent

coastal areas from an overpopulated region occupied by one exclusive social group to a relatively underpopulated place experiencing the gold rush effect for a second time.

A few anomalous extended pit burials in stratigraphically post-Chiribaya positions at Chiribaya Baja (Jessup pers. com.) and Loreto Viejo (Unit 2304) may represent still another social group, albeit apparently a very small one. These burials do not in any way resemble Estuquiña burials from the middle valley (Williams et al. 1989), nor San Miguel or Gentilar burials from the Azapa area, which continue the general Chiribaya pattern. The Chiribaya Baja examples were buried with provincial Inka ceramics (Jessup pers. com.), so these burials may pertain to a group or class of people in contact with the Inka state in late prehispanic times. By the time of these possibly Inka burials, however, the Chiribaya group had apparently disappeared, leaving the few Estuquiña pottery users, the perhaps fewer Inka-related individuals, and the coastal spring settlements of San Miguel pottery users to play out the permutations of the equilibrium group number model in the coastal Osmore valley.