Linguistics for Archaeologists: a Case-study in the Andes

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In the previous issue of CAJ, *Heggarty (2007) set out how certain key principles and methods of historical linguistics can be exploited to open up another window on the past, from a perspective quite different and complementary to that offered by the archaeological record. Following this up, we turn here to an ideal case-study for exploring how the various patterns in linguistic (pre-)histories can be matched with their most plausible correlates in the archaeological data. Beyond our initial illustration of the Incas we now look further afield, to set the sequence of major civilizations of the Andes into its linguistic context, tracing the expansion trajectories of the main Andean language families further back in time, stage by stage, ultimately to their most plausible original homelands. The linguistic story emerges starkly at odds with assumptions widely held among archaeologists of the region. Indeed we encounter a paradigm case of how only a radical rethinking can reconcile our two disciplines' findings into a single, coherent, holistic prehistory for a human population — in the Andes, a prize now tantalizingly within our reach.*

1. Archaeology and linguistics

Enquiry into the prehistory of human populations is not exclusively the domain of archaeology, but an interface with sub-branches of certain other disciplines, not least genetics and — our focus in this article — linguistics. Research at the so-called *new synthesis* where these disciplines intersect holds out the ultimate prize of a single holistic scenario for prehistory that takes the partial stories that each of these separate fields can uncover and weaves them all coherently together into one.

In practice, however, such multidisciplinary work has all too often been dogged by misunderstandings between the disciplines. In a previous paper (Heggarty 2007), I therefore sought to set out, for the purposes of archaeologists, both the general principles of comparative/historical linguistics, and the specific methods that this field uses to trace back through time the relationships between particular languages, and by extension between the populations who spoke them. As a first illustration of how those principles and methods are applied, that first article focused on the most widely-spoken language family of the New World, Quechua. The linguistics convincingly shows that the popular assumption still current among many archaeologists and historians of the region — that the spread of Quechua across the Andes was essentially the work of the Incas — is simply wrong. The language data point unmistakably to a completely different and much older story.

Yet the role of the Incas is but one of a whole range of issues in the prehistory of the Andes in which archaeology and linguistics still have a great deal to learn from each other. For if it was not the Inca 'Empire' that propelled the main Quechua expansions, then which other culture(s) did? And what of the region's other major surviving language family, Aymara[1], with which Quechua's history is inextricably intertwined? From which homeland(s) did these two families first begin to fan out across the Andes, and when? Through what stages did their expansions unfold, played out in which regions, and in which cultural and demographic contexts? Picking up the thread from where we left it with the Incas, this second article now completes the story with these broader issues.

For archaeologists specializing in the Central Andes this article serves as an overview of the linguistic

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scenarios for the region's prehistory, and of how these can inform interpretations of the archaeological data. For a wider readership it serves to complete the general demonstration of how linguistics and archaeology can and should work hand in hand to inform each other. To this end, there is no better case-study than the Central Andes, one of the world's major independent poles of civilization, yet all but entirely overlooked in new synthesis research until very recently. Indeed we report here on the latest multidisciplinary approaches: new linguistic techniques are finally yielding more refined measures of the degree of divergence between languages, in the numerical format required for these results then to be input to phylogenetic analysis algorithms originally developed in the biological sciences. It is arguably only the latest generation of such algorithms, namely those of the *network* rather than just the 'family tree' type, that embody a model truly suited to how *languages* diverge. Quechua and Aymara provide fitting illustrations of how these new techniques can help revise and sharpen our vision of the earliest events in the prehistory of language families.

It transpires, in fact, that Andean linguistics is at last nearing striking distance of our ultimate goal: to be able with real confidence to match up the linguistic clues to the prehistory of the populations of the Andes with the 'cultures' in the archaeological record that best correspond, and perhaps ultimately with the relevant data from human genetics too. Naturally, such a holistic picture can only be drawn up in concert with specialists in those other disciplines. Before that can be achieved, however, it is a *sine qua non* that the true linguistic story be heard.

2. Archaeological and linguistic scenarios for the Andes

For the benefit of non-specialists, we start with a brief overview of the nature and scale of the multidisciplinary issues in the Andes. Figure 1 outlines the established periodization followed by most archaeologists of the region, while Figure 2 locates the main sites associated with each of the major archaeological cultures. Figure 3 shows the current distribution of the Quechua and Aymara language families, and identifies the main regional dialect groupings within each. For clarity all figures have had to omit a considerable amount of archaeological and linguistic detail; they are limited to those sites and dialect groupings important for our cross-disciplinary purposes and which are specifically mentioned in this text.

Broadly speaking, the archaeological chronology sees three periods for which the material culture evidence points to certain cultural influences extending across wide expanses of the Central Andes: the Early, Middle and Late 'Horizons'. The best understood of these three is the Late Horizon, alias the Inca 'Empire', established through a rapid military and diplomatic expansion out of what came to be its capital, Cuzco in southeastern Peru. The beginning of this very short Late Horizon is variously put at one or other of a series of key dates assumed for the main Inca expansions (here we take 1476); it ends abruptly with the Spanish conquest in the 1530s. The Middle Horizon, from approximately AD 600 to 1000, associates two separate centres: Tiwanaku[2], near Lake Titicaca just inside northwestern Bolivia; and Wari, near Ayacucho in south-central Peru. There are some obvious similarities, as well as many significant differences, between the two; debate continues as to the relationship between them, and their processes of expansion. Earlier still, Chavín de Huantar in central highland Peru marked the focal point of the Early Horizon, whose nature, extent and dates remain poorly understood but which might be approximately dated from 700 BC to AD 200.

Of the three Horizons, the Incas achieved both the most extensive territorial spread across the Andes, and apparently the most powerful control on a military and political level, albeit distinctly short-lived. The Middle and Early Horizons also attest to some degree of pan-Andean unity, for example in their iconography and ceramics, but many questions remain as to the exact nature and extent of any real control that the respective Horizon centres might have exercised more widely outside their home regions.

Between the Horizons lie two 'Intermediate' periods, during which the wider cultural influences observed across the Central Andes during the Horizons appear to break down into more localized, regional phenomena. Significant manifestations of material culture are certainly to be found, but over smaller expanses of territory, and relatively isolated from each other. Examples that will come into the discussion here include Moche and Nazca during the Early Intermediate Period, and Chimú and Ica-Chincha during the Late Intermediate.

The long period before the Early Horizon holds many uncertainties, though our vision has been refined in recent years as more evidence emerges from a number of significant Pre-Ceramic period sites in central Peru. Notable among these are Kotosh in the highlands, and the monumental architecture of a number of river valleys along the central coast, including the Caral-Supe site dated as far back as 4600 BP. Even the origins of agriculture and the later

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Period	Approximate dates	Sites/'cultures' mentioned in this text, by region						
		North		Central		South		Altiplano
		Coast	Highlands	Coast	Highlands	Coast	Highlands	(Highlands)
Late Horizon	**AD 1476–1534**	**Inca**	**Inca**	**Inca**	**Inca**	**Inca**	**Inca**	**Inca**
Late Intermediate	AD 1000–1476	Chimú		Pachacámac		Ica-Chincha		
Middle Horizon	**AD 600–1000**	**Wari**	**Wari**	**Wari**	**Wari**	**Wari**	**Wari/Tiwa.**	**Tiwanaku**
Early Intermediate	AD 200–600	Moche				Nazca		
Early Horizon	**900 BC–AD 200**	**(Chavín)**		**Chavín**	**Chavín**	**(Chavinoid)**	**(Chavín)**	
Initial Period	1800/1500–900 BC				Kotosh			
Pre-Ceramic Period	?–1800/1500 BC			Supe/Pativilca	Kotosh			

Notes: This table is far from a comprehensive archaeological picture, for which readers are directed to any standard reference work on the archaeology of the Andes. Very many other cultures are necessarily omitted, and details of periods and regions greatly simplified (the long Pre-Ceramic Period, for instance, is subdivided into a number of stages). Any strict categorization and chronology is in any case unavoidably somewhat artificial. The characterization and selection here is intended only to serve the purposes of this article, by setting into their approximate geographical and chronological contexts only the sites and 'cultures' mentioned in the text.

Figure 1. *Simplified schema for the archaeological periodization of Peru and Highland Bolivia — as most relevant for possible correlations with the major Andean language families.*

development of complex societies in the Andes, with the transition some 3000 to 4000 years ago from the Late Pre-Ceramic to the Initial Period, turn out to be unexpectedly relevant to the linguistic story too, though we touch on these deeper issues only briefly here (§4.2), reserving them for separate discussion in Heggarty & Beresford-Jones (in prep.).

Other than Quechua and Aymara, all indigenous languages of the coast and highlands of Peru are now extinct. We do at least know of a number that survived long enough to enter the historical record, such as Quingnam (including the so-called 'Pescadora' language) on the north-central coast, or Culle in the north-central highlands; see for example Torero (2002, 49 & chap. 4). In some cases we have even been left with a certain amount of linguistic documentation, as in the case of Mochica (see Cerrón-Palomino 1995b). Nonetheless, other than the occasional mention here where they have some relevance (§5.3.1), their utility for our purposes is limited: what little we do know of them provides precious little data on what divergence there may have been within these languages, and certainly reveals no evident relationships to any other languages within larger families. Without this we are unable to reconstruct any stages and expansions in their prehistories to project our knowledge of these languages far back into the past, as we can so fruitfully with Aymara and especially Quechua. Tentative associations may be entertained, on a geographical level, between the languages of the north Peruvian coast and the major local cultures in the recent archaeological record, but beyond that we can say little of use. Hence our focus here on the more informative Quechua and Aymara; indeed it is principally in connection with them that we shall have cause to mention briefly also the Uru-Chipaya family and Puquina (§5.2), both of which were once spoken relatively widely in the Bolivian highlands and into southern Peru, even as late as Spanish colonial times.

Of the various periods in the archaeological chronology for the Andes, it is naturally the Horizons, with their greater cultural unity and geographical spreads, that appear to offer the most logical motors for the major language expansions. Indeed at first sight the distributions of Quechua and Aymara in Figure 3 coincide fairly well with the ranges of two of the Horizons in Figure 2: all Quechua falls within the extent of Inca control in the Late Horizon, while Aymara overlaps rather neatly with the Tiwanaku sphere of influence during the Middle Horizon.

The first of these supposed correlations provided the test case for the previous article (Heggarty 2007), where it transpires that the fundamental historical linguistic facts about the Quechua family actually rule out definitively any suggestion that the Incas could have been primarily responsible for its spread. Quechua is by no means a single language, but a family of languages whose divergence and expansion necessarily go back long before the Incas. Moreover, Quechua started out from a homeland doubtless not near Cuzco at all, but much further to the northwest, somewhere in Central Peru.

Beyond this, though, where we left the story at the end of the previous article many fundamental questions remained to be dealt with. In particular, how can we try to locate more specifically the Quechua homeland? And how might we pin down the various stages of Quechua expansion rather more accurately in time, space and socio-cultural context, so as to asso-

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ciate them with known forces and cultures in the archaeological record? These are the questions we move on to here, but before we can complete the story of the origins of Quechua we must turn first to the other main surviving indigenous family of the Andes, Aymara. For as we shall see, their histories have long been inextricably intertwined, so much so that one cannot understand the one without the context of the other.

3. Dating and locating homelands: the case of the Aymara family

3.1. Aymara and Tiwanaku? How linguistics can rewrite common superficial assumptions

It is Aymara, for instance, that fills the one significant gap in the territorial spread of Quechua that is still occupied by another indigenous language. The main dialect region within the Quechua family, namely *Southern* or *Cuzco-Bolivian* Quechua, is split curiously into two, straddling the Aymara-speaking area to north and south. Aymara is spoken, then, across most of highland northern and western Bolivia, and into neighbouring parts of southernmost Peru and northern Chile (Fig. 3). Almost all of this territory lies within the high-altitude (*c.* 4000 m) plain known as the *Altiplano*, at the heart of which stands the Middle Horizon site of Tiwanaku, near the shores of Lake Titicaca. Moreover, as already noted, the present-day Aymara-speaking area overlaps reasonably closely with the extent of Tiwanaku influence during the Middle Horizon. Such a strong geographical and even topographical, high-altitude correlation has tempted many observers to assume a straightforward association of Aymara with the Tiwanaku culture: i.e. the (Early Intermediate and) Middle Horizon are seen as the time-frame for Aymara expansion, starting out from a homeland in Tiwanaku itself. This is the view of Bird *et al.* (1984), for instance, while Kolata (1993, 241) sees at least the herders of Tiwanaku as Aymara-speakers, and for Stanish (2003, 50–51) 'Most scholars believe that the earlier cultures of the [Titicaca] basin, such as Tiwanaku, were also Aymara-speakers'.

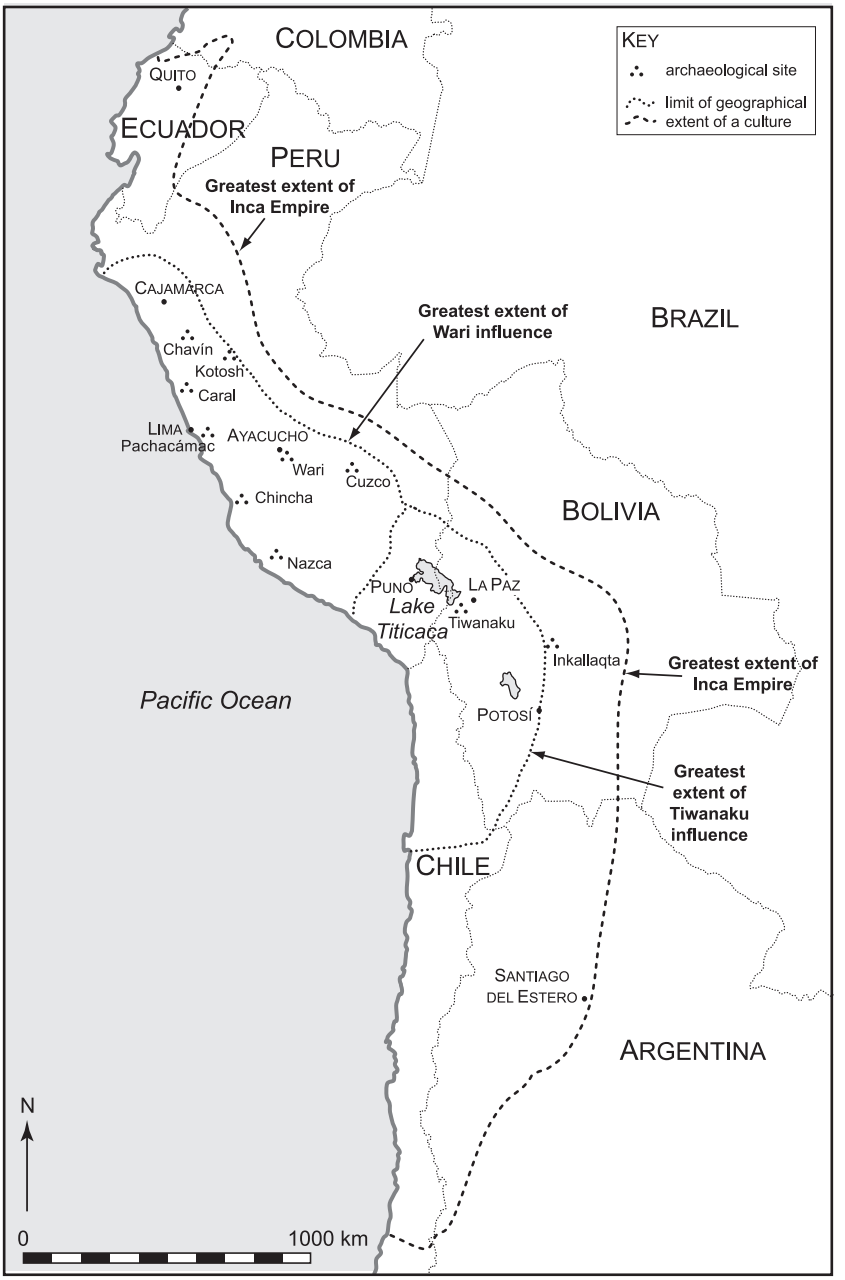


Figure 2. *Archaeology of the Central Andes as discussed in the text.*

The cautionary tale of Quechua and the Incas, however, suggests that we would be well to rein in any enthusiasm for an Aymara–Tiwanaku equation pending a closer look at the linguistic story. Indeed this story once more turns out to be radically at odds with the superficial modern-day geographical fit. A number of popular myths surround Aymara

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Figure 3. *Quechua and Aymara language families: present-day distribution.*

too, and it is high time that Andean archaeologists discard them:

- Aymara is not a single, compact language, but a family which also counts a little-known cousin isolated far from the Altiplano.
- Aymara is most plausibly not to be associated with the people of the Tiwanaku culture, who most likely spoke Puquina instead.
- Of the two main Middle Horizon centres, it is not Tiwanaku but Wari that is thought by most linguists to have played some important role in the middle stages of Aymara expansion.
- As with Quechua, linguistic opinion inclines to the Aymara family too having originated nowhere near the Altiplano, but far to the northwest, somewhere in central Peru. From there, over an extended time-scale that may have begun as far back as the Early Horizon, Aymara expanded southeastwards, at one stage duly becoming firmly ensconced in the Cuzco region. Eventually it would be supplanted there by the later arrival of Quechua, though this process was by no means complete even at the time of the Incas.
- Perhaps most disconcerting of all, it may well be that the Inca nobility themselves originally spoke some such regional form of Aymara (now extinct), and perhaps at an even earlier stage Puquina.

So bold and unexpected are these claims that they again call on us to justify how Andean linguists could have come to these conclusions, and to assess quite how much confidence we can place in each of them. In other words, Aymara provides a second valuable test-case of how historical linguistics can be applied to help us look into human prehistory.

3.2. Approximate, relative dating by degree of linguistic diversity

Looking to the toolbox of linguistic methods as laid out in Heggarty (2007), we turn first to the basic rule-of-thumb correlation between the passage of time and degree of language divergence. What of Aymara, on this criterion? What time-depth bracket is implied by the degree of linguistic diversity that we observe today across the Aymara-speaking territories of the Altiplano? And how consistent is this with the Middle Horizon time-depth of Tiwanaku, *c.* 1400–1000 BP?

The linguistic diversity in Aymara across the Altiplano turns out not to be particularly significant.[3] Altiplano Aymara is standardly considered to consti-

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tute but a single, fairly coherent language, and though there is certainly a fair amount of regional variation, mutual intelligibility remains very high. Progressing beyond such impressionistic statements to put meaningful, precise figures on language divergence is an inherently troublesome task (see Heggarty 2007, 324–5), though measures of overlap between language varieties in their basic vocabulary, such as those in Heggarty 2005, 13), are valid at least as indications of the orders of magnitude concerned. On those figures, overlap among Altiplano Aymara varieties remains at between 88 and 92 per cent, i.e. of the same order as that found *within* the Cuzco-Bolivian 'dialect' of Quechua. The default linguistic assumption (see Heggarty 2007, 323–5) would therefore be that Aymara only began extending across this region relatively recently; or to be more explicit, at a time-depth of the same order of magnitude as Cuzco-Bolivian Quechua — that is, during the Late, not the Middle Horizon, or at most a few centuries either side. To put it another way, had Aymara spread across the Altiplano as early as Tiwanaku, one would have expected far more diversity to have developed by now. Something already appears amiss, then, with the Aymara–Tiwanaku equation.

One line of argument that might help explain away this unexpectedly limited diversity would be to posit that the Aymara-speaking lands of the Altiplano could have remained, through the centuries, an unusually cohesive territorial unit, with strong enough contacts maintained across it to have kept a lid on language divergence. This, though, would be to posit a scenario rarely seen through history until the era of mass literacy, language standardization and the nation-state. Indeed, it would be quite atypical of the linguistic development of all other Quechua- and Aymara-speaking areas elsewhere in the Andes, in each of which the language appears to have fragmented relatively quickly. The particular topography and ecology of the Altiplano arguably qualify it as a special case, however. Not only is it extraordinarily flat by Andean standards, but it also forms the largest and richest area of camelid pasturage in the whole cordillera. It has not been lost on scholars such as Núñez-Atencio & Dillehay (1979) or Lynch (1983) just how important camelid caravans were in articulating Tiwanaku's expansive influence. Could these factors have so facilitated contacts and trade between populations across the whole region as to maintain it as a single, highly coherent speech community throughout the many centuries that have elapsed since the Middle Horizon? Assessing such questions necessarily calls on both linguistics and archaeology to inform each other.

Whatever happened in the Altiplano, though, our story thus far is missing another crucial fact, very little known outside Andean linguistics but which quite overturns our entire view of the history of Aymara. This is simply that the Aymara spoken in the Altiplano is not alone. Most unexpectedly, we need to look some 700 km to the northwest, to the semi-desert mountains of the Lima department, to two clusters of isolated villages in the province of Yauyos where a now highly endangered language lingers on the lips of no more than a thousand or so speakers. It goes by the local names of Jaqaru and Kawki (which linguists use to distinguish its two local varieties, though speakers tend to use both names interchangeably), but turns out to be unmistakably related to the Aymara of the Altiplano. Indeed in the terminology we follow here, Jaqaru and Kawki form the *Central* branch of the Aymara family, the only surviving cousins of the *Southern* branch spoken in the Altiplano.[4]

The degree of difference between these two branches immediately casts a whole new light on Aymara: on how much we can tell of its prehistory, and how much further back we may be able to trace its origins and divergence. For as with the various languages within the Quechua family, the two branches of Aymara too are taken to be about as divergent from each other as are some of the major Romance languages of Europe: for Cerrón-Palomino (2000, 41) the distance between Central and Southern Aymara is 'similar to that between French and Spanish'.[5] Indeed in Heggarty (2005, 13) the overlap ratings between varieties on opposite sides of the Central–Southern Aymara divide are as low as the mid 50s per cent, so on these measures there is actually *more* divergence within Aymara than between even the most different varieties in the Quechua family (in the mid 60s per cent).

The default interpretation would therefore be that the Aymara family's divergence began even before that of Quechua. An important rider to this, however, is that we have good reason to suspect that in this rather special case, purely lexical measures such as these will tend to overstate the divergence in most other aspects of language, such as the sound or grammatical systems, in which Central and Southern Aymara do indeed appear not to be so divergent. Their degree of difference in vocabulary alone has clearly been somewhat inflated by the tiny, isolated Central Aymara having yielded, even more than its Southern cousin, to a particularly heavy influx of loanwords from the Quechua that has long surrounded it, replacing much of its original native Aymara vocabulary. Pending studies now underway on levels other than vocabulary (Heggarty in prep.), then, enough

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uncertainties remain that linguists are confident only of a broad-brush time-frame for Aymara divergence: roughly the same order of magnitude as that of Quechua. Or in other words, to attempt to pin absolute dates on this, one might venture a span of rather more than one millennium, but probably less than three.[6] A more precise assignment to specific dates and cultures will only be possible within an overall scenario that encompasses also the geographical aspects of Aymara's possible homeland and stages of dispersion, employing the other techniques available in the toolkit of comparative/historical linguistics.

3.3. Locating homelands: the case of the Aymara family

For if Tiwanaku is no longer a very plausible candidate, where did Aymara originate then? How and when did it expand? The existence of Central Aymara throws the geographical question wide open, with no particular need to focus on the south.

Of the various proposals put forward, one was based on early claims by Hardman ([1966] 1975) that Central Aymara shows a much higher degree of diversity within it and per unit of area than does Southern Aymara, thus suggesting the Central region as nearer to the original homeland (as per the rule of thumb explained in Heggarty 2007, 326, 333–4). Balanced comparisons are not really possible, however, given that only two closely neighbouring varieties of Central Aymara have survived. In any case, a growing body of more recent research[7] confirms that Jaqaru and Kawki are much less different to each other than Hardman had initially claimed. The calculations in Heggarty (2005, 13), for instance, rate divergence between the Central Aymara varieties as actually slightly less (93 per cent overlap) than that between their Altiplano cousins (88 and 92 per cent). To clarify, then: the difference *between* the two surviving branches of Aymara (Central and Southern) is very significant, and of the same order as the maximum divergence across the Quechua family; the differences between the varieties *within* either branch, however, are much more limited. This can best be visualized in Figure 4.

A radically different scenario was that put forward by earlier advocates of a Tiwanaku homeland, for whom the Central Aymara communities could be explained away as simply a distant resettlement from the Altiplano. In the archaeological record, however, there is no evidence of Tiwanaku's reach extending so far north. Its influence projected only into the southernmost corner of Peru, where it soon abruptly gave way to that of the other Middle Horizon centre, Wari, still hundreds of kilometres short of the Central Aymara area. Linguistically too, recall just how different Jaqaru/Kawki is from Southern Aymara: the two branches are far from mutually intelligible, with overlap ratings in core vocabulary as low as the mid 50s per cent. Such great divergence, and thus any supposed resettlement, would therefore most plausibly go back to a time before the Middle Horizon in any case. Nor can the resettlement suggestion be squared with overwhelming evidence from other sources that forms of Aymara were in fact once widely spoken right across the southern half of the Peruvian Andes, a more or less *continuous* territory of which the two modern-day 'branches' are but the surviving extremes. For maps of these regions thought once to have been Aymara-speaking, see Adelaar & Muysken (2004, 260), Torero (2002, 57) and Cerrón-Palomino (2000, 378).

The evidence for this comes in the form of placenames, and references in Spanish colonial documents. The customary warnings are very much in order as to the dangers of face-value interpretations of both these sources of data. Indeed in this case the usual facile 'folk etymologies' and other traps lurking in toponyms and centuries-old documents are compounded by the Spaniards' evident confusion as to how all the different forms of native languages that they encountered really related to each other. Their texts are peppered with inconsistencies in the terminology they use to describe languages and ethnic groups, not least the notoriously thorny ethnonyms *Aymara* and *Quechua* themselves (see Cerrón–Palomino 2000, 27–41; 2003, 31–7).

Nonetheless, when both these sources are interpreted with care and by specialists, the picture is clear. Numerous chronicles written after the Spanish conquest refer to forms of Aymara still being spoken in a number of pockets right across the southern half of Peru: see Cerrón-Palomino (2000, 30–31, 37–8) and Torero (2002, 127–38). The same region also registers a host of placenames of unmistakably Aymara origin. As just two examples, the toponym *Cuzco* itself seems to be Aymara (Cerrón-Palomino 2007), while the Apurímac department includes the province of *Aymaraes*, exactly midway between the two modern Aymara-speaking regions. Cerrón-Palomino (2002) argues for an Aymara origin of certain placename suffixes commonly encountered as far north as Ancash, though he also warns that the supposed Aymara etymologies claimed for localities even further north are sporadic and much less certain (see also Cerrón-Palomino 1998; 1999; 2000, 279–80, 289–93; 2003, 333–4, 378). So while further research is required to ascertain quite how far north Aymara toponymy may reach, for southern Peru the answer already seems assured. Forms of Aymara

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were once widespread across the region, including notably in and around Cuzco itself, and some survived well into the Spanish colonial era.

More intriguing still is the 'particular language of the Incas' referred to in a number of Spanish documents as a 'secret' language, the preserve of the native Inca nobility. A few verses in this tongue are actually cited in Betanzos (1996 [1557], ch. XIX, 93) as the 'Song of Tupaq Yupanki' — and they are conspicuously not Quechua. Much pored over and debated by Szeminski (1990), Torero (1994; 2002, 141–6) and Cerrón-Palomino (1998; 2003, 335), this language appears to be some form of Aymara, albeit not particularly close to either of the surviving branches, and arguably with traces of influence from Puquina. Moreover, there are a host of other powerful arguments for an earlier Aymara presence in the Cuzco region, surveyed in Cerrón-Palomino (1999; 2004).

All this evidence of geographically intermediate forms of Aymara, now extinct, reminds us of the dangers of another superficial assumption and idealization about language histories, all too common even among linguists themselves. This is to suppose that in all cases language divergence necessarily happens in the form of branching into a 'family tree', ignoring the other possibility of the *wave model* of divergence, or indeed some combination of the two, as is no doubt frequently the case in practice. (For details, see Heggarty 2007, 320–21.) A useful perspective can be gained from the recent history of new synthesis work that has sought to apply to language data phylogenetic analysis packages that were originally designed for research into speciation and population genetics. The first generation of these algorithms was able to produce outputs only in the form of branching trees, with many insisting also on uniquely binary branches; yet this constitutes a gross idealization of how languages very often diverge in practice, into dialect continua. Attempts to apply such analyses to Quechua data, for instance, yield output 'trees' patently at odds with what we know of the family and its classification.

Much more appropriate as models of language divergence are the algorithms used by the latest generation of phylogenetic analysis packages, those of the 'network' type. The one illustrated here is *NeighborNet*, by Huson & Bryant (2006). This takes as its input data a grid of numerical measures of how different each language variety is from each of the others (i.e. in linguistic applications the taxa being compared against each other are regional language varieties, rather than species or populations.) In cases where the signal in these quantitative data is consistent with a tree-like structure, *NeighborNet* duly draws one; but in cases where it is not, the algorithm can also accommodate a radically different representation of how the languages relate to each other, mapping these more complex, cross-cutting relationships as web-like 'networks' instead. When one applies *NeighborNet* to ratings of divergence in vocabulary across Quechua, this is precisely the picture it paints, in line with the powerful objections that have long been raised to the traditional simplistic 'branching-tree' classification of the family. Figures 5 and 6 of the previous article (Heggarty 2007, 334, 336) thus visualize how the early divergence of Quechua appears instead to have come about primarily not by discrete branching events (associated especially with long-distance migrations in stages and at different time-depths), but by wave processes, giving rise to a dialect continuum instead.

We complete the second of those figures here by 'zooming out', in Figure 4 below, to add the detail of how the Aymara family is represented on the same data. In contrast to the dialect web of Quechua, Aymara does reveal a fairly neat branching tree with a single, deep cleft, even on a *NeighborNet* analysis. This illustrates a particular advantage of network-type analyses: they are able to combine both modes of language divergence into one model and output representation, depending on the relative strengths of the tree-like *vs* web-like signals inherent in the data on language relationships that are input to them, hence the contrast between the Quechua web and Aymara tree both within the single *NeighborNet* in Figure 4.

Taken at face value, then, this *NeighborNet* does suggest a population history involving a clean break between two different entities, Central and Southern Aymara. That said, there are cases when even in *NeighborNet* a tree-like pattern can be a function not of the true history of a language family, but simply of the particular selection of data input to the phylogenetic analysis. Even where a family did indeed originally diverge gradually into a dialect continuum, if we compare only varieties taken from each of its two extremes, such a sample will necessarily produce a result more tree-like than was actually the case.[8] What the vagaries of history have left to us of the Aymara family today may well be just such a biased sample. With the extinction of the presumably intermediate varieties right across southern Peru, the only ones that have survived into our data set happen to give an incomplete and skewed picture of what was probably its true nature and history, as a broad dialect continuum. (Transferred to the present-day context, this serves only to emphasize the urgency of recording the linguistic diversity of humanity before so much of it goes extinct, as several thousand languages are

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doomed to do over the coming decades. Aside from the enormous loss in terms of the human cultural experience and diversity that they represent, for every language that dies unrecorded, critical clues to human prehistory die with it. Language death is to linguistics what 'grave-looters' are to archaeology.)

This lack of a full data set of Aymara languages necessarily limits our attempts to try to identify the family's most likely homeland. One can only strive to make the best of what signals do remain, carefully interpreting them while bearing in mind that they do not necessarily represent the whole picture. Alongside the various types of linguistic data already discussed, a final crucial source of data on Aymara history is to be had by contrasting it with its neighbour, Quechua. For this comparison yields ample evidence of intense and prolonged contact between the two language families, and by extension also between their speakers, through much of their histories. Piecing all this data together into the most coherent overall picture, the two leading experts, Cerrón-Palomino (2000, 290) and Torero (2002, 46), both come to the conclusion that the most likely homeland for Aymara was in fact nowhere near Tiwanaku, but much further north, somewhere in Central Peru.

This, of course, is in the same general area as their putative homelands for Quechua. Indeed this is a large part of their reasoning, since the evidence of intense Quechua–Aymara contact from perhaps even *before* each family began to diverge implies that the two ancestor languages themselves must presumably have lain close to each other geographically. Before we try to fill in the details of the geography of the Quechua and Aymara homelands and stages of expansion, then, we have an even more fundamental issue to address. For now that our reconstructions of Quechua and of Aymara histories have taken both families back to areas close to each other, at time-depths of roughly the same order, this 'coincidence' raises an obvious question that we can no longer avoid: what is the nature of the relationship *between* these two families?

4. Deeper relationships and new approaches: the 'Quechumara' question

4.1. A case-study for new quantitative and phylogenetic approaches

The suggestion that Quechua and Aymara might themselves have sprung from a common origin arose in the early days of Andean linguistics, in the face of what at first sight seems a mass of striking parallels between them. Much was once made, for instance, of the fact that the sound inventories of each family appear all but identical, before it was very rightly objected that this actually applies only to the *southern* varieties of each, and that their rules for how those sounds can be combined are in fact radically different (see Cerrón-Palomino 1995a). For decades this so-called 'Quechumara' question remained a central enigma of Andean linguistics, and while those who reject the idea that the two families are demonstrably related have grown increasingly confident that the balance of the evidence has swung decisively their way (Torero 2002, 154), even in recent years some authorities have still tentatively maintained a more open mind (Campbell 1995; Cerrón-Palomino 2000, 337). In any case, the very fact that debate continued to and fro for so long is testament to this being a particularly thorny case. Conventional methods seem to have been exhausted, while still leaving this crucial question without a satisfactory resolution (for a brief summary in English, see Adelaar & Muysken 2004, 34–6).

Such a context is thus a fitting one in which to apply a clutch of new methodological approaches that have emerged in recent years. Indeed for our purposes in this article, the Quechumara conundrum serves as a model illustration of how these latest methods can shed stark new light on issues in the prehistory of languages that traditional analyses have hitherto proved unable to resolve definitively.

A range of new techniques were applied to the Quechumara question by Heggarty (2005), reported also in McMahon & McMahon (2005, 156–7, 166–73) and McMahon *et al.* (2005). The core linguistic method employed is the one whose results have already been cited here, in the form of ratings of percentage overlap in vocabulary between various regional forms of Aymara and Quechua. These measures are calculated for a set of basic word meanings by a dedicated programme that adopts a radically new and more linguistically sensitive approach, designed specifically to address the numerous criticisms levelled at the traditional lexicostatistical methodology. The meaning list too was adapted to ensure it was appropriate to the Andean languages and context, replacing words for Old World fauna and concepts with New World equivalents, for instance. This linguistic method was then combined with *NeighborNet* for phylogenetic analysis of the results.

The particular nature of the Quechumara question required two further methodological innovations. Firstly, a fact that many non-linguists (and even a few doomed 'linguistic' attempts) have failed to recognize is that basic lexicostatistics cannot in principle be used to establish *whether* the languages being compared are or are not related to each other. On the contrary, it

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relies fundamentally on the concept of word cognacy, i.e. on the prior assumption that the languages compared are already known to be related, as established independently by the only valid linguistic means to that end, the *comparative method*. This cross-family Quechua–Aymara study therefore called for a novel approach to those words whose status as either truly related ('cognate') or just loanwords is unclear or disputed. Such terms are legion in Quechua and Aymara, and necessarily call for a methodology that does not require us to prejudge the very question we are trying to investigate: whether the language families are related or not. Secondly, we needed to extract from our data set some criterion diagnostic of precisely that key question. To this end, within the 150 basic word meanings that made up our data set, we also isolated two extreme subsets of about 40 meanings each: those for which the word used typically remains highly stable through time (e.g. the lowest numerals), and which are therefore more reliable indicators of common origin; and those which are the least stable and most susceptible to change, including by replacement by loanwords through language contact (e.g. meanings like *bird*). In selecting these contrasting subsets we were guided by precedents from wide surveys by Lohr (1999) of several large, unrelated language families.

For each of the two subsets we calculated our usual measures of difference between Andean language varieties in their vocabulary. When these separate sets of results were input to *NeighborNet*, it produced from them the two outputs in Figure 5, which respectively stretch and compress the output diagram in opposing directions relative to the results for the overall data set given in Figure 4.

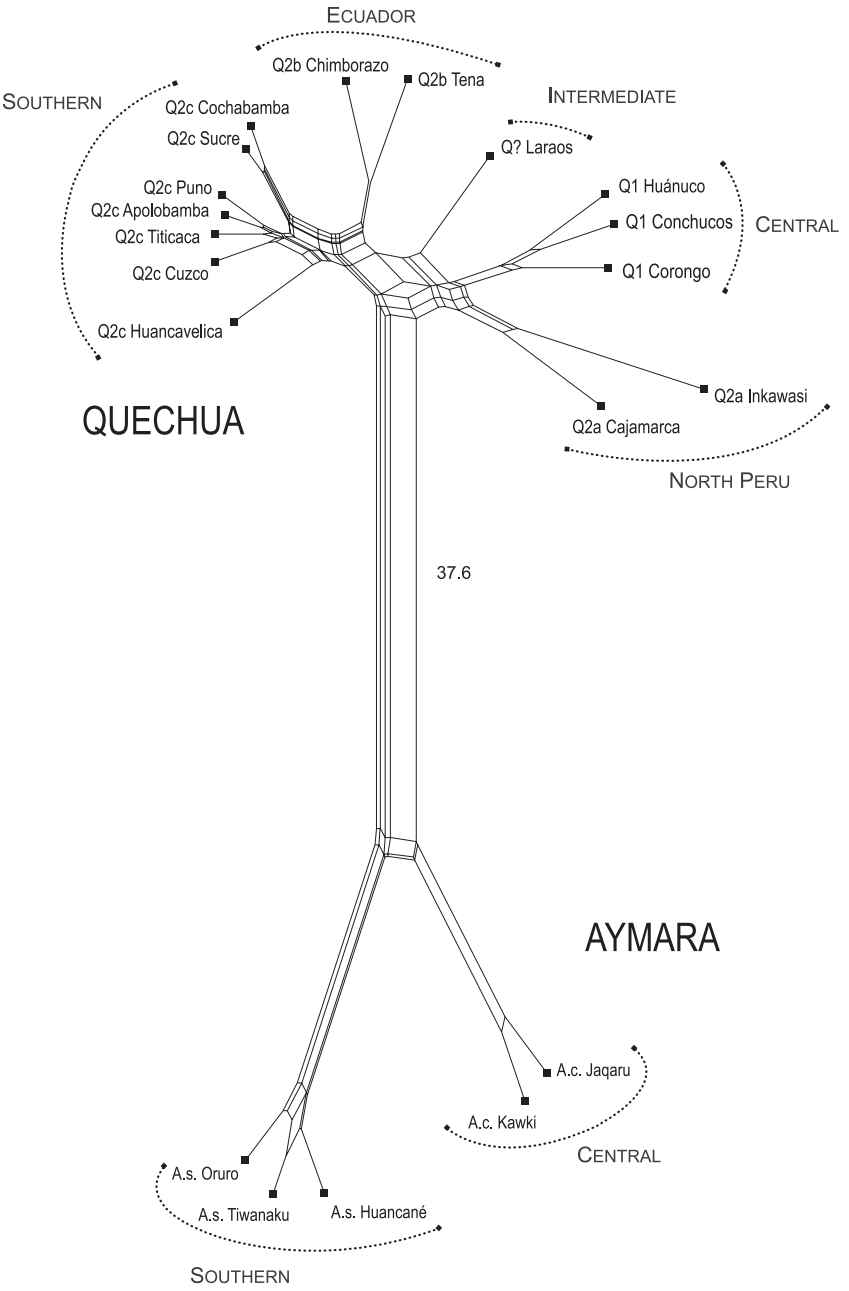


Figure 4. *Degree of difference between 20 regional varieties of Quechua and Aymara for an overall list of 150 basic word-meanings, as represented by* NeighborNet, *on the basis of quantifications of their divergence in lexical semantics in Heggarty (2005). The degree of difference between any two language varieties is mapped as the total distance along the edges that separate them in the* NeighborNet. *Labelled as per the traditional classifications of the families.*

This stark, consistent contrast between the results from the two different subsets comes down firmly on one side of the Quechumara debate. Aymara and Quechua show precious little similarity in the most stable subset of meanings (shown on the left); rather, most of their similarities are to be found in the least stable and most

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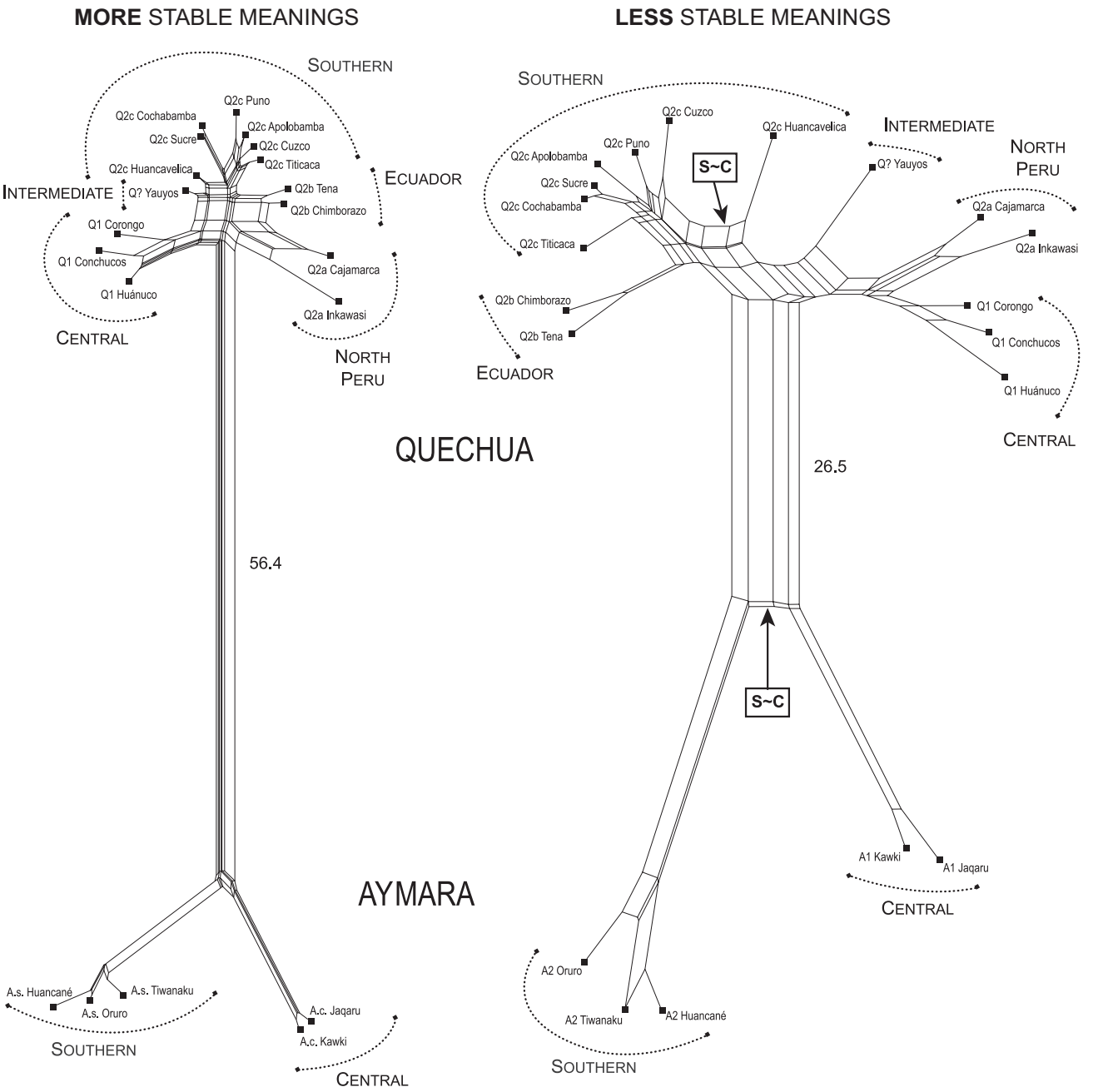


Figure 5. *Degree of difference between 20 regional varieties of Quechua and Aymara for two contrasting subsets of meanings as represented by* NeighborNet *on the basis of quantifications of difference in lexical semantics in Heggarty (2005). See caption to Figure 4 for how to interpret* NeighborNets. *S~C indicates the opposition between Southern* vs *Central varieties of each family. The two numbers shown indicate the respective distances (out of a maximum 100) of the main edges separating the two families.*

easily borrowed subset (shown on the right), where the two families pull much closer together. This pattern is much more compatible with a scenario in which the two language families do *not* stem from a common source, and the correspondences between them go back only to heavy contact instead. This conclusion is further

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reinforced by the detail of the *NeighborNet* of the least stable meanings, in which the branches of each family pattern suspiciously with geography: Central Aymara is closer to Central Quechua, Southern Aymara to Southern Quechua. This stands as all the more evidence of contact — between the geographically adjacent varieties — as an explanation for the known Quechua–Aymara correspondences, rather than common origin.

The only rider to this conclusion is the one that has to be added to all such relatedness debates: 'as far as we can tell', i.e. as far back as linguistic methods can take us. Indeed in the case of the Andes, since so few indigenous languages have survived into our data, and no records from any earlier than 1532, we cannot expect those methods to take us as far back as they can with languages documented millennia into the past, as is the case with a number of Indo-European lineages. Still, the significance of this caveat should not be overstated. Even if there once was some putative single 'Proto-Quechumara' ancestor, it must go back to an extremely remote period, for otherwise linguists would have been left with much stronger, clearer signals of their relatedness, and would have had no trouble in demonstrating it convincingly and reconstructing the basics of this proto-language. We can still state with very considerable confidence, then, that even if Quechua and Aymara were ultimately related, the time-span for their divergence from any putative ancestor must be counted in many millennia, much further back than we can trace the divergence within the Quechua and Aymara families themselves. That is, we are taken back to a period for which in the Andes linguists can only speculate, and for which our archaeological evidence too is extremely limited. For all practical purposes, then, we can indeed consider the language families not to be genealogically related.

4.2 Making use of language contact evidence

This finding that Quechua and Aymara are not demonstrably related is hardly a 'disappointment' — far from it. On the contrary, it represents very useful data: for it is now with greater confidence that we can assert that such parallels go back instead to a different explanation, but one equally valuable as a clue to the prehistory of the populations who spoke them: long periods of exceptionally strong mutual influence between the language families, and perhaps at an earlier stage still, between their respective proto-languages.

It should be noted that this fact holds whatever position one takes on the Quechumara question. For even if the families were ultimately related, very many of the parallels between them remain too suspiciously similar to be imputed to some ancient shared form or loanword, and are compatible only with fairly recent mutual influences, while many more are limited to particular regions where the two families border on each other. Other shared features, though, do hark back to the very earliest stages of each family's divergence, or to a time even somewhat before then. (See the supplementary information at www.quechua.org.uk/supplinfo.htm for a discussion of the numerals system, for instance, a microcosm of the complex relationships between the Aymara and Quechua languages.)

So whether Aymara and Quechua are ultimately related or not, a scenario for the early population history of the Andes will be plausible to linguists only if it can accommodate periods of particularly intense contact between whatever 'cultures' are identified with the speakers of these language families. This applies both to relatively recent times, when mutual influence has been particularly heavy between the southern varieties of each family, and to periods far back in their histories, even before they began to diverge significantly at all. As noted above, this has often been taken as a powerful linguistic argument for asserting that the homelands for both families were likely relatively close to each other. In which case, given that the genealogical structure and dialect geography of the Quechua family point to a homeland in central Peru (Heggarty 2007, 333–7), this is where we are drawn to place the origins of Aymara too. Certainly, central Peru appears to be one candidate homeland region that can be made to fit plausibly into the divergence patterns of both families.

In fact, so remarkable is the degree of interpenetration of Quechua and Aymara that certain authors have felt that it calls for explanation in terms of language-external factors claimed to be peculiar to the Andes, particularly their accidented mountain topography. Since Murra (1975, 59–115), it has been usual to stress that the different altitude levels in the Andes offer access to a range of radically different ecological resources: the so-called *pisos ecológicos* or ecological floors. It is suggested that this would have encouraged any given ethnic group not to concentrate itself in one area and altitude band in the Andes, but deliberately to split up to ensure footholds at a range of different altitude levels. The group as a whole could thus access and control the full gamut of ecological resources of all levels, thereby also mitigating risk from adverse environmental conditions at any one level. The effect of this 'discontinuous territoriality' (Shimada 1985) would be to bring members of different ethnic groups, and their respective language lineages, into constant contact with each other as neighbours, as each group sought some presence at each different altitude level.

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In such a context, one could indeed expect the linguistic consequences to take the form of particularly strong interactions between languages, such as those observed between Aymara and Quechua. For one linguist's view on this, see Torero (2002, 95–6).

The Quechumara issue also invites reflection on a broader picture still, for the failure to identify any deeper relationship between the two families is symptomatic of the single most striking feature of the linguistic panorama of the Central Andes at the grandest scale: the absence of any overarching family of any great breadth and time-depth. This observation takes us to the core of the relationship between archaeology and linguistics at an even deeper level, but one that there is not space to do justice to here. This issue is therefore reserved instead for the fuller exploration that it deserves, in Heggarty & Beresford-Jones (in prep.). For our more immediate message here, suffice it to say that this unusual and provocative point shows again just how informative the intriguing special case of the Andes can be, even at this broadest of levels in the archaeology–linguistics interface.

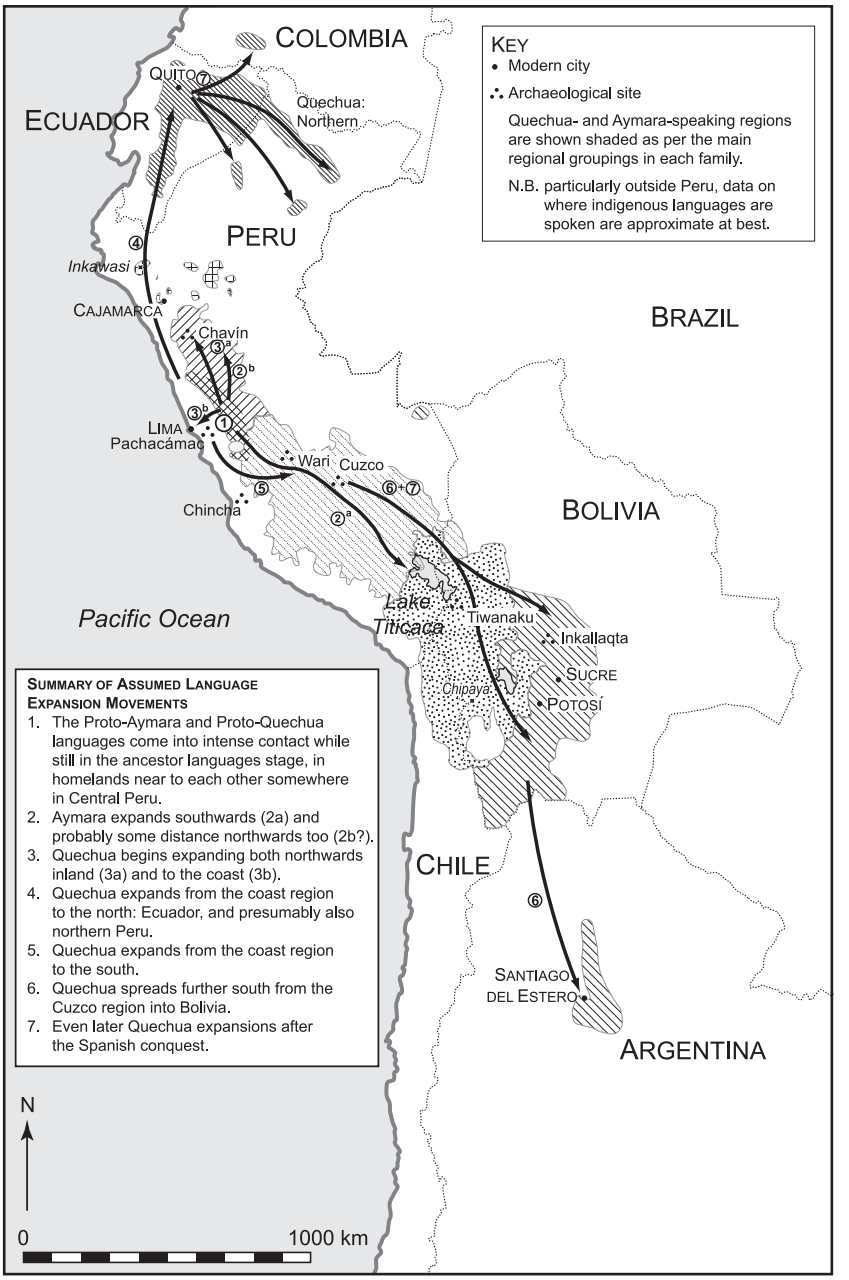


Figure 6. *Compromise view of currently assumed sequence of expansions of the Quechua and Aymara language families.*

5. The scenario – to the limits of what linguistics can tell

To return to Quechua and Aymara individually, and to much more recent times for which our picture is more reliable, we conclude in this final section by surveying the current state of linguistic knowledge on their 'family histories': both the broad outlines on which linguists are generally agreed, and the finer points on which uncertainties remain. I focus here on the linguistic literature, published mainly in Spanish, for it seems to have largely escaped the attention of the few archaeologists who have entered the field. Their own contributions tend to deal with the linguistics rather summarily (e.g. Bellwood 2005, 235) and/or rely on early proposals such as Bird *et al*. (1984) which are linguistically quite outdated and unreliable (see also Isbell 1984).

There is firm consensus among Andean linguists that the ancestor language of each of the two major families began diverging into its corresponding family long before the Late Horizon, and quite plausibly before the Middle Horizon too, perhaps even by a millennium or so. And while Quechua and Aymara do not stem from any remotely recent common source, the starting points for their respective expansions were at some locations in central Peru close enough

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for the two languages to have influenced each other very heavily by contact from a very early date. This period constitutes stage 1 in Figure 6, which seeks to provide an approximate compromise overview of the sequence of expansions of both the Aymara and Quechua families as proposed by leading Andean linguists. The location of stage 1 here is deliberately intended to be vague, as merely a rough overall region, across which are peppered a number of more precise proposed homeland locations, according to the various rival hypotheses that have been advanced.

5.1. Expansions and cultures: the case of Wari

Before we start looking for specific archaeological 'cultures' to link particular language families to, however, an important distinction needs to be drawn. We are careful to speak here of associating a language expansion with some particularly potent *force(s)* able to account for it, rather than necessarily with some specific socio-political *entity* empowered by such forces. Again the Andes offer pertinent examples, not least that of Wari.

The extent of Wari material culture defines the Middle Horizon in Peru. Yet exactly what the cultural, political and ideological driving forces were that created this archaeological record are questions that remain very much in debate among archaeologists. Was Wari a fully-fledged 'state' or 'empire' established by conquest and with direct, powerful military control (even if short-lived)? Or was it only a looser entity, perhaps a strong core but a weak periphery, whose influence operated essentially on the levels of cult practice, trade and/or a package of agricultural innovations (new maize strains together with terracing and irrigation technology)? And if so, where did the divisions between its core and periphery lie?

Such questions may well be critical ones for archaeologists, but the point for our purposes here is that it is not necessarily a prerequisite that we resolve them in detail before we can proceed to establishing a link with a language expansion. That some Andean linguists have proposed Wari as the motor for some major language expansion or other — whether that of Aymara as a whole, or the first stage in the spread of *Southern* Quechua — does not presuppose the first vision of Wari, as a unified militaristic state.

Trade, for instance, was doubtless a major component of whatever Wari was, and is known to be a powerful force capable in its own right of spreading a language as a *lingua franca*, as has already been argued for the spread of Quechua to Ecuador and parts of northern Peru (see §5.3.1 below, and the fuller discussion in Heggarty 2007, 327, 331). Other components of the Wari 'culture' may well have contributed to projecting this trading influence over a particularly extensive range: road networks, camelid caravans and perhaps the *khipu* record-keeping system, for instance. Moreover, the same logic as is used to argue for agriculture as a linguistic motor — that it allows those who have it to out-populate their neighbours who do not — might be applied in the case of the Wari expansion too, albeit on a lesser scale and as only one contributing factor among several. This time the 'losers' would already have been agriculturalists, but markedly less productive than their Wari neighbours for want of their package of technological improvements. They would therefore have been able to support a population only at a lesser density than the Wari, and more exposed to collapse in the event of severe environmental episodes such as the periodic *El Niño/La Niña* phenomenon and associated highland droughts.

None of this requires a Wari state organization with some clear military superiority in order to spread its language; that would no doubt have helped, but it is not a necessary condition. The very same sociocultural forces that can lead archaeologists to identify a 'culture' (while still debating its exact political nature), may be sufficient in themselves as motors for language expansion, without requiring a particular vision of that culture as a political or military entity. Trade and agricultural productivity may have been enough to promote a language spread, even if Wari military control was lacking or only short-lived. More to the point for archaeologists, of course, is how the observation that Wari is a prime candidate as motor for a very significant language expansion provides a new perspective to feed back into their own debate on quite what its nature was.

5.2. Expansion of the Aymara family

With this clarification in mind, we can now begin our survey to place the main stages of the divergence and expansion histories of Quechua and Aymara into their probable geographical, demographic and sociocultural contexts. The first of the two to start expanding significantly was most likely Aymara: primarily southwards, though as noted in §3.3 above, there are indications from toponymy that at one point it may well also have reached as far north as Ancash (stages 2a and 2b? in Fig. 6). Perhaps only a few centuries later came Quechua's turn to expand, both north and southwards, the latter movement following on the heels of the earlier Aymara expansion and gradually 'overwriting' it. This idea of a succession of Aymara then Quechua expansions in relatively quick sequence

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is based firstly on both families exhibiting internal diversity of approximately the same order, or if anything slightly greater divergence in Aymara, hence at least a default assumption of similar time-depths for their expansions too. Secondly, such a scenario entails prolonged periods of coexistence between the two language families, and can thereby account both for the strong parallels between them, particularly the southern varieties of each, and for the traces of an Aymara presence still in the Cuzco region as late as the beginnings of the Inca state.

Input from archaeologists is indispensable in order for us to assess which demographic and/or cultural motor(s) could so successfully have taken Aymara, and then Quechua, so far from their original homelands, particularly southeastwards to Cuzco and the Altiplano. An obvious candidate for a significant role in at least one of these phases is the one just discussed: the Wari 'culture' of the Middle Horizon. Indeed, both Torero (2002, 126–31) and Cerrón-Palomino (2000, 294–6) incline to identifying Wari with Aymara rather than with Southern Quechua. Nonetheless, plenty of uncertainties remain in both the linguistics and the archaeology here. For any of the competing scenarios in one discipline, it is rather too easy to find some sort of correlate to invoke from among the various proposals in the other. In such a context, claims of cross-disciplinary support risk being circular rather than offering truly independent backing.

It is true that Wari may offer a suitable vector for helping spread Aymara across much of southern Peru, as well as leaving toponyms further north. But Wari can *not* convincingly be invoked as taking Aymara much further southeast into its present-day territories in the Altiplano; indeed the whole scenario is based on Aymara *not* being the language of Tiwanaku, and only arriving there later, during the Late Intermediate. That said, this last movement out of southernmost Peru does presuppose a heavy Aymara presence *there* already by the end of the Middle Horizon, a presence duly attributed to Wari expansion in this scenario. Yet Wari's ability to propel 'its language' powerfully into the Cuzco region seems uncertain. For despite impressive isolated sites such as Pikillaqta (McEwan 2005), some 25 km southeast of Cuzco, debate continues among archaeologists as to exactly what form and degree of 'control' is represented by sites of this type. Furthermore, whatever the intensity of this control, it was apparently short-lived. Specifically, for our purposes, was it enough to bring about wholesale language shift to Aymara among much of the region's population?

If one takes the view that Wari's impact in the southern reaches of its territory was rather limited, then this actually seems to correspond better to the level of presence assumed for Quechua there at the time: just beginning to implant itself in a region across which Aymara was still more widely spoken but which Quechua would eventually overtake by the time that the Inca state was forming. Indeed, if we accept the model of 'Wari as Aymara' rather than Southern Quechua, then we are left searching for a suitable motor for the latter's expansion across an area that was once the Wari heartland, and which counts today among the most solidly Quechua-speaking areas anywhere in the Andes. We shall take up this search in §5.3.2 below.

As our knowledge stands, then, Wari does not necessarily fit exclusively or perfectly with either of these two language expansions. In fact, this case illustrates well a more general problem in our cross-disciplinary task: while archaeology does have its means, at least in ideal conditions, of setting its findings in a more or less absolute chronology, linguistics does not. It offers only a *relative* sequence of events within at best a broad span of absolute dates that might be compatible. Relative to the more fixed archaeological chronology, then, the linguistic scenario can shift up or down as a whole, or indeed stretch out or contract. (Archaeologists might compare this to Renfrew's (1973, 115–17) 'chronological fault line' that emerged during the 'radiocarbon revolution' in Europe, which forced traditional chronologies for the prehistory of some regions to be both stretched out and shifted back wholesale much further into the past, relative to those for other regions.) In the Andes, our two disciplines' time-scales might therefore interlock in a number of different ways. Working out which permutation is the most plausible overall is all the more difficult in this case, where we have not one but two look-alike language expansions to deal with over Central-Southern Peru, both in the same southeastward direction and in fairly close succession.

Returning to Aymara, what does seem more reliable is the picture of the final stages of its expansion, as we emerge into times that are increasingly historically documented, and as the chronological margin of error inherent in linguistic analyses gradually reduces. As we have seen (§3.2), there is near consensus among linguists that the diversity of Aymara across the Altiplano where it is mostly spoken today is too limited to be consistent with an expansion as early as the Middle Horizon, and therefore with a Tiwanaku homeland. Rather, Aymara must have finally spread into this region only relatively late: at the earliest, some time in the Late Intermediate Period. Specific motors for an expansion at that time are still unclear, however.

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Cerrón-Palomino (2000, 294) suggests this 'third expansion' as that of the 'ethnic group of the Aymaraes … in the upper basin of the River Pachachaca (Apurímac) … displaced by [Southern] Quechua-speaking peoples'. Torero (2002, 131) too details possible stages and regions through which Aymara reached the Altiplano, but without identifying a particular motor. Both proposals seem rather speculative given the current state of our knowledge; again, an input from archaeologists is sorely needed.

In any case, however it began, the expansion of Aymara to its present-day extent continued apace up to and even well into Spanish colonial times, at the expense of other indigenous languages established earlier in the region. Indeed, what we know of the linguistic history of the Altiplano since the arrival of the Spaniards looks very much like the tail-end of just such a process. In the early decades of colonial rule, two other indigenous language families were still widespread enough for the Spaniards to 'recognize' them, not least for the purposes of evangelization; both inexorably lost ground, however, particularly to Aymara. Puquina is now long extinct, save for some intriguing fragments mixed into the otherwise Quechua-based 'secret' speech of the itinerant herbalists of Callahuaya, in the Cordillera Apolobamba east of Lake Titicaca. Uru-Chipaya, meanwhile, survives tenuously only in two remote villages, Santa Ana de Chipaya and Ayparavi, beyond Lake Poopó in the Bolivian Altiplano (Cerrón-Palomino 2006, 17–27). Aymara's expansion at the expense of these languages would have included it displacing the language(s) of the earlier Tiwanaku culture, for which the best candidate seems to be Puquina. This scenario would account for Puquina's own apparently wide distribution in earlier times, over much of the Middle Horizon orbit of Tiwanaku. The southwesternmost corner of Peru, where it borders with both Bolivia and Chile between Lake Titicaca and the Pacific, displays extensive toponymy of apparently Puquina origin. Spanish colonial documents, meanwhile, repeatedly attest to Puquina-speakers in these regions, as well as in other pockets further to the east and south across the Bolivian highlands (Torero 2002, 389–404, 465).

To summarize our knowledge of Aymara expansion, then: the broad outlines are clear, in terms of directions and relative, approximate time-scales; but beyond that, other than for the final stages, most of the detail remains far from certain. Indeed, the earlier stages are a clear illustration of how linguists can differ both in their approach, and their detailed conclusions. Torero (2002, 126–31) proposes an ambitiously detailed hypothesis to fill in the gaps in our linguistic knowledge of the history of the Aymara family, a sequence of assumed phases in its divergence, each assigned to particular archaeological cultures. To come up with this, however, he is pushed to read a great deal into our very limited data on the 'missing links' in the story of Aymara, including separate branches which he claims can be identified among the dialects assumed to have stretched across south-central Peru, where the middle stages in his divergence scenario are played out. So far does Torero take this that he arrives at his scenario in a way which for Cerrón-Palomino (2000, 296) is 'purely speculative' to the point of being 'gratuitous'. It is indeed all too easy to 'fall into speculation', as Cerrón-Palomino (2000, 294–6) warns, admitting frankly that at the present state of our knowledge the details of even his own suggestions can be but 'tentatively sketched' at best. We must accept that the finer points of Aymara's expansion are not yet filled in, and may never be by linguistics alone, given that we have long lost almost all trace of the relevant language data. As we have seen, even basic questions such as the homeland and association with Wari remain to be entirely confirmed.

5.3. Expansion of the Quechua family

Within the Quechua family so much more diversity survives that we are able to fill in considerably more detail in the history of its expansion. Quechua too is taken to have started out from a homeland in central Peru (its approximate location at stage 1 in Fig. 6). From here, some fairly simple spread would have taken what are now the Central Quechua dialects to their current distribution, stretching from their southern limit in Huancayo to the northern one in the north of Ancash (stage 3a).

The longer-range expansions, though, are generally agreed to have originated from an area on or just inland from the central coast. The splintered continuum of dialects that have (just) survived into the new millennium, in the arid highlands immediately inland from the coast, would thus be a remnant of this once wider Intermediate Quechua area. Perhaps here was the original homeland itself, or at least an area that Quechua reached at an early stage in its expansion (i.e. stage 3b in Fig. 6).

5.3.1. Expansion northwards

From here Quechua made it far to the north, in a long-distance movement played out most likely over a period long after Quechua divergence had first begun, but still a few centuries before the Inca conquest (stage 4). This took it into Ecuador, and may also explain the North Peruvian Quechua outposts 'en route'.

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Quite which path it followed to reach Ecuador is debated, and it is unclear how significant a population movement was involved. (What does seem reliable linguistically is that this expansion was largely independent of the northward spread of Central Quechua, which proceeded in parallel but much further inland, and which seems to have advanced no further than northern Ancash.)

A leading theory is that this form of Quechua spread principally as a *lingua franca* for trade. Indeed there seems to be an obvious candidate that fits the bill in time-depth, location and trading 'vocation': the Ica-Chincha culture of the central coast of Peru during the Late Intermediate Period, as first suggested by Torero (1984; 2002, 93–6). This early proposal has since been supported by a number of scholars, many of whom have also accepted a second key element, namely that the specific route by which Quechua spread was along the coast by maritime trade.

Hocquenghem (1993), however, makes a case against any supposedly significant *sea-borne* trade. For a start, south of Ecuador the strength of the Humboldt Current makes long sea journeys back southwards along the coast particularly difficult. Perhaps Pre-Columbian paddled rafts could surmount the difficulties, but for European vessels at least, a route south close to land became practicable only with the development of powered ships. Throughout the colonial period the Spaniards were unable to make headway by sail southwards along the coast, and instead having rounded Punta Pariñas usually landed immediately at Paita, the port for Piura. Passengers disembarked and goods were off-loaded for the faster overland mule and ox-caravan to Lima, while the ships looped out deep into the Pacific to avoid the Humboldt Current and approach Callao (the port for Lima) from the south (Walker 1979, 8–9).

Nor does Quechua ever seem to have been well established on the coast in northern Peru, but only in isolated enclaves well inland: for Adelaar & Muysken (2004, 172) 'There is evidence that Quechua never became widespread in the region'. Unfortunately our knowledge of the indigenous language families that were once spoken in this area is limited (see §2 above), gleaned mostly from toponymy and some scant historical records. All are now extinct, including the main inland language Culle, and the Mochica of the coast (except, intriguingly, for a few fossilized mantras in an old ritual chant known as the *Taki*, an ethnolinguistic curiosity still sung in the Quechua-speaking redoubt of Inkawasi). Nonetheless, it is clear that these languages yielded only relatively recently, and to Spanish, not to Quechua, which never significantly displaced them. Indeed over the Late Intermediate the North Peruvian coast was home to the 'Kingdom of Chimor', a regional polity so powerful that one would hardly expect its own language(s) — Quingnam and Mochica? — to retreat significantly merely because of passing Quechua-speaking traders from Ica-Chincha, whatever route they travelled by.

Rather, Quechua effectively just leap-frogged those languages further north into Ecuador, where no such single, powerful polity existed to outweigh its attraction as a useful trading language. Its impact in northern Peru would have been limited to establishing *en route* the small pockets that are the only significant evidence of Quechua that we can detect in the region. Indeed it may be that *en route* can be taken quite literally here, for if Hocquenghem is correct then perhaps these Quechua enclaves formed as outposts on a trade route not by sea but by land, along the main highways which later became part of the *Qhapaq Ñan*, the 'road' network of the Inca Empire: one along the coastal strip, one further inland. If so, it would be no coincidence that the highland route passes close by the Quechua enclave of Inkawasi, and straight through that of Cajamarca. Torero (2002, 267–8, 271) himself uncovers Quechua toponymy even further north along this route, in the highlands of the Piura department; indeed to judge from ethnographic evidence, Quechua was still being spoken as late as a few decades ago in the Huarmaca district of the Huancabamba province (Taylor and Itier, pers. comm.). A scenario in which all of these outposts fulfilled a role as 'caravanserais', playing host to traders from many different Quechua-speaking regions, and others for whom it was not a native language at all, has two further linguistic attractions. It would fit with Taylor's (1984, 16–21) preferred characterization of the North Peruvian Quechuas as specifically mixed rather than intermediate varieties; and would also account for how recalcitrant they have proved to any straightforward classification relative to the rest of the Quechua family.

Torero (2002, 93–6) argues also for one other candidate source for the Quechua expansion from the coast of Central Peru, with a quite different cultural motor that would have operated most likely in combination with trade through Chincha. Some 150 km further north along the coast lies Pachacámac, which long exerted a powerful cult influence over much of the Central Andes as an oracle and pilgrimage destination. It was also at times a city-state of some economic and administrative power in its own right, particularly during the Late Intermediate Period, though Torero suggests that it helped expand the Quechua of the central coast even from as early as the start of the eighth

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century. It remains to be assessed, however, whether the 'power' or influence of Pachacámac really was so strong as to spread Quechua so dramatically, and whether it really radiated outwards rather than acting more as a pole of attraction inwards. Nor is it clear whether its influence extended so far north as Ecuador in any case. Any role for Pachacámac might therefore best be seen in the expansion of coastal Quechua in the other direction: southwards and inland.

5.3.2. Expansion southwards

For indeed, over roughly the same period as forms of the intermediate (central coast?) Quechua were leap-frogging northwards, others are imagined to have been busy extending in from the coast, and towards the southeast (stage 5, perhaps actually contemporary with stage 4). This expansion too presumably did not begin until long after the first stages of Quechua divergence, for by the time that it had reached into the Huancavelica area, the Quechua it brought was already very distinct from the southernmost form of Central Quechua now spoken around Huancayo. Where the two eventually met, they duly formed the one fairly clear linguistic frontier within continuous Quechua-speaking territory (Heggarty 2007, 335). The difference between the two was perhaps even exacerbated much later by the colonial labour draft for the mercury mines in Huancavelica, bringing there populations drawn from all areas further south within the bishopric of Ayacucho.

In this southward spread, Quechua seems to have been following on the heels of the earlier expansion of Aymara. Indeed, the usual assumption that this Quechua expansion is to be set in the Late Intermediate follows from the idea that Aymara is to be associated with Wari. The nagging doubt, of course, is whether the Late Intermediate (rather than the Middle Horizon) offers 'motors' powerful enough to bring Southern Quechua to such dominance here: for it would in time replace all other indigenous languages across the region, except in the surviving redoubts of Jaqaru and Kawki, and in the Altiplano far to the south, where Aymara was still one step ahead. Even in the Cuzco region, Quechua came to pre-eminence only relatively late, as the Incas rose to power. Moreover, their subsequent 'imperial' expansion was too short-lived to disturb the linguistic picture significantly in any areas to the north that must already have been speaking some form of Quechua. The Incas were primarily responsible only for taking their own local form of Quechua further south still, leap-frogging the Aymara-speaking region into southern Bolivia (stage 6). Finally, even certain policies of the Spanish colonial regime continued to cement and further expand Quechua, particularly in these southernmost regions, until as late as the Túpac Amaru II rebellion in 1780.

5.4. Homelands and 'cultures'

If we know this much detail, then is it not possible to locate somewhat more precisely than just 'somewhere in central Peru' the homelands from which Quechua and Aymara first began to spread, and to identify some corresponding extra-linguistic forces that might have propelled those earliest expansions?

Proposals have certainly been made, although none have yet proved convincing and there is no consensus. For one view, we may cite Torero's (2002, 46) contention that the Quechua and Aymara families 'originated, respectively, on the central coast — the area of the formation of proto-Chavín cultures — and on the southern coast — the area of the Paracas culture'. He goes on to assign the heavy early contacts between the two families to the Early Horizon: 'it may be postulated that the interpenetration between the ancestor languages of the modern Quechua and Aymara language families goes back to the period of development' of classical Chavín. If Torero is right, then the schema in Figure 6 needs to be adjusted, shifting the homelands to the coast and reversing the direction of expansion 3b. Moreover, in associating the early stages of Aymara with Paracas and Nazca, Torero (2002, 126–31) sees these also as the agents of its initial expansions and linguistic divergence, extending the language inland both to the Yauyos area and separately towards the Ayacucho area. This split would ostensibly account for the separation of Central and Southern Aymara branches respectively, though Torero's vision is actually more elaborate in any case (§5.2). Importantly for his proposal, the latter movement also serves to take (Southern) Aymara into the area that Torero requires it to be in as the staging post for the next major expansion he envisages, associated with Wari.

Torero's proposals hardly enjoy unanimity, however. While Cerrón-Palomino's (2000, 294–6) scenario aligns broadly with Torero's as regards the homeland and first expansions of Aymara, he places the likely homeland of Quechua not on the coast but further inland, in the 'central-northern highlands', leaving the coast as the homeland for Aymara alone (Cerrón-Palomino 2003, 22). Among his linguistic arguments are certain characteristics of the former coastal Quechua which he argues betray its intrusive character in that area. He also sets store by the claim that Central Quechua shows great dialectal diversity per unit area, often taken as a rule-of-thumb indicator a family's

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likely point of origin (Heggarty 2007, 326, 333–5). Indeed, Chavín lies in the area that Cerrón-Palomino points to, and has sometimes been suggested not in the role that Torero sees for it, but simply as the original Quechua homeland. Either scenario remains compatible with the revisions and conclusions proposed recently in Heggarty (2007, 335–7).

Looking back much further still, even the Late Pre-Ceramic site of Caral — or perhaps better, the concentration of such sites throughout the Supe and Pativilca drainages — has been put forward in the capacity of an ultimate Quechua homeland, as noted by Cerrón-Palomino (2003, 22), for instance. Datings for these sites range from *c*. 3000 to 1600 BC, however, so such an association would be pushing at the very earliest limits of our plausible time-bracket for the Quechua family's divergence, far more so even than Chavín. Quite rightly, Cerrón-Palomino is at pains to qualify that any such suggestion could refer only to a 'Pre-Proto-Quechua', i.e. corresponding to a period long before any expansion and divergence began, and wisely observes that even to say that remains 'rather premature, if not to say speculative'. Still, that he even entertains the possibility is evidence of how uncertain our datings are, and how far things have changed since the discrediting of glottochronology.

It is worth recalling at this point that the only events for which linguistic data can provide even a broad time-frame are either periods of significant contact between languages, or especially *expansions* from and into given areas, leaving a signal in the form of a genealogy of divergence within a language family. So even if Supe/Pativilca or Chavín is considered too far back in time to have supplied the cultural motor behind the Quechua or Aymara language expansions, this is not necessarily an objection to their inhabitants having spoken earlier stages of those language lineages, but *without* successfully spreading them at those periods. For in the absence of some suitable demographic and/or cultural factor(s) to propel them to expand, it ought to be the default assumption, after all, that people and their languages stay put.

Still, the real interest is finding which forces *did* promote the expansions. In principle, so important a centre as the Chavín of the Early Horizon would naturally count among the candidates best fitted for some sort of early role, in the same way as Wari too, in later times, doubtless contributed to some major stage in the expansion of one or other of the families. Nonetheless, these two alone hardly constitute enough separate motors for all of the stages of expansion that we would wish to explain. Some of the smaller-scale polities of the Intermediate Periods must have been involved too, as per Torero's suggestion for Ica-Chincha and Pachacámac, for example, as the agents behind the spread of coastal Quechua both north and southwards.

The nub of the problem is that all of the cultures named above are in roughly suitable places, and all (just?) within our unhelpfully broad time-window. Since we are still left with these uncertainties even after our methods for dating divergence and for locating homelands have been taken as far as they can go, we need to look to the one alternative approach that remains. That is, it is high time for a detailed assessment of whether and which of the proposed candidate 'cultures' really were endowed with demographic and/or cultural factors powerful enough to account for such far-reaching linguistic consequences as are attributed to them. Supe/Pativilca? Chavín? Ica-Chincha? Pachacámac? Wari? Others still? These are *par excellence* questions that it falls to archaeologists to judge. Indeed, the realization that at least some of these candidates were of such a nature as to propel striking linguistic expansions cannot fail to inform archaeologists' own debates as to what these 'cultures' really were.

6. Over to the archaeologists…

This, then, is how far the state of the linguistic art has taken us in the Central Andes. Above all, we have a convincing demolition of the popular myths about Quechua and the Incas, Aymara and Tiwanaku. We have time-scales of an order of magnitude further back than the Late and perhaps even the Middle Horizons; we have likely locations for both families' homelands in central Peru (whether coast or highlands); and we have plausible proposals, at least, for the main stages and directions in the expansions of each. On these broad-brush issues there is general agreement among Andean linguists, for at this level the linguistic data are fairly unequivocal and convincing.

Beyond this, however, this linguistic survey has also revealed how much remains to be done to refine and confirm our vision of the prehistory of Andean populations. Many of the more precise questions — about dates, homelands, and which of the various stages of the major language expansions are to be associated with which particular manifestations in the archaeological record — are still very much open to debate. A number of more detailed scenarios have been put forward, but as yet they remain in the realm of speculation. We certainly now have a viable basis on which to complete the task, but to fill in the gaps and help assess the relative plausibility of the differ-

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ent proposals, linguists of the Andes have come to the point where they must look to colleagues outside their own discipline. A contribution from archaeology is now indispensable.

The sheer extent of territory (once) covered by Aymara, and particularly Quechua, cries out for a scenario able to account for their success. Which demographic and/or cultural factors were so powerful as to have projected these two particular families to such dominance? Identifying those factors in the population prehistory of the Andes is a task firmly within the remit of archaeology. We hope that now, better apprised of the fundamental findings of their linguist colleagues, archaeologists of the Andes will be in all the stronger a position to take it on.

Appendix: sources and further reading

The established panorama of the prehistories of the Quechua and Aymara families that forms the basis of this article and the previous one is founded above all on the work of the two leading and widely-respected Peruvian linguists: the late Alfredo Torero, and the prolific Rodolfo Cerrón-Palomino. Each has drawn on his own fundamental research, integrated with that of a number of more recent contributors — we have had cause to mention in particular Adelaar, Taylor and Landerman — to put together an overall scenario for the origins and expansion of the main language families of the Andes. Their most valuable surveys are to be found in Torero's *Idiomas de los Andes: lingüística e historia* (2002, esp. 45–52, 123–31), which gathers together his proposals over the past four decades; and in Cerrón-Palomino's standard reference works *Lingüística Quechua* (2003, 22, 323–49) and *Lingüística Aimara* (2000, 273–97), the former is a reprint of the original 1987 edition so it is the latter which actually contains the more up-to-date revision. Although their proposals concur in much of the broad outline, debate on finer points has been at times acrimonious; of the two, Cerrón-Palomino is recommended for his more dispassionate and punctiliously even-handed approach.

All of these basic works were published in Peru, in Spanish, and aimed primarily at specialists in Andean linguistics. Rightly so, though this has meant that their important conclusions have remained less than ideally accessible worldwide and to other disciplines. In English, a sound basic reference work with significant sections on Quechua and Aymara is Adelaar & Muysken's *Languages of the Andes* (2004, 165–91, 259–67), though this does not enter into detail on the issues most relevant to archaeology. It is this gap that this pair of articles has sought to fill, to provide archaeologists with a first port of call in English: a reference overview of the findings of the leading Andean linguists over the last four decades since their discipline came of age, brought up to date with the latest contributions from the novel techniques of the 'new synthesis'.

Notes

1. In the terminology used here, I follow the detailed and reasoned proposal set out by Cerrón-Palomino (1993), adopted also by a number of other Andean linguists such as Taylor (2000, 2, fn. 8). That is, I use the term *Aymara* in the same way as *Quechua*, as names for the families as a whole. My *Aymara*, then, corresponds to the coinages *Aru* by Torero (1972 [1970]), and *Jaqi* by Hardman (1975 [1966]), or indeed *Aymara*n as used by some writers in English such as Adelaar & Muysken (2004). Their more restricted use of *Aymara* is what I specify as *Southern Aymara*, i.e. the branch spoken in the Altiplano; my *Central Aymara* covers what they refer to as *Jaqaru* and/or *Kawki*. Similarly, my use of *Quechua* as a family name corresponds to what occasional authors in English also term *Quechua*n.
2. In this pair of articles I have bowed to convention in using the spelling *Tiwanaku* currently preferred by most English-language authors. Nonetheless, as argued cogently by Rodolfo Cerrón-Palomino (pers. comm.), this spelling is actually erroneous and misrepresents the likely original native form of the word. This did indeed include the extra syllable *ya*, as represented by the first *a* (following *i*) in the standard Spanish spelling *Tiahuanaco*, but mistakenly removed from *Tiwanaku*. That is, in modern standard orthography for the Andean languages the correct spelling of this placename should in fact be *Tiyawanaku*. Similar linguistic considerations support the original spelling *Cuzco* rather than *Cusco*: see Cerrón-Palomino (2007, 143–51).
3. For a comprehensive survey of regional variation across Southern Aymara, see Briggs (1993).
4. See note 1 above.
5. Where original citations are in Spanish the translation is my own in each case.
6. Mention ought to be made here of the very first claims surrounding the time-depth of the Aymara family, by Martha Hardman, who single-handedly pioneered the study of Jaqaru in the 1960s. Her work at the time included a first attempt at lexicostatistics and glottochronology for the Aymara family (which she terms *Jaqi*), which led her to suggest in Hardman (1975 [1966]) a time-depth of some fifteen centuries. However, as with Torero's (1972 [1970]) glottochronological results for Quechua, any confidence in such datings as necessarily remotely accurate has long since been abandoned, and the method as a whole is widely discredited. Moreover, in this case Hardman's data lists turned out to be so incomplete as to be scarcely valid for this purpose, nor

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were they ever published. Her unusual early conclusions about the internal structure of the Aymara family have also been entirely superseded.

7. See Belleza Castro (1995), Cerrón-Palomino (2000, 63–5, 286–7), Heggarty (2005, 47–8), Feist (2005) and Oliva León (2007).
8. This can be demonstrated with the Quechua results here: if one excludes all the intermediate varieties to leave just three or so at each extreme, *NeighborNet* duly redraws the relationship between these extreme varieties as a tree with a single deep branch.

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