

## Archaeological Cultures of the Paleolithic to Neolithic Periods in Europe and their Relationship to Y-Chromosome Haplogroup R1b1c

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### Events in the Paleolithic (36,000 – 10,000 BC)

The Aurignacian (circa 34,000 to 26,000 BC) and Succeeding Cultures - Modern humans have been in the western most reaches of Europe (e.g., Portugal) for at least 45,000 years as reflected in the archaeological assemblages found like a trail of breadcrumbs extending westward from the Asian homeland. It is this Aurignacian Culture which is associated with genetic grouping M269-R1b1c or predecessor R1b group (e.g., Semino, 2000; Cinnioglu et al., 2004). This assumption has been made based on present – day population genetics, but can be challenged based on which of the many estimates for the origin and expansion of R1b1c once chooses to use.



*Aurignacian Culture*

Succeeding cultures, with the approach of the last Ice Age, were the Gravettian (circa 28,000 to 23,000 years ago – with Venus figurines as one characteristic feature), Solutrean (circa 22,000 to 17,000 years ago, including finely made microliths, when it disappears abruptly), The Badegoulian culture appears to abruptly replace the Solutrean via an eastern incursion, but its relationship to the Magdalenian (see later) is in question (Gamble et al., 2005).



### *Gravettian culture*



### *Solutrean culture*

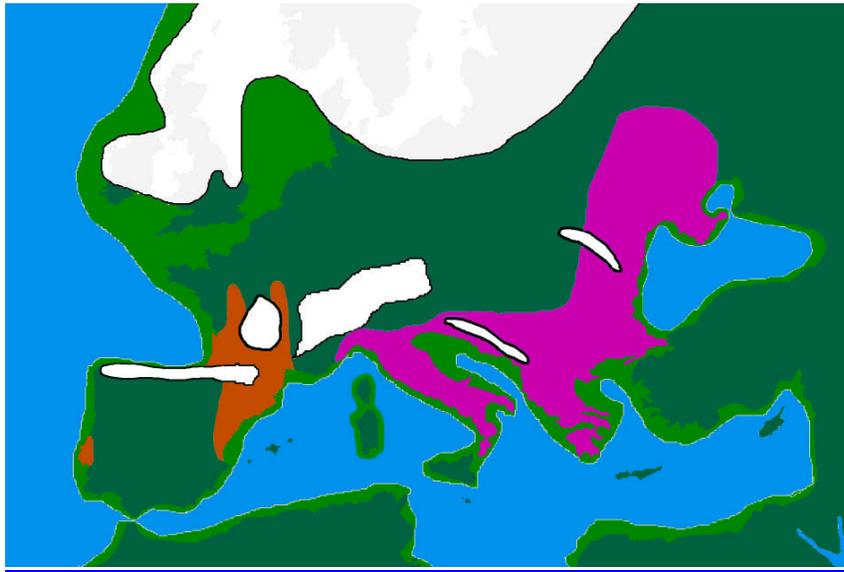
The Last Glacial Maximum and Glacial Refugia – It is time to pause and consider a major disruptive force in the genetic “landscape”, the Ice Ages, where most of Scandinavia, along with Scotland and parts of England, and the entire Alps (for example), were covered by over a mile thick mantle of glacial ice.

In speaking about the Franco – Cantabrian Refugium (in Southern Spain and France) Achilli et al. (2004) noted, *the major climatic changes that have occurred since the arrival of the first modern humans. In particular, the early Paleolithic populations of Northern and Central Europe either became extinct or retreated to the south during the Last Glacial Maximum (LGM) ~20 kya, and there was a gradual repopling from southern refuge areas only when climatic conditions improved, from ~15 kya.* This group used mtDNA (mitochondrial, direct line female lineage) evidence, as did Pereira et al. (2005) in relation to the, *late-glacial expansions from a south-west European refugium* (p.22) of haplotypes H1 and H3, spreading northward along the Atlantic coastline. In exploring the available data, the authors noted that it appears that H1 and H3, as well as haplogroup V (Torroni et al., 2001) entered Europe from the east 20,000 to 25,000 years ago (during the Gravettian epoch) and expanded toward northeastern Europe 12,000 to 14,000 years ago (during Magdalenian times). When looking at the Y-chromosome data, one influential viewpoint (e.g., Semino, 2000; Rootsi et al., 2004) is that after about 15,000 years ago (during the Magdalenian phase), there was a major radiation of haplogroup M269-R1b1c from this refugium to Northern and Central Europe (in a sense backtracking along the pathways of their Asian forebearers).

The above genetic data suggests that the Western Europeans may trace their descent not to the Aurignacian but Gravettian people – or some combination.

Gamble et al. (2005) estimate about 17,000 humans resided in the Franco – Cantabrian refugium with an expansion to 64,000, *in the initial stages of northward expansion* (p.201).

There is a large body of literature relating to the plight of an array of species during the Last Glacial Maximum; including species as diverse as brown bears, birds, mice, voles, salamanders, fish, shellfish, and a wider assortment of plants (e.g., oak). An excellent review of this data is Taberlet et al. (1998) who describe, *three main potential refugia in Portugal – Spain, in Italy, and in the Balkans* (p.454). One publication on the subject, focusing on the human population, and meant for a general readership, is “After the Ice” by Mithen (2004).



*Ice Age Europe. Franco – Cantabrian Refugium (brown), Italian, Balkan and Ukrainian (purple)*

Point of Origin and Age of S28-R1b1c10 and Related Clades - A widely accepted view is that the ancestors of M269-R1b1c, and by inference, R1b1c4 (highest concentration among Basques of Northeast Spain), and R1b1c6 (highest concentration in southern Spain), and R1b1c7 (highest concentration in Ireland) “over wintered” in the Franco – Cantabrian Refugium.

In support of the theory of a refugium in northern Spain and southern France, and that the descendants of the earliest Paleolithic hunter – gatherers retreated there, is the strong west to east negative cline for this haplogroup seen today. The percentage figures reach saturation in the west of Ireland (where the majority of males are R1b1c), diminishing in numbers to east (e.g., Poland) where percentages of R1b1c in the general population begin to drop below 10% (Semino et al., 2000).

However a Balkan or Asia Minor refugium is strongly suspected in relation to the “Eastern variety” (p49a,f Taq haplotype 35 with DYS393 = 12) of M269-R1b1c (to be discussed later) as per Cinnioglu et al., 2004.

Two recently discovered Y-chromosome markers, which are “downstream” variants of R1b1c, include S21-R1b1c9 (being the predominant variety in Holland, Northern Germany and Scandinavia), and S28-R1b1c10 (being the predominant type in Eastern

and Central Europe, particularly the Alpine regions) with little territorial overlap. The age and place of origin of each is at this point unknown.

It is probable that all clades of R1b1c other than the Eastern variety noted above (haplotype 35), in other words those which are p49a,f Taq haplotype 15, emerged out of the Franco – Cantabrian Refugium between 15,000 and 10,000 years ago. It is not known whether the S21-R1b1c9 and S28-R1b1c10 Y-SNP mutations occurred in the latter location or at some point further east. Present distribution patterns, however, would argue for the major expansions of each to have occurred east of the present French border. Age estimates in relation to S28 vary widely, depending on the mutation model (e.g., least squares), the mutation rate chosen per marker, whether back mutations are taken into consideration, the underlying assumptions such as whether mutation rates for individuals today can be used to apply to populations which lived thousands of years ago, and the assumption as to the generational age (e.g., 20, 25, 30 years). Using the methods advocated by Chandler and Nordtvedt the age of S28 is about 2,500 years before present (BP); that for McEwan is 6,541 BP (although stating that a date closer to the end of the Ice Ages seems more realistic); and for McGee is 8,300 years before present. It is likely that the earliest estimates are for the origin of S28, and the more recent ones reflect the expansion of S28. This whole area is very controversial and there does not seem to be a way to obtain agreement at this point.

Post-Glacial Expansion and the Magdalenian culture - Based on a knowledge of the present distribution of the various clades of R1b1c, a reasonable hypothesis is that much of the R1b1c\* (plus R1b1c4, R1b1c6, and the proto – R1b1c7) remained in the Iberian Peninsula during and after the LGM. However, some M269-R1b1c\* (as well as S21-R1b1c9) made their way, perhaps along the coastal margin from northern Spain or west of the Massif Central from the French Mediterranean coast to northern France, on to northern Germany, and then to Scandinavia – and from Denmark into Sweden and Norway. S28-R1b1c10 likely followed a path east of the Massif Central, probably along the Rhone corridor, then eastward following the Alpine glacial margin to the headwaters of the Rhine and Danube Rivers in Switzerland and southern Germany. This would be consistent with the Magdalenian culture, which extended from the LGM 18,000 years ago, to about 10,000 years ago and has an artifact distribution pattern that mirrors what is proposed in relation to the radiation of S28-R1b1c10 from the Aquitanian Refugium.



*Magdalenian Culture*

The Magdalenian culture of circa 18,000 to 10,000 years ago includes the well – known Lescaux and Altamira cave art. *The later phases of the Magdalenian are also synonymous with the human re-settlement of north-western Europe after the Last Glacial Maximum. Extensive research in Switzerland, southern Germany and Belgium has provided detailed AMS radiocarbon dating to support this* (Wikipedia entry for “Magdalenian”, see research papers published in Proceedings of the Prehistoric Society for 1996 and 1997).

Specific Hypotheses to be Explored in the Present Study - While lingering in the Paleolithic it may be apropos to outline the perspective of the present author. Clearly, only evidence from ancient DNA could answer the question with any degree of certainty, however it is proposed here, based largely on the present – day distribution of S28, that it is autochthonous (aboriginal) to the region where it is found at the highest percentage level in relation to other clades of R1b1c. Hence, we shall explore the evidence that S28 migrated to, or emerged in, what is today the Alpine region north of Italy (with its sister clade S21-R1b1c9 flourishing in the Baltic and northern Germanic areas).

The Taberlet et al. (1998) work examining a wide spectrum of species may apply to the human population (see Figure 6 in their study). Gamble et al. (2005) have ascertained a rather similar pattern for the post-glacial expansion of humans based on a radiocarbon analysis of securely dated activity (e.g., settlement) sites. They identified two linked refugia, one in Cantabria (northern Spain) and a second in Aquitaine (southern France) with two corridors opening up, one on each side of the Massif Central, from which humans expanded and dispersed (see Figure 1, p.196).

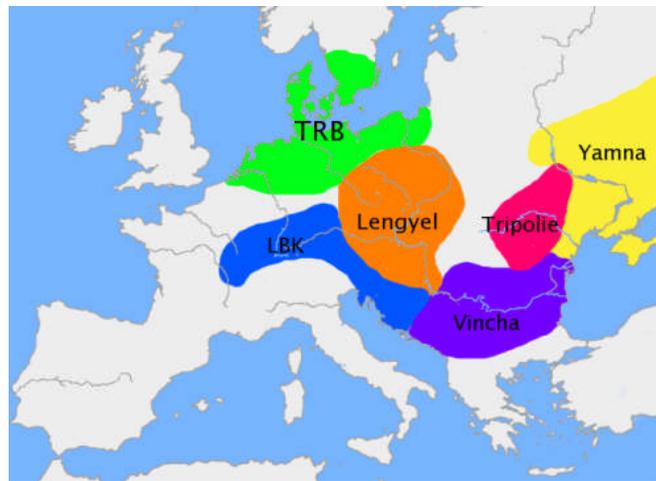
### Mesolithic Age: 10,000 - 5500 BC:

The Azilian industry succeeded the Magdalenian culture, emerging about 10,000 years ago. This culture was replaced by the Sauveterrian culture in Southern France and Switzerland. At the end of the Younger Dryas “cold phase” the climate permanently moderated in Central Europe. About 8300 BC, during what is known as the Holocene, there occurred a northward spread of most species of trees and animals to repopulate Europe such that by 5500 BC deciduous trees covered most of the Continent. One particularly interesting area relating to this expansion, with continuity possibly to present times, is the region of Valcamonica in the Camonica Valley between the Italian Lakes and Switzerland. Here are an amazing 300,000 carved figures on rock (e.g., extinct animals, what appears to be the Celtic god Cerunnos, chariots) that date from circa 8000 BC until 16 AD. This region later became the home of the Lepontic (proto-Celtic) speaking Golesecca culture which merged with the incoming Celts circa 400 BC to form the Insubres tribe.

### Neolithic Age: 5500 – 2200 BC:

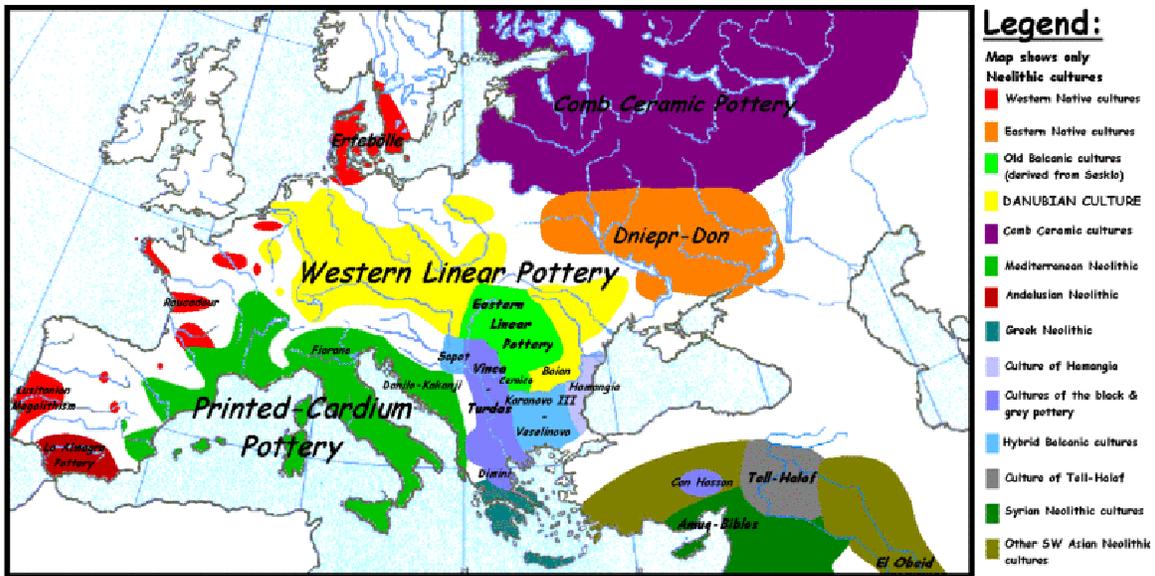
By **5500 BC**, immediately north of the Alps, the Linearbandkeramik, abbreviated to **LBK** Culture is established. This configuration encompasses the heartland of the later Hallstatt

– La Tene Culture, and is the proposed homeland of S28-R1b1c10, one of the most common haplogroups in the region today. It was an agricultural economy which spread at a rapid pace from the Hungarian plain east to the Ukraine, and west to Eastern France. In addition to their characteristic pottery with bands of narrow lines, they also had timber – built longhouses about 12 meters in length, and relied on cattle and free ranging pigs. The consensus (Mithen, 2004) is that the people were the indigenous Mesolithic descendants of hunter – gatherers in that region. The cultural continuity was so strong that, *A house from the village of Cuiry-les-Chaudardes in the Paris basin will appear near-identical to one from Miskovice in the Czech Republic, constructed almost 1000 kilometres away and several hundred years before* (p.180). Cemeteries were adjacent to the villages, but alas the soil conditions seldom allow more than just traces of tooth enamel to survive.



*Map of the LBK (later Rössen, Central Europe) Culture 5500-4500 BC.*

The Western Linear Pottery Culture is the major archaeological horizon, with the area of highest concentration of sites being the Middle Danube where it was a component of, and successor to, the “LBK”.



Map of Major Archaeological Cultures in Europe 4500 – 4000 BC.

In Central Europe the Rössen Culture emerged out of the Western Linear Pottery / LBK Culture. This group built “Hunebeds” or megalithic tombs (large stones covered with earth) to house their dead. The agrarian society that emerged encompassing the cultures from the LBK to the Rössen is often called the “Danubian culture”.



Map showing Rössen cultures 4000 – 3500 BC.

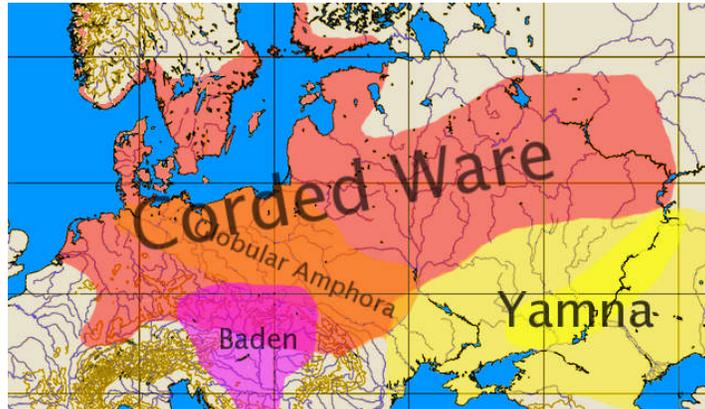
Nomadic Indo – European peoples (e.g., proto – Celtic), probably from the east, colonized large parts of Europe about **3500 BC**, settling among the proposed M269-R1b1c\* descendants of the Neolithic farmers and the Paleolithic hunter – gatherers in the north. They appear to have taken over the lands of a large percentage of the Rössen

people via a sweep from the Southeast. There is, however, no evidence of a mass migration, most of the development appears to be local. It is interesting to note that the pastoral Oetsi, the “Iceman” mummy was found with a complete Neolithic – Copper Age hunting kit in the glaciers of the Tyrolean Alps on the border between Italy and Austria (Italy won out and his remains are housed in Bolzano). He died about 3500 BC. His home has been placed at Val Venosta (near Valcamonica noted above) among the Ladin peoples who possess the same mitochondrial (maternal line) DNA as the “Iceman” – haplogroup K (K1\* in the case of Oetsi – see Rollo et al., 2006) - at a very high rate to this day (Thomas et al., 2007). Perhaps one day the ancient DNA techniques will have progressed so that we can determine whether perhaps Oetsi was Y-DNA R1b1c10.

It is also at this time (**3500 BC**) that the Balkan – Danubian Complex has moved from the Thracian area of the Black Sea to what would become Austria and merged almost seamlessly into the Corded Ware Horizon (Culture) (or becomes same) overlapping in the eastern tier around the Danube River directly above the Adriatic Sea by **3200 BC**. It is interesting that Cruciani et al. (2007) determined a date of 3300 BC for an expansion of two genetic Y-chromosome haplogroups from the Balkan Region. Both E3b (M78 – V13) and J2 (M12), originating in the Balkans, apparently diffused into Northwest Europe at this time. It is unknown at present whether other haplogroups accompanied them; although the relative scarcity of E3b and J2 in Northern Europe today may indicate that they were minority groups. They are candidates for those who introduced agriculture to the northern regions. A more numerically significant group in Europe, haplogroup I in the form of M253-I1a, P37-I1b1 and M223-I1b2, is believed to have originated in the Balkan – Thracian area (Vinchha Culture?) and perhaps the latter three groups migrated with E3b and J2 to the Northwest, their ranks being thinned with distance from the homeland.

Between **3200** and **2300 BC** the Corded Ware / Single Grave / Battle Axe Culture was ubiquitous over Northern Europe to Belgium and across the Northern tier of the Alps and introduced metals to these regions. It is contemporaneous with the Funnelbeaker (or Beaker) Culture (2800 – 1900 BC) and its successor (with a reliance on cattle), associated with, but not identical to, the Corded Ware Culture (who were dependant on sheep) with three variants. First, the Central European Corded Ware Culture encompassed the region of Northern Switzerland east to the Czech Republic and Southern Poland. This horizon would be a good candidate for the “hotspot” of S28-R1b1c10. To the east is the second grouping, the Eastern Corded Ware Culture, extending to the Ukraine and Russia. The territorial pattern of the Eastern Corded Ware Culture and Single Grave Culture appears to closely match the present – day distribution of S21-R1b1c9, with the Myres et al. (2007) data showing a strong representation in Russia westward to Holland (with the highest percentage of S21), but fading out to the west in France and south to Italy (with the lowest percentages in the European sample). The EthnoAncestry Database (2007) shows a high percentage of S21 in Scandinavia (e.g., Norway). It is interesting that one of the highest possible percentages of S21 is in the far - east among the Bashkir of Russia (Lobov et al., 2007) where up to 77% of these people of the Volga – Ural region are M269-R1b1c (and with further testing, may be found largely S21 or S28 or “Eastern” M269).

Furthermore in the east among the Yamna and successor cultures would be M17-R1a1 people originally from the Eurasian steppes who may have added more M17-R1a1 to the mix. Hence, R1b1c9, R1b1c\*, and R1a1; plus E3b, J2, I1a, I1b1 and I1b2 were likely neighbors of S28-R1b1c10 and some would merge into the core La Tene ethnic mix.



*Map of Corded Ware and Globular Amphora Cultures 3500 – 2800 BC.*

The Beaker Culture now arrives on the scene about **2800 to 1900 BC** and includes the area occupied by the above Global Amphora Culture, but extending well to the west to include Iberia and the British Isles, replacing the megalithic peoples. Although lacking direct evidence, this group is believed to be a proto - Celtic culture (e.g., Kruta, 2004) but likely spread westward primarily by cultural distribution.



*Beaker Culture 2800 – 1900 BC.*

### Some Concerns

The above is meant only as a discussion paper and is part of a study of the origin and expansion of Y Haplogroup S28-R1b1c10. It largely follows what would be considered “traditional” thinking in relation to R1b1c. The goal is to seek other interpretations since

the present author does not understand how, considering the similarity between the “Eastern” and “Western” varieties of R1b1c (with 37 marker modals differing on only two YSTR markers plus the p49a,f haplotype) that the separation of the two could have been such that the former over-wintered in Anatolia and the latter in Iberia during the era preceding the LGM. Taberlet et al. (1998) shows that most of Europe was re-populated (for a variety of different plant and animal species) via the Balkan refugium. It makes more sense the present author that R1b1c was situated in the Balkans until the end of the Younger Dryas at which time there was a massive expansion to the north and west. This does not appear to be a view that population geneticists have entertained to this point. However dating techniques are woefully inadequate and the reality is that there is no agreement on the place and date of the origin of M269-R1b1c. If population geneticists have missed the mark, then perhaps the combined efforts of genetic genealogists can offer a more persuasive argument to better pin down the genesis of R1b1c.

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