# G13: A Green and Pleasant Land
## Europe in the Neolithic

*WC 3450*

It is difficult to imagine 21st Century life without the morning shot of caffeine — the "heart starter" as coffee addicts call their drug of choice. If our early ancestors had had tea or coffee back in the days after the Ice, they would necessarily have had to drink it black. Even the small quantity of milk in their "cuppa" or their cappuccino would have given them diarrhoea and a most unpleasant feeling of bloating.

Recent research[1] shows that the gene variant which allows adult[2] Europeans to digest cows' milk did not arise until after the introduction of dairying into Northern Europe sometime around 8-9 kya. This research shows that unlike people in the Levant and North Africa, the northern Europeans were not lactose tolerant 5,000 years ago. It also suggests that the ability to digest milk sugar not only came about because of the advent of dairying, but that "…….*positive selection was acting massively on prehistoric European populations and that the speed of the spread of the allele (gene variant) was enormous.*"[3]

Interestingly too, scientists are now testing ancient grains of wheat and deducing much about the lifestyles of Neolithic peoples[4]. To do this, they devised ways to distinguish between primitive emmer wheats and modern bread wheats. The earliest farmers grew primitive wheat, known as "emmer" *(Triticum turgidum ssp dicoccoides)* which has poor bread-making characteristics.

And, if you have blue eyes, then you have in your genes what might be a souvenir from the ancient people who brought agriculture to northern Europe. This little memento is a mutation of a gene called OCA2 which occurred 10-6 KYA and which literally turns off the ability to produce brown eyes[5]. Before then, everyone in the world had brown eyes.

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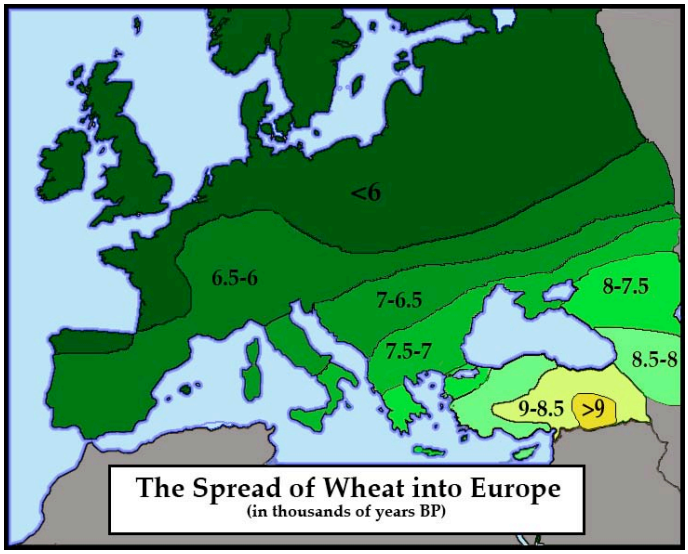
1 Swaminathan, N: "Not Milk? Neolithic Europeans Couldn't Stomach the Stuff", *Scientific American.com,* 27 February 2007.

[2] Babies are born with an enzyme lactase which allows them to digest milk but this fades as we get older. The lactose tolerant gene preserves this ability into adult life – sometimes called "lactase persistence".

[3] Dr Mark Thomas, UCL Biology, said: "The ability to drink milk is the most advantageous trait that's evolved in Europeans in the recent past. Without the enzyme lactase, drinking milk in adulthood causes bloating and diarrhoea. Although the benefits of milk tolerance are not fully understood yet, they probably include: the continuous supply of milk compared to the boom and bust of seasonal crops; its nourishing qualities; and the fact that it's uncontaminated by parasites, unlike stream water, making it a safer drink. All in all, the ability to drink milk gave some early Europeans a big survival advantage." J. Burger et al, Absence of the lactase-persistence-associated allele in early Neolithic Europeans, *Proc. Natl. Acad. Sci. USA*, 10.1073/pnas.0607187104

[4] Terry Brown & Glynis Jones: New ways with old wheats, http://www.shef.ac.uk/archaeology/research/wheat

5 *Blue eyes result of ancient genetic 'mutation'*, Roger Highfield, Science Editor, Telegraph.co.uk, 30/01/2008 - full article **Eiberg, H. et al**: Blue eye color in humans may be caused by a perfectly associated founder mutation in a regulatory element located within the HERC2 gene inhibiting OCA2 expression, *Human Genetics,* http://www.springerlink.com/content/2045q6234h66p744/fulltext.pdf




And not only brown eyes: until about 4,000 BC, Europeans probably had brown skin. An early theory suggested that the amount of melanin in our skins was greatly reduced when we first entered northern latitudes where there was less sunlight, but a 2005 study indicates[6] that the loss of melanin was more recent, probably as a reaction to changes in lifestyle — eg, the ingestion of cow's milk — and improved clothing brought about by the Neolithic Revolution.

The domestication of animals[7] and the development (if not invention) of agriculture are generally taken to be two of the three criteria for the Neolithic. The third is the development of pottery. Now, we have already seen the use of fired loess to make the Venus figurines of Dolní Věstonice about 29-25 KYA and the potsherds of the Jomon in Japan dating from as far back as 16,500 years ago, neither of which were Neolithic. However, the combination of all three criteria definitely establishes a culture as "Neolithic".

The Neolithic did not necessarily mean an improvement in lifestyle. In his book *After the Ice*, Steven Mithen[8] has his narrator, a resurrected John Lubbock, visit a wide range of modern archaeological sites as they were in their hey-day thousands of years ago. It is a fascinating journey and the book a good, illuminating read even if the resurrection of John Lubbock[9], whom we met back in the earlier part of this course as the inventor of the terms "Paleolithic" and "Neolithic", is a clumsy and annoying literary contrivance. Mithen at one stage has the time-travelling Lubbock sit and watch life in the Neolithic village on the plains of Macedonia now known as Nea Nikomedeia:

> *The overriding impression from his woodland seat is that life at Nea Nikomedeia is hard: tilling fields, weeding, watering, grinding seed, digging clay, clearing woodland. Labour appears to be in short supply as even young children are pressed in to weeding and spreading muck.*

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[6] Cheng et al., *Science*, 28 October 2005, p. 601. The margin of error was large: the change could have occurred closer to 12 kya.

[7] Of course this does not include the domestication of the grey wolf /dogs: that happened much earlier in the Paleolithic.

[8] Mithen, S: *After the Ice, A Global Human History 20,000–5000 BC*, Phoenix, 2003.

[9] In his book, *Pre-historic Times, as Illustrated by Ancient Remains, and the Manners and Customs of Modern Savages*. Lubbock succeeded to a baronetcy in 1865 and was created 1st Baron Avebury in 1900.

In comparison, the life-style of the hunter-gathers Lubbock visited in earlier times seemed much easier. “For them”, he remembers, “ *the key to a full stomach had been knowledge, not labour: where the game would be, when fruit would ripen, how to hunt wild boar and catch shoals of fish.*[10]

Another feature of the *Neolithic Revolution* as it is sometimes called was the unequal division of labour which became obvious as the Mesolithic was replaced by the Neolithic. A common pattern, at least as demonstrated in the archaeology reported in *After the Ice* was that the men continued to hunt in the old style while women took on more and more of the duties related to the growing of crops and herding of animals. And, because increased food supplies meant more babies, they had more children to look after. Furthermore, women usually became the potters and — as even hobby potters in modern times will tell you — pottery is not light work.

Pottery is said to have come to Europe in the style known as *Linearbandkeramik*, or more commonly as LBK[11] which, as we have already seen in the last Unit, flourished from about 5,500 to ~4,500 BC, especially along the middle Danube, the upper and middle Elbe, and the upper and middle Rhine. The pottery was obviously designed for domestic use and included simple cups, bowls, jugs and other containers for food and liquids. In the early phases the pots were without handles but by the later period, lugs came into use and some of them were pierced so their owners could hang them up.

***Examples of LBK pots (Wikipedia Commons Free)***

Despite the name, which implies the pots were decorated with lines and bands, decoration was obviously a matter for the creative imagination of the potters: among others, motifs included curving lines, spirals, triangles and chevrons incised into the body of the pots while the clay was still wet. These are so similar to the decorations painted onto their pots by the people of Starčevo-Körös on the neighbouring Hungarian Plain that it is generally believed the LBK culture originated there before moving up-river to the North-West.

[10] Mithen, Op. cit. p. 165

[11] In England various names have been used although historically, the best-known was *Danubian I* ware after its use by the Australian-born archaeologist, Vere Gordon Childe, the excavator of Skara Brae and incidentally, the man who coined the term "Neolithic Revolution".


*LBK and Starcevo cultures*

## Did they borrow or were they conquered?

The big controversy raging over the advent of the Neolithic to Europe, including agriculture, domestication of animals and pottery, is — as it seems ever to be in archaeology — whether it came via *invasion/migration or cultural diffusion*?

The older view was that the Linearbandkeramik (LBK) was brought to Europe by an invasion approximately 5700-5000 BC by people of the Starcevo-Koros culture of the Hungarian Plain. However, more recent studies have shown there were forager-herder/horticulturists in Central and Western Europe as far back as the *Terminal Mesolithic:* for example, domesticated flax seed and cereal pollen radio-carbon dated to 6500 BC have been found near Zurich; and even earlier, as early as 5,800 BC, there is evidence of small-scale animal husbandry and horticulture near the junction of the Rhine and Main Rivers. [12]

If I read the warring scientists correctly, there is a wide-spread consensus that (a) there were invaders but they came only in small numbers; (b) that the original inhabitants — the Mesolithic peoples of the region — quickly adapted the more sophisticated Neolithic techniques of their new neighbours to their own — albeit more primitive — ways.

In an interesting study which confirmed that migration had played an important part in the spread of the LBK, Wahl [13]and his colleagues analysed the isotopes of strontium found in the tooth enamel and in the bones of ancient remains. These isotopes yield a signature as it were of the place of birth and the place of death of an individual so that in this case, they provided a good indication whether or not the person had migrated from one locality to another during his or her lifetime.

The findings showed that the proportion of migrants was higher in the cemetery at Flomborn[14] which represented an earlier phase of the LBK than at the later Schwetzingen[15] cemetery. Interestingly also, a majority of the remains in the later cemetery were female, often young females who presumably died in childbirth. This suggests that by that time, women were changing place of residence as part of the marriage system, whereas the more even balance of the sexes at the earlier site indicated families were moving rather than individuals.

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[12] Wahl, J: Prehistoric human migration in the Linearbandkeramik of Central Europe, *Antiquity,* September 1, 2001.
[13] Op. cit.
[14] Flomborn is a municipality in the district Alzey-Worms, in Rhineland-Palatinate, Germany.
[15] Schwetzingen is a German town in Baden-Württemberg, 10 km (6 miles) southwest of Heidelberg

With one exception, all the immigrants at the Flomborn cemetery had strontium isotopes which suggested they came from the Vosges Mountains and/or the Odenwald. Perhaps a characteristic of the burial practises of the people of that time was the orientation of the skeletons. At both places, those judged to be immigrants had been buried facing the Odenwald (ie, facing east) which led archaeologists to conjecture this was their place of origin. Non-immigrants however, were buried facing the opposite direction. This correlation between immigrant status and burial position is particularly significant because it is believed the original inhabitants of the region were actually a Mesolithic people, so that we have in the ratio of strontium isotopes in bone and tooth enamel an indication of the replacement of Mesolithic with Neolithic culture.

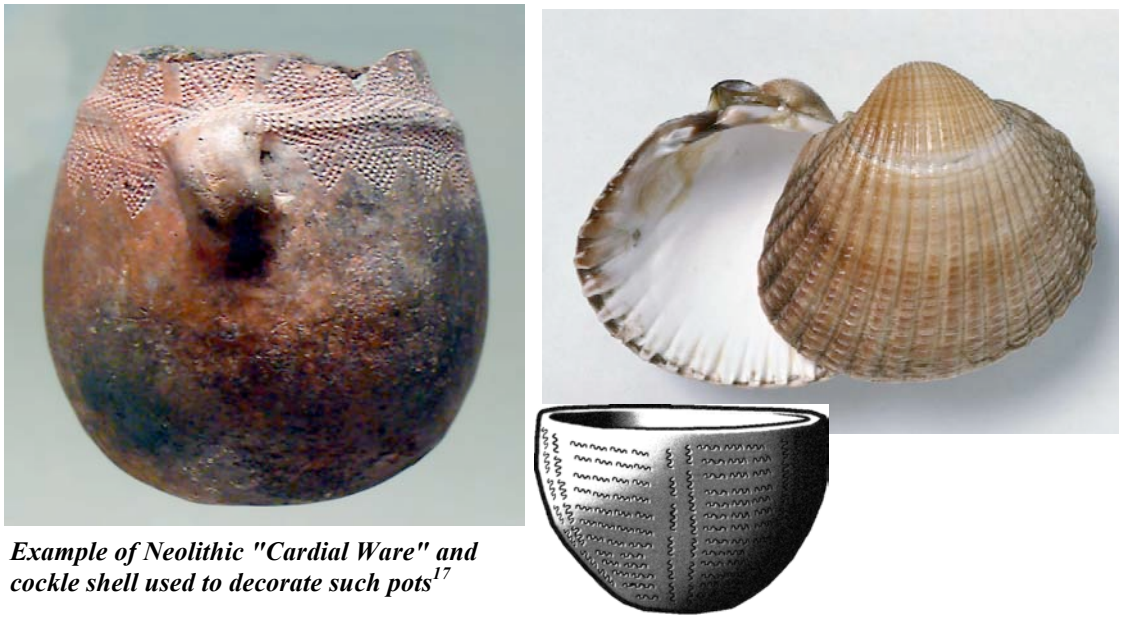
So, at least in this LBK part of Europe, the coming of the Neolithic was a complex process in which (in Wahl's words) *a small groups of immigrant farmers ... came into contact with local forager-herder/horticulturalists*... rather than an invasion by hordes of farmers who either wiped out or drove the original inhabitants from their homelands. However, it seems to me important to remember that, even if the number of Neolithic immigrants was small, so too the local populations into which they intruded were also relatively limited.

These *local forager-herder/horticulturalists* were the peoples who, in the generations following the LGM and later, the Younger Dryas, had been re-populating Europe. I am inclined to believe that if they had come close to developing agriculture and animal husbandry of some kind all by themselves, they would have appreciated and been able to adopt the new ways far more readily than had they been Palaeolithic people peering out of the forests at the strange ways of invading farmers come to steal their hunting grounds.

Most of the archaeological sites visited by the avatar of John Lubbock in Mithen's *After the Ice* although eventually Neolithic, at first went through a stage where, for example, seeds of wild grasses were harvested and scattered so as to provide a greater yield when the women returned the following year. Gradually this evolved into taking the seeds to a more convenient place where they were deliberately planted… The seed pods of wild plants, particularly the ears of wheat, have a habit of shattering and thus scattering their seeds far and wide. This has an advantage to the plant itself but for humans depending on collecting the seeds for food, it was a distinct disadvantage. Research has shown that the development of what is called "indehiscent" or "non-shattering" wheat began ~9500 ya in the Fertile Crescent but it was a slow process because dehiscent forms were still being cultivated anything up to ~7,500 ya.

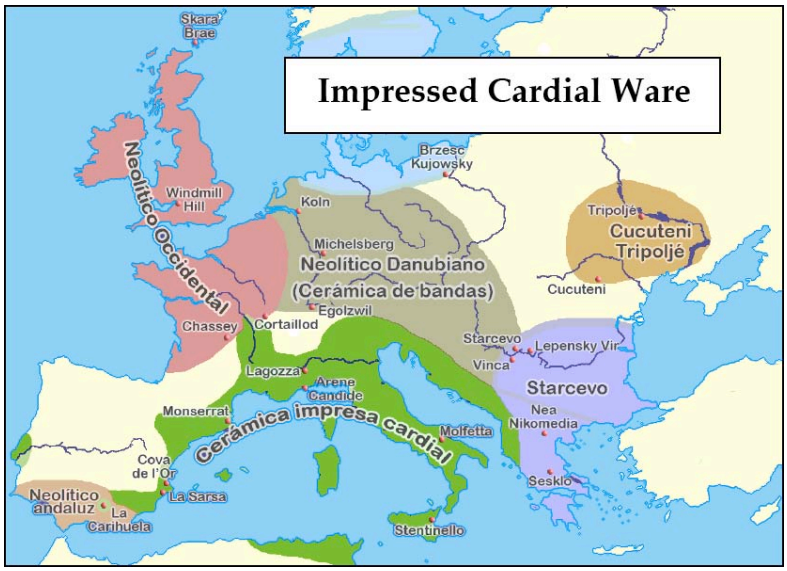
**The "other" farmers**

In his iconic *Seven Daughters of Eve*, Bryan Sykes says that agriculture was brought to Europe by the descendents of the seventh daughter, Jasmin and that it spread northwards from the Mediterranean. Sykes paints a rather rosy picture of the life and times of Jasmin who, he says, lived in what is now Syria, near the Euphrates River, the part of the world we learned at school was called *The Fertile Crescent*.[16] Whatever her name, other geneticists more properly label this "Jasmin" simply "mtHaplogroup J".



***Example of Neolithic "Cardial Ware" and cockle shell used to decorate such pots***[17]

As was the case of the Neolithic and the LBK culture, so too archeologists trace the southern spread of the Neolithic by following a style of pottery. In this case, it is known as Impressed Cardial Ware or just *Cardial Ware* from the characteristic decoration made by pressing a particular shell (which has a wavy edge) into the clay while it is still wet.



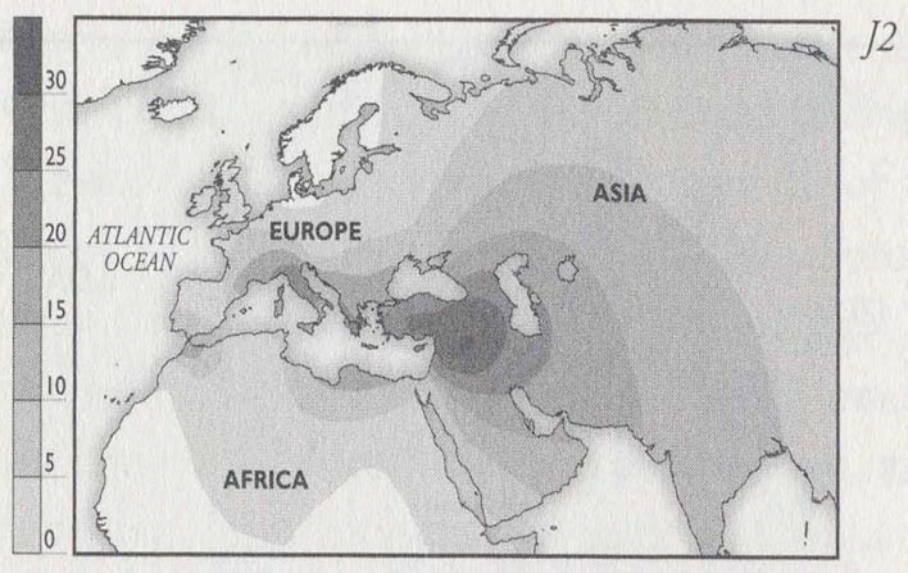

Cardial Ware has been found all around the shores of the Mediterranean as the map we looked at regarding LBK also shows:

***Cardial ware region shown in mid-green***

[16] Sykes, B: *The Seven Daughters of Eve*, WW Norton & Co., 2001. Pp 260ff.

[17] There are many "cockle shells" which would have provided the decorations on Cardial wares… this is given only as an example.

The men who accompanied the women who made this Cardial Ware belonged to two y-Haplogroups, E and J, the latter named by its discoverer after the comparable mtHaplogroup. Both are complicated and subject to rapid change in nomenclature as research uncovers more SNPs to refine the para-haplogroups.




**y-Haplogroup J**

There isn't time here to explore both these important haplogroups so we will concentrate on Hg J which is thought to be a fellow traveller with Hg E in the spread of the Neolithic into Europe by this southern route.

Dennis Garvey, who used to run a web-site[18] giving information about the various y-haplogroups, says that historically, J is thought to have evolved in the Fertile crescent 7000-9000 years ago. yHg J is divided into two major clades of which J1 is defined by SNP M-267 and believed to have originated in the southern part of the Fertile Crescent whence it moved into the Middle East, the Arabian Peninsula, and east and north Africa. On the other hand, J2 — which is defined by SNP M-172 — originated in the northern part of the Fertile Crescent and moved westwards into Europe, perhaps via the Balkans. Almost all European J's belong to J2. These days, yHaplogroup J is more common in Europe to the south and east of the continent, particularly along the Mediterranean coast (for example, 22% in Greece, Italy, 20-30% while it is not found in Holland).

**Who then were the farmers of the Mediterranean shore?**

In one of the few uncomplicated and readable articles on this subject, Martin Richards in his paper *The Neolithic Invasion Of Europe* [19] reported a very interesting study by King & Underhill (2002) who compiled a database of painted pottery and anthropomorphic clay figurines from the Near East. These are thought to have originated in the Levantine and Anatolian Neolithic and carried westward with the Neolithic into parts of Europe, including Greece and the Balkans, as far as

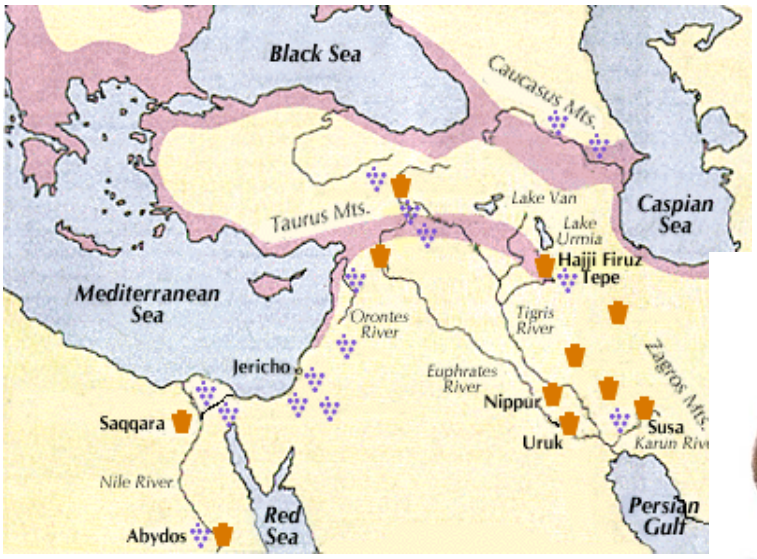
[18] http://freepages.genealogy.rootsweb.com/~dgarvey/DNA/hg/YCC_J.html. Garvey referred to the following papers: Semino, O. et al: Origin, Diffusion, and Differentiation of Y-Chromosome Haplogroups E and J: Inferences on the Neolithization of Europe and Later Migratory Events in the Mediterranean Area, *Am. J. Hum. Genet.* 74:1023–1034, 2004; N. Al-Zahery: Y-chromosome and mtDNA polymorphisms in Iraq, a crossroad of the early human dispersal and of post-Neolithic migrations Molecular Phylogenetics and Evolution (2003)

[19] Richards, M: The Neolithic Invasion Of Europe, *Annu. Rev. Anthropol.* 2003. 32:135–62. References in the original.

the Danube basin and the central Mediterranean coastline. They then compared the distribution of these artefacts with the distributions of yHaplogroups E3b and J.

So, if I read this research correctly, the suggestion is that what was known as E3b (when the paper was written but is now E1b1b) and two clades of J, as evidenced by the spread of figurines and painted pottery, made it as far into Europe as the central Mediterranean coast and as far north as the Balkans and the Danube. However, although the western Mediterranean showed similar Levantine y-chromosomes, there was no figurines or painted pottery. The indication is therefore that later migrants, perhaps Greek or Phoenician traders or colonists carried the genes as far as Iberia and southern France but long after the artifacts were no longer made[20].

Another most interesting suggestion[21] has been that the westward expansion of yHg J (actually J-M172) into Mediterranean Europe can be seen reflected in the spread of **viticulture**, the cultivation of grapes for wine-making.




***Map: spread of viticulture; (below) the oldest wine jar[22]***

The earliest evidence to date of wine making was found in a jar in the kitchen of a mudbrick house at Hajji Firuz Tepe in the Zagros Mountains in Northern Iran. This dates from about 5400-5000 BC.

In the map above of the ancient Near East and Egypt, the distribution of the modern wild grape is shown in purple shading. The "grape" symbols show sites where evidence has been found of wine making while the "jar" symbols indicate sites where wine jars have been recovered. Other evidence exists of wine making among variously, the Phoenicians, Israelites, Sumerians, Akkadians and the

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[20] The map given earlier shows impressed cardial pottery reaching as far as southern France and the east coast of Iberia. Southern Iberia and the Atlantic coast show indigenous styles.

[21] **http://m172.blogspot.com/search?q=Viticulture -** *Correlations in the spread of Viticulture and Haplogroup J2* , October 23, 2008

[22] ***http://www.museum.upenn.edu/new/exhibits/online_exhibits/wine/wineneolithic.html***

Hittites of Anatolia…. During the Minoan period, wine making spread to Crete. From there it was taken by the Etruscans to Italy and by the Phoenicians to Iberia where it has played an integral part of the economy ever since. There seems to be a high correlation between the spread of viticulture, at least in the pre-Roman world, and the movement of J2 people, representing J-M172, westwards across the Mediterranean.

**Cohen Modal Haplotype**

There is another interesting historical link demonstrated within Haplogroup J. This is shown by what is called the "Cohen Modal Haplotype".

Although geneticists are not so certain these days that Hg J originated in the Fertile Crescent[23] — Iran — it seems fairly clear that J-M172 first appeared in the north of that area, separating it from the other, more southerly clade J1. Within this J1 clade — but only to a lesser extent in J2 — a specific set of six Y-STR marker values have been found which clearly distinguished a long lineage of Jewish religious leaders who claim to be descended from Aaron, the brother of Moses. Membership of the Jewish community is normally reckoned in the female line, but for the Kohanim descent is patrilineal. Although not all modern-day Kohanim possess this haplotype, on-going research indicates that a significant proportion do and that the lineage has been preserved, if not necessarily from Moses' dad, then for a very, very long time. However, having this haplotype does not guarantee a man is a direct descendant of Aaron: it can be found in many other lineages, especially among Arabs who, like the Jews and others of the Middle East, share ancestors who lived before historical ethnic and religious identities had come into being.

**How was the Neolithic culture transmitted?**

Culture can be transmitted in many ways. One of the best characterizations of the methods of cultural transmission is by Zvelebil[24] whose proposes the following 7 means:

> *1. **folk migration**, the traditional migrationist explanation: the directional movement of a whole population from one region to another, leading to genetic replacement;*
> *2. **demic diffusion** by means of a wave of advance[25];*
> *3. **elite dominance**, in which a social elite penetrates an area and imposes a new culture on the local population;*
> *4. **infiltration** of a community by small numbers of specialists fulfilling a particular need, such as livestock farmers;*

[23] **http://m172.blogspot.com/ -** *Haplogroup J2-M172 in Iran,* Thursday, October 30, 2008
[24] Richards, op. cit., ref Zvelebil M. *The social context of the agricultural transition in Europe.*In Renfrew & Boyle 2000, pp. 57–79
[25] The wave-like movement of large group of people. This is actually a statistical model which estimates the speed of movement in any direction across a range or territory.

*5. **leapfrog colonization** by small groups targeting optimal areas to form an enclave surrounded by indigenous inhabitants;*
*6. **frontier mobility**, or exchange between farmers and foragers at agricultural frontier zones; and*
*7. **regional contact**, involving trade and exchange of ideas.*

We might have reason to come back to this analysis later when dealing with cultural changes which historically have been ascribed variously to invasions, mass migrations and almost any cause other than the gradual change among the indigenous inhabitants. Meanwhile, Martin Richards gave what seems a plausible summary of what probably happened in Europe during the Neolithic when he suggested that the genetic evidence is

> *...most consistent with pioneer leapfrog colonization of southeast and central Europe, with subsequent infilling acculturation of much larger numbers of indigenous foragers.*

That is, immigrants brought their new ways to a limited number of key localities from which their culture spread out, absorbed and adopted by the indigenous Mesolithic peoples. Richards also finds the evidence most consistent with an origin in the Balkans rather than in the Near East. As for the Atlantic west, he suggests that the agricultural revolution and its associated culture was brought there by a leap-frog colonization from the Mediterranean coastal regions — probably by boat. He also adds that the Neolithic was brought to north-western Europe not by people fresh from the Balkans or Middle East, but from Central Europe where they had practised these new ways for so long they were effectively indigenous. By whatever means agriculture came to Europe, Renfrew believes, then *contact-induced language change must have been an important mechanism*. Maybe then, this was the time the Indo-European languages arrived in Europe?

**Finally**
Eventually we will see the same mechanisms at work when we consider the so-called "invasions" of Britain by the Angles and Saxons and later, by the Norse Vikings. For the moment, however, the Neolithic in Europe is clearly still not fully understood and it might never be… However, one thing does seem to stand out so far, that Europe in the early Holocene was populated both by people who came from the east where they had learned the ways of agriculture, the domestication of animals and the arts of pottery, and by others whose ancestors arrived during the Pleistocene, either before the LGM or in the warm period between the LGM and the Younger Dryas. Although many genes and cultural skills originated in the east, it is important that we also acknowledge the skills the indigenous people learned and adapted, sometimes invented, for themselves. However, the question still remains whether agriculture was sufficiently potent an innovation to increase the descendents of the immigrants to the numbers indicated by the R1b dominance of today.