

Summary: 03 The longest march of all

The genus *Homo* spent a long time in Africa before venturing out into the rest of the world. Although modern humans probably originated in Central Africa, they appear to have moved around the continent: mtDNA sequences for modern Africans indicate that the Khoisan of Southern Africa and the West pygmies of Central Africa are the closest living descendants from these original humans. Their Haplogroups are designated mtHg L0 and mtHg L1. While scientists are not sure about the reasons our remote ancestors moved around in Africa, one thing is sure, that they were subject to some extremes of climate change and part if not all their motivation for moving was to follow their food supply. This was a pattern human beings have followed ever since and constitutes the basis for what we call “migrations”. Over time and as populations expanded, mutations known as L2 and L3 largely replaced the original mtHaplogroups L0 and L1, except for the Khoisan and Biaka (West Pygmies) who were displaced — and indeed, who have continued to be displaced ever since.

The first exodus and the Toba bottleneck: Around 100 KYA some *H. sapiens* moved out of Africa through the Gaza Strip into the Levant where they displaced the Neanderthals. This sojourn in Eurasia was cut short by the fall-out from the worst volcanic catastrophe in the last 28 million years, the eruption of the Gunung Toba in northern Sumatra. This occurred ~ 74 KYA. Ash from the eruption covered 4 million square kilometres and reached Central Asia and the Middle East. This cloud created a volcanic winter for 6 years and a glacial maximum for a further 1000 years; the average global temperature dropped by 3 to 3.5 degrees Celsius while sea levels were lower than they had been since the Eemian Glacial Maximum some 60,000 years earlier. *Homo sapiens* was wiped out entirely in the Levant. After some years, the Neanderthals, returned. They were much better cold-adapted to survive the volcanic winter. In Malaysia the ash blanket was up to 9 m thick while in much of India, between 3 and 6 m deep. Surprisingly, there was little or no devastation east of Sumatra because prevailing winds carried the ash plume to the west. This was crucial for the human migrations to South-east Asia and Australia. The YTT caused such destruction of human life that it created a genetic **bottle-neck**, that is, a huge reduction in genetic diversity among the survivors.

The second Exodus - the human diaspora begins: A range of possible dates are given for the "Out of Africa" exodus but a convenient one is ~85 KYA. That allowed sufficient time for people to be beyond the YTT “kill zone” and to survive to populate the Earth. These emigrants probably crossed into Asia at the southern end of the Red Sea, the *Gates of Despair*. Once in Eurasia, some went north or north-west to Central Asia while others beach combed the way eastwards to the super-continent Sahul. Although mtHaplogroups L0-L3 existed in Africa, only mtHg M and mtHg N are known to have made the exit. Similarly, only y-Haplogroups A, C and F made the crossing.

The “Last Ice Age”: When we talk of “the Last Ice Age” we normally mean that period from about 22 KYA to 12 KYA during which much of the northern Hemisphere was covered by huge ice sheets, when sea levels were up to 125 meters lower than they are today, and much of the earth’s surface was covered by glacial desert, tundra or steppes so cold and wind-swept few if any animals and plants lived there for long. Strictly speaking, this should be called the **Last Glacial Maximum** or **LGM**. Technically we are still in the Last Ice Age albeit perhaps nearing the end of it. There have been four Ice Ages in the Earth’s history, this Last beginning about 40 MYA when an ice sheet formed in Antarctica. About 3 MYA — that is, during the Pleistocene — ice sheets formed in the Northern Hemisphere. Since then the ice sheets have alternately

advanced and retreated roughly in cycles of 40,000 and 100,000 years. The periods in between these “glacials” or times of icy extreme are called “interglacials”.

Around about 40–30 KYA the world warmed a little. Human populations increased rapidly and expanded into Europe and northern Asia. During this time too, *H. neanderthalensis* became extinct. The growth in population meant that there were more mutations so that new Haplogroups proliferated, two of which — U and H — reached Europe.

So far we have been able to trace the migrations of Man through mtDNA as he moved around his native Africa (Hgs L0 – L3), as he crossed into Asia (Hg M and N), later travelled through southern India and what is now the Indonesian archipelago and South East Asia (but which was then Sundaland) and reached Australia and Papua/New Guinea (Hgs M and N), or took a more northerly route and reached China (Hgs N and M). There, N and M diversified into Hgs A, B, C, D, E, F, G, M, and Y. Later immigrants to Papua-New Guinea brought with them Hgs P and Q. Here, in ancient Australia, more varieties of N and M developed. And in Europe — in this course, our final destination — were people belonging to haplogroups H, I, J, K, T, U, V, W and X. Just how some of the Neolithic haplogroups got there is a matter for another day....

