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Clashes in Pilsen and Mainz

Pilsen is unseasonably hot for September. I am far too warmly dressed. My nylons are damp, the heat makes my feet swell and I discreetly kick my shoes off under the table, to get through the afternoon. I have taken a seat right in the middle of the front row so as not to miss a word of the very latest DNA findings about Europe's earliest farmers.

We are in the city's university, in one of the smaller lecture theatres. It is already full to bursting when the seminar begins. Participants fetch chairs from other lecture rooms. There are people sitting on the floor and squeezing in through the open doors. The organisers have seriously underestimated the degree of interest in DNA technology as a new tool.

The sun beats down on the windows, and the heat becomes increasingly oppressive – but it is nothing compared to the heated emotions of the participants. DNA in archaeology can clearly make feelings run high, both in Sweden and in central Europe.

'Even if these are the results we get from DNA research, that still doesn't make us migrationists!' cries an overwrought archaeologist. This is the first time I have heard the word 'migrationist', which is clearly a term of abuse. It refers to the theory that agriculture was disseminated largely by migrating farmers – precisely the conclusion currently being reached by one DNA study after another. These results are clearly viewed as being not quite respectable.

The word will crop up time and again during the event. It gradually dawns on me that for many archaeologists of the older generation, 'migrationism' has disagreeable ideological connotations and associations with Nazi ideas of a master race. But I see absolutely no sign of any such ideologies among the Hungarian researchers presenting their results. On the contrary, the research team leader, a professor of archaeology

from Budapest called Eszter Bánffy, goes out of her way to give a warning about the way in which certain political forces in her home country misuse genetics. She is referring to racist propaganda against Roma and Jews, which sometimes deploys pseudoscientific arguments drawn from genetics.

As far as I can judge, the work done by Eszter Bánffy's doctoral students in cooperation with German scientists is nothing short of groundbreaking. A pale young man called János Jakucs explains how he has collected DNA samples from over 700 skeletons representing the first millennium of agriculture in Hungary and the neighbouring countries of Serbia and Croatia. He has visited museums and universities, negotiated and coordinated, and organised radiocarbon dating. Several other doctoral students report on their part in the overall project.

The main piece of news is that they have extracted mitochondrial DNA from the first farmers to arrive in Hungary, starting some 7,800 years ago. They have managed to analyse most of the 700 skeletons collected by Jakucs.

As I explained earlier in the book, virtually all analysed individuals from Europe's oldest hunting population – from Spain to Russia – belong to one variant or other of haplogroup U. Group U5, which I inherited from my mother and my maternal grandmother, is a typical hunter's lineage.

However, quite different variants are dominant among the farmers who appeared in Hungary 7,800 years ago: haplogroups such as N1a, T2, K, J, HV, W and X. They also include H, now the commonest group in western Europe, to which my paternal grandmother's maternal lineage belongs. As I have mentioned, both H and K have also been found in DNA analyses of the earliest farmers from Syria.

The most important results come from an archaeological site called Alsónyék-Bátaszék, which lies on the banks of the Danube in south-west Hungary. This was excavated between 2006 and 2009 in connection with the building of a motorway. In Alsónyék-Bátaszék, Hungarian archaeologists have found the most extensive vestiges ever of Hungary's first farming culture, the Starčevo culture.

The hours pass, the sun beats down on the windowpanes, and the room temperature rises – both the one you can measure with a thermometer, and the heat generated among the seminar participants. Many archaeologists who rely on conventional methods are extremely sceptical of what they view as ‘migrationist’ ideas – and, indeed, of DNA technology *per se* as an archaeological tool. At the same time, a conflict between different camps of DNA researchers is also emerging with growing clarity.

The Hungarian archaeologists and their German partners use basic DNA technology. Their testing is mainly restricted to mitochondria, which account for only a very limited proportion of human DNA, and they conduct only low-resolution analyses. Even the tests on my mitochondria and those of my paternal uncle, which I commissioned from a firm specialising in tests for family history researchers, are higher resolution.

There are also a few DNA researchers in the Pilsen lecture theatre who use a more sophisticated technology. By analysing nuclear DNA, they are able to obtain a more complete picture of the genetic history of individuals and populations. The researchers who analyse nuclear DNA believe that the picture given by those who work on mitochondrial DNA is oversimplified, too black and white. They are keen to emphasise the nuances that only their technology can detect. One German researcher working on nuclear DNA is particularly contemptuous of those whose purview is mitochondrial DNA. I get talking to him on the tram back into the city centre once the seminar is over for the day.

‘Guido Brandt is an idiot,’ he says. I am rather taken aback at his plain speaking, given that we have only been acquainted for a few minutes. My impression of Guido Brandt, a German doctoral student working with the Hungarians, is that he is anything but an idiot. It is just that he uses a comparatively simple DNA technology. The strength of Brandt’s findings, and those of the Hungarians, is not the technical sophistication of their DNA technology. It is the large number of samples

from locations and periods that are critical for the dissemination of agriculture in Europe.

A few weeks later I gain a deeper understanding of the conflict. I visit Guido Brandt in his home town, the German city of Mainz. I interview him in the chilly hut where he and his fellow doctoral student have been working since the university closed their institution.

Only a few weeks previously, Brandt was the first author of a study published in *Science*. Yet the university chose not to issue a press release. Instead, the press release came from a university in Australia, where a number of co-authors are based, and the National Geographic Society, which had provided financial support. The information department at Mainz's Johannes Gutenberg University even denies there is anyone called Guido Brandt at the university, although I have enquired after him on several occasions.

It transpires that he and a fellow doctoral student found themselves caught between two feuding professors. The two young postgraduates made a tactical error in betting on the wrong horse.

The university's press department also denies that the Johannes Gutenberg University now has anything to do with Kurt Alt, the former professor of anthropology in question. But he, too, exists nonetheless, and I meet him in the rooms where he and his secretary are in the process of winding up his long career. They are busy trying to empty a set of bookshelves that go all the way up to the ceiling and packing tons of books into boxes for removal.

The interview is not particularly informative. Alt, who was a dentist before making a career in anthropology, is clearly not very knowledgeable about DNA technology and the latest archaeological findings. Yet he was a pioneer in the field, being quick to recognise the opportunities it presented and to employ people with more extensive knowledge of DNA.

That was where it all went wrong. Alt and a newly recruited expert fell out in less than half a year. 'I've never seen a personal relationship break down so quickly,' says one of the researchers who saw it happen. That researcher has now left the whole toxic DNA field and is working in another field at a museum in Mainz. Another former member of the team has moved to Australia.

But Guido Brandt and his fellow doctoral student are still there, working away in a chilly hut and trying to bring their theses to a successful conclusion in spite of everything. And it all seems to be going very well. The study recently published in *Science*, of which Brandt is the first author, deals with 364 individuals from the Stone Age to the Bronze Age in the German region of Saxony-Anhalt. It covers more individuals whose DNA has been analysed than all the archaeological studies ever published taken together. Even if his work is restricted to low-resolution analyses of mitochondrial DNA, it is still quite an achievement.

The results confirm what earlier, less extensive studies have shown, as do the results from Hungary: all the early hunters belong to haplogroup U. They are classed as U5, like me, or U4 or U8. About 7,500 years ago, agriculture reached the region that is now Saxony-Anhalt. Archaeologists were already aware of this, partly because the linear pottery that gave its name to the Linear Pottery (LBK) culture made its appearance at exactly that time. Undoubtedly, local hunters would have joined them in the course of the journey. But it is only the lineages including haplogroups H and K that appear to have come all the way from the cradle of agriculture in Syria.

I also meet the 'winning horse' – the Johannes Gutenberg University's new professor of anthropology, Joachim Burger. His office is on the edge of Mainz's botanical gardens, in an attractive large building that the university recently had built for him. One of his young students shows me to his study and knocks respectfully on the door.

Joachim Burger's face stiffens when he hears I have also met Kurt Alt and Guido Brandt. He makes it clear to me that he has no intention of forgiving Brandt for what he regards as

treacherous behaviour. In other respects he is friendly. He has made tea for us and lights a nightlight to keep the teapot warm. He gives me tips about wine cellars and restaurants in Mainz. The situation feels almost like a date, rather than an interview.

Naturally he wants to show me his newly built lab, which he describes as the most advanced DNA laboratory in the whole of Germany. But it is late afternoon, and the alarm system is so complex that we are unable to enter the lab. So Burger shows me a film about it instead, set to his own music; composing is his hobby.

Burger is a successful researcher by any standards. He collaborates with the main players in his field and has published a number of studies in leading journals. Some of his results, pertaining to the DNA of domestic animals and people, are dealt with elsewhere in this book. I will confine myself here to the study published in *Science* on the same day as Brandt and Alt's work – the one that the university's information department chose to focus on exclusively in its press release.

Burger says he is not really in favour of researchers analysing mitochondria in isolation, now that there are so many better methods. Yet the study he published in *Science* deals with mitochondria. More specifically, it covers mitochondria in combination with isotopes. It is very ingenious and interesting.

Comparing different isotopes of carbon, nitrogen and sulphur provides insight into people's diet. Burger and his team examined 29 individuals buried in a cave called Blätterhöhle. They date back to the time just before agriculture arrived in the region that is now Germany and a few millennia after that.

The oldest individuals are quite clearly hunters. The isotopes show they lived mainly on fish and meat from wild animals, and they all had mitochondria belonging to haplogroup U. Eight of the individuals from more recent times are quite clearly farmers. They belong to typical haplogroups such as H and J, and the isotopes indicate that they ate meat from domestic animals such as sheep and cattle.

Hitherto, the picture was blurred by 12 individuals who lived at the same time as the farmers and were buried in the same cave, but whose mitochondria were typical of hunters, belonging to groups such as U5. Now the isotopes show that they actually lived different lives from the farmers, despite being buried at the same spot. The hunters lived mainly on fish.

Burger's study thus indicates that groups of hunters and newly arrived farmers lived side by side for at least a few thousand years. They clearly had a good deal of contact with each other. Apart from the fact that they used the same cave as their burial ground, the farmers seem to have obtained all their stone tools from the hunters.

Over centuries and millennia, hunters and farmers intermingled and merged. In addition, new waves of immigrants arrived. Guido Brandt's major *Science* study of the mitochondria of people living in Saxony-Anhalt over four millennia shows clear signs of such changes. It points to subsequent waves of farming people who migrated into the region from the north and the east.