Human mobility

Buried identities

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In this project, we will study the buried persons themselves and revealing their genetic and geographical provenience. The study will be based on burials with preserved skeletal material from southern Scandinavia, from the late middle Neolithic, late Neolithic and early Bronze Age periods. This is a material which is essential for many of the questions discussed, but that so far has received little systematic treatment. Comparisons will also be made with reference material from earlier periods and other regions, such as Germany and Poland. A systematic comparison of bio-archaeological data with variations in burial practices and artifact compositions will provide us with new insights on socially effective ways of classifying people during these periods, and contribute to our understanding of how gender, ethnicities and elites were constructed.

Bioarchaeological analysis informs us about factors such as sex, age, stature, activity patterns, physical violence, disease, and genetic traits. In this study, genetic traits will be studied through tooth morphology. These variables will be complemented by systematic isotope analyses in order to look at variation in diet and geographic mobility between the buried persons. Mainly strontium isotopes have been used, but other isotopes such as oxygen and sulphur are increasingly complementing these. Such methods enable us to study movement between geologically different regions during a person's lifetime.

Human diet may be studied using carbon and nitrogen isotopes in the skeletons. A large number of such analyses have been performed on Neolithic skeletons from Sweden, but most of them from other regions and few from Battle Axe contexts. However, this constitutes a good comparative baseline for the present project. Reference material is also at hand from other countries, such as the Britain and Germany.

Ancient DNA

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The key focus of the ancient DNA study will be to exploit recent technological and computational developments, in order to reconstruct the genetic history, and origins, of the Nordic and north European populations of the 3rd and 2nd millennium BC. When compared with pre-existing European Neolithic ancient DNA datasets, and modern DNA datasets, the new data will supplement and add historical depth to the strontium isotope analyses, as well as resolve kinship between the ancient samples. Three strategies will be employed:

1. Several hundred south Scandinavian and central European (German and Polish) skeletons from the 3rd and 2nd millennium will be pre-screened for appropriate DNA survival and quality, in order to generate a test dataset. Based on previous result, combined with new techniques that significantly enhance success rates, we anticipate subsequently genotyping between 100 and 150 samples for

both mitochondrial (complete mtDNA genomes), Y chromosome and autosomal DNA (15,000 informative SNPs).

This data will be compared against both published and unpublished ancient datasets and with modern datasets, in order to establish the geographical location and possible origin of primarily the new Corded Ware (CW), Single Grave (SG) and Battle Axe (BA) culture groups of the early 3rd millennium BC, but also of later Bronze Age groups of the same regions. The CW, SG and BA cultures are candidates for some major migrations that introduced a completely new social organization, and possibly Indo-European languages, that persisted into the Bronze Age. Did they have a steppe origin, a Nordic origin, a Polish/central European or a mixed origin? Did the later Bronze Age people of Scandinavia share genetic relations with these groups? The ancient DNA data will contribute to resolving this.

2. Using the data generated above, we will be able to investigate the kinship of skeletons within barrows and burials, in order to document whether they were family barrows, and whether some individuals were foreigners.

3. The complete nuclear genome sequence will be generated from hair sampled from one of the most well preserved skeletons – in particular that of an oak coffin burial of Jutland from 1400 BC. Recent technical developments published out of the Copenhagen group have demonstrated that not only is this feasible, but that such data can provide fine scale details about ancient humans – including resolving sample genetic origins to unprecedented detail, but also incidentally offer insights into functionally important genetic traits of the ancient people.