Chapter 10

Isotopes and Mobility in the Ancient Roman World

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Introduction

Stable isotopes are routinely used in anthropology to investigate diet and mobility in past human populations. Anthropological research using isotopes started in the mid-1980s when archaeologists and biological anthropologists began to use them to investigate migration in prehistoric and historic human populations. There has been a consistent increase in isotopic research on human remains in the past 30 years, but the results of these studies have remained largely confined to anthropological audiences through selective publication in specialised journals. It has only been within the last 15 years that interdisciplinary research has started to encompass time periods and geographic regions not typically studied by anthropologists, such as the ancient Roman world. In this paper, I maintain that integration of isotopic evidence with historical, epigraphic and archaeological evidence provides a new opportunity for exploring human mobility, at both the individual and population levels, and can contribute to a more nuanced picture of mobility in the past. Isotopes can give us information on who was moving within a specific population and provide information on where they may have come from. What we cannot gather from the remains is why they moved (e.g. slavery, tourism, pilgrimage, wars, trade) and that is where historical, archaeological, and epigraphic evidence can enrich our understanding of the motives for human movement. I argue that these are complementary, not contradictory, lines of evidence. Sometimes the various lines of evidence may not agree, but this does not mean that one source of information is right or wrong, and a more constructive way forward is to explore how, and perhaps why, these different lines of evidence tell a different story about the past.

The first part of this paper reviews isotopic studies that have explored mobility in different regions of the Roman Empire to highlight the breadth of
research that has been conducted, and the contributions this research makes to understanding mobility in the Roman world. The discussion then turns to concerns raised by Christer Bruun about the use of oxygen isotopes to explore mobility in Roman Italy, specifically at the site of Isola Sacra near Rome, including a discussion of the recognised limitations of isotopic evidence. Finally, a case study is presented from the Roman Imperial (1st–4th c. CE) site of Vagnari in southern Italy to investigate questions concerning geographic origins, mobility and identity in this rural Roman cemetery, and how the evidence can contribute to our understanding of Roman expansion in the region.

The Use of Oxygen and Strontium Isotopes to Study Human Mobility in the Roman World

Isotopes are variants of natural elements (e.g. carbon, nitrogen, oxygen) that differ slightly from each other due to the presence of a different number of neutrons. The isotopes of an element will react in a similar manner in chemical reactions, but slight differences in atomic weight will affect the rate of chemical reactions. Isotopes are categorised as stable or unstable, and the stable isotopes of elements do not decay over time. One of the most widely known elements is carbon, which has three isotopes; two stable (12C, 13C) and one unstable (14C). The unstable isotope of carbon decays at a known rate, and is widely used for dating organic material from archaeological sites, known as carbon-14 dating. Stable isotopes do not decay over time, so the ‘signal’ formed during life is preserved in the bone or tooth. Oxygen has three stable isotopes: 16O, 17O, and 18O. Stable isotopes are typically represented by the delta symbol (δ), which represents the ratio of a heavier to lighter isotope in relation to a recognised international standard (δ18O = 18O/16O). Unlike oxygen, strontium is not typically reported using delta (δ) values, but rather as a ratio of the two isotopes (87Sr/86Sr). The variation in these ratios is very small, so the results are reported in parts per thousand (‘per mil’ or ‰).

The two isotopes used to study mobility in the past are oxygen and strontium. The oxygen isotopes found in bones and teeth are derived primarily from water consumed during life, whereas strontium isotopes are obtained mainly from the diet. Although some variability in oxygen isotope values may be due

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3 Bruun 2010; id., in this volume.
4 The isotope 87Sr is a radiogenic isotope that is the decay product of rubidium (87Rb). Rocks that are very old (>100 mya) have higher 87Sr/86Sr values, whereas relatively younger rocks (<1–10 mya) have lower values (Bentley 2006: 139).