

Ancient Health: Skeletal Indicators of Agricultural and Economic Intensification, edited by Mark Nathan Cohen & Gillian M.M. Crane-Kramer, 2007. Gainesville (FL): University Press of Florida. (Bioarchaeological Interpretations of the Human Past: Local, Regional, and Global Perspectives.) ISBN-13 978-0-8130-3082-1 hardback £48.00 & \$75.00; xvii+432 pp., 80 b&w ills.

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In the introduction to *Ancient Health: Skeletal Indicators of Agricultural and Economic Intensification* Cohen writes (p. 1) of challenging the paradigm 'that human lives have generally improved through time' particularly with the introduction of agriculture. *Ancient Health* follows twenty and more years after *Paleopathology at the Origins of Agriculture*. The titles hint at an important development, to which attention is drawn in the first chapter of *Ancient Health*. Cook (Chapter 1) is one of several authors who point out that we have no idea what to call 'the origins of agriculture', particularly in North America. There is no point in time, back into the Archaic, at which you can say that North American indigenous people did not use food-producing techniques. Cook also questions the standardized approach by which researchers were asked to assemble data into specific tight categories for the 1984 volume. She points out (as do others in *Ancient Health*) that several 'health indicators' have multiple aetiologies or do not serve as sure proxies for health. While Cook considers that dental caries may indeed be most closely linked to changes in diet associated with agricultural intensification, she notes that there is now more reliance on stable isotopes. Perhaps the interpretation of stable isotope values, themselves, may not be so simple. In a later chapter Norr draws conclusions from her stable isotope analyses that seem at odds with both the caries data she presents and other researchers' readings of $\delta^{13}\text{C}$ collagen values.

In the introductory chapter Cohen also questions whether standardized approaches are desirable, and unfortunately this skepticism is borne out by Chapter 2, in which Larsen and a large group of colleagues present standardized data for many sites for which sample sizes and age distributions clearly vary. While directing us towards a wealth of literature, the chapter raises more questions than answers. For example, my tests of their data show that there are significant adult caries rates differences through time in Georgia, but not in Florida until the late mission period.

We need to understand what is going on in more detail, with recognition of the importance of gender differences and the age dependency of 'health indicators'. The more rewarding of the chapters are those which focus tightly on specific features in greater detail, especially features of dentition, comparing across time or between ecological zones. A question raised by several chapters concerns inconsistent differences in dental pathology between coastal and inland groups. But in order to understand this fully, one cannot simply record dental caries. We need information on antemortem tooth loss, types of abscessing, attrition, gender and age group differences. The most interesting chapters are those which put a great deal of emphasis on such analyses.

Other chapters expend quite a few words acknowledging recurrent questions. Does a high rate of a stress indicator demonstrate that the population was healthy enough to survive periods of malnutrition, infection or infestation by parasites? Or should we view the presence of these skeletal and dental lesions as markers of extreme ill-health in the population? If indicators are present at low levels, does that mean that the population was subject to little insult? Or were frail individuals subject to such ferocious infections that they died before stress marked their bones or teeth? Constantly restating the problem provides no answers and without detail, at the very least, of sex and age breakdown of the skeletal sample observations we cannot even begin to approach a solution.

Thus, the more detailed papers are of greatest interest, specifically those on Chile (by Alfonso *et al.*) and Peru (Pechenkina *et al.*), India (Lukacs) and Thailand (Domett & Tayles; Douglas & Pietrusewsky). These generally give greater emphasis to dental pathology which has the advantage of being (relatively) free of conflicting or paradoxical interpretations.

Comparisons across time are obviously significant to the theme of this book, since the aim is to compare populations with and without major reliance on agricultural products. A basic problem is how to control all variables. The difficulties here are exemplified by the chapter on Southern Scandinavia by Bennike and Alexandersen, where there is apparently an uneven response to the introduction of agriculture, a dip in the trend lines from the Mesolithic into the middle and late Neolithic. This dip occurs in the early Neolithic perhaps as a consequence of gene flow. Presumably Portugal did not undergo sufficient gene flow to make a biological change evident, but unfortunately the sites examined for that country by Cunha *et al.* did not cover the early Neolithic. Our own work on Portuguese Mesolithic and Neolithic

sites indicates that, rather than crude caries frequency, type and location of caries is of major importance (a feature also noted by Japanese researchers who are unfortunately unrepresented in *Ancient Health*). Only one paper in this volume, on Chile (Alfonso *et al.*), considers caries in this type of detail. Nevertheless, both Scandinavia and Portugal demonstrate the necessity of having a continuous array of samples to establish the true trajectory of change. Graphs given at the end of the book to summarize the findings and give a picture of trajectories need to be viewed with caution: I checked a few examples and found trends indicated in the absence of significant differences in frequencies across time or even in a feature not mentioned in the relevant chapter.

The observation of changes consequent upon population amalgamation into larger settlements is naturally rather different from the observation of increased reliance upon agricultural products alone. This has been dealt with in *Ancient Health* specifically only in regard to Mesoamerica by Morfín and Storey, with no firm indication that urbanization leads to declining health. However, a four page *tour de force* summary by Roberts and Cox of 6000 years of English history, leading into a discussion of British skeletal samples, no doubt includes the effects of increasing urbanization. However, a less ambitious study focused on temporal trends within one area would have been more telling.

While Cohen & Armelagos's *Paleopathology at the Origins of Agriculture* (1984) stressed 'the origins of agriculture' in its title, this recent volume is subtitled to take into account 'agricultural and economic intensification' as a way of acknowledging that a multiplicity of factors may be involved in changes. The range of factors is well covered in the chapter by Smith and Horowitz on the Southern Levant, the result of many years of study of 19 sites. Population continuity seems certain; gracilization precedes the introduction of agriculture but is not a consistent trend. The transition to agriculture is apparently a period of poor health, but it is also a period of aridification. Diet declined in nutritive value, but at least it kept people alive through a time of stress, and increasing density of population did not lead to increased infectious disease. So we have the compounding factors — what is causing increased enamel hypoplasia and dental pathology? Population increases, population density, aridification? Clearly agriculture is the factor that allows an increase in the birth rate and survival despite a less varied and healthy diet. The discussion continues through upturns and downturns mediated by environmental factors, concluding at the end of the Pre-Pottery Neolithic in the increase in disease with

the close association of human beings and domesticated animals.

An extremely interesting aspect of this book is the inclusion of a chapter by Pfeiffer on South African foragers, showing that variation exists even without changes in subsistence. A similar type of study on Australia would show precisely the same variation in non-agriculturalists. Particularly fascinating is a chapter by Lukacs on changes in a population in the Indian Deccan. In response to increasing aridity, this population reverted from horticulture to foraging as a way of life. Several dental features responded with changes in the expected direction. But not all geographical areas follow an expected trajectory of change. The papers dealing with Malaysia (by Krigbaum) and the two mentioned above on Thailand demonstrate variability and that rice agriculture may well have different sequelae to food-production based on other sources of carbohydrates (particularly maize).

The recurrent question of how to interpret stress markers in skeletons, signs of strong healthy survivors or of frail individuals in an unhealthy environment, is not paralleled by an equal interest in another paradox. All else being equal, many children among the dead indicate high fertility rather than high mortality; that fertility has an important place in the changes recorded in *Ancient Health* is not dealt with adequately. At a time of extremely high fertility, one expects females to be particularly stressed, thus analysis by sex is important. And in order to estimate fertility levels we need careful age assessments of the sample up to age 20, this will also help recognize bias in the sample. The effect on the health of mothers and infants as a consequence of reduced birth spacing is nowhere considered and the demographic analyses throughout the book are very inadequate, some employing methods and assumptions that were already questionable 20 years ago.

With regard to general methods employed, I have mentioned that the most useful chapters give information broken down by sex and especially age, and that age dependent features must be analysed by age. There must be clear recognition that without such analysis, one is unable to arrive at a reasonable evaluation of trends. The lack of tests of significance is something of a drawback in many chapters. In one (Alfonso *et al.*), significance is tested by a formula for z that I cannot replicate and unfortunately the sample sizes for the observations are not given in sufficient detail to allow confident retesting. Another chapter (Morfín & Storey) makes comparisons by calculating from the original proportions using a standardized age structure across samples, apparently not realizing that percentages *are* standardized and that the resulting values are not different from those given by the percentages.

As Lukacs says (p. 237) of one of the papers in the 1984 volume, the 'impressionistic' conclusion does not always hold up when examined in greater detail and in some cases the chapters of this book do not hold up under close scrutiny. Nevertheless, this new contribution to an ongoing discussion is of value. While Cohen emphasizes a challenge to the paradigm that health improves through time (p. 1), this collection of papers allows us to see that health in the past did not necessarily decline through time. As Larsen says in his foreword (p. xx), the papers demonstrate that the trends in the 'quality of life and well-being ... are more complex than was previously imagined.'

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Reference

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