Contents

1 Introduction ...................................................... 1
  1.1 Scope and Current Research Areas .......................... 1
    1.1.1 Spatial Distribution of Settlements and Population
          Estimates Based on Archaeological Remains .............. 1
    1.1.2 Testing the Hypothesis of a Neolithic
          Demographic Transition ................................. 3
    1.1.3 The Sociodemographic Approach
          Based on Bone Remains ................................. 3
  1.2 Major Milestones in Palaeodemographic Research .......... 4
    1.2.1 First Attempts ........................................ 4
    1.2.2 Fascination for Palaeodemography .................... 5
    1.2.3 The French School and Research in the French-Speaking
          World Since 1992 ....................................... 7
    1.2.4 Research Outside the French-Speaking
          World Since 1992 ....................................... 8

Part I The Data of Interest

2 Epistemology of the Discipline ................................ 13
  2.1 Representativeness of the Anthropological Sample ........ 13
    2.1.1 Biological Archives: Contribution and Limitations ...... 13
    2.1.2 From the World of the Dead to the World
          of the Living: The Question of Representativeness ....... 14
    2.1.3 Problems with Small Samples ............................ 18
    2.1.4 The Migration Question ................................. 18
    2.1.5 Is It Futile to Study the Demography
          of Archaeological Populations? .......................... 19
2.2 Ideas About Age .................................................. 20
  2.2.1 Age, a Word with Many Meanings ....................... 20
  2.2.2 Civil Age, Biological Age and Social Age:
        An individual’s Place in Society ....................... 21
  2.2.3 Towards Socially Significant Age Groups ................ 22
2.3 Considerations Concerning Reference Populations ............ 23
  2.3.1 The Hypothesis of Biological Uniformity ................ 23
  2.3.2 Towards a Pre-industrial Biological Standard? ......... 25
  2.3.3 Influence of the Sex and Age Structure
        of the Reference Population ............................ 25
  2.3.4 Choice of Reference Population Structure ............... 28
  2.3.5 Other Insidious Biases in Current
        Reference Collections ..................................... 29
  2.3.6 Towards an Ideal Comparison Collection ................ 30

3 The Osteological Data ......................................... 31
  3.1 Identifying Sex ................................................ 32
  3.1.1 Adults ..................................................... 32
  3.1.2 Juveniles .................................................. 33
  3.2 Estimating Age ................................................ 33
  3.2.1 Juveniles .................................................. 34
  3.2.2 Adults ...................................................... 39
  3.3 Problems with the Methods for Determining
        Age and Sex ................................................ 45

4 Establishing a Reference Population .......................... 53
  4.1 Establishing a New Reference Population for Adults ......... 54
    4.1.1 Claude Masset’s Reference Collection .................. 54
    4.1.2 Adjusting the Reference Population .................... 63
    4.1.3 The P_Lisbon1889 Reference Population ................. 70
  4.2 Establishing a Reference Population for Juveniles .......... 73
    4.2.1 Tooth Emergence and Mineralisation .................... 74
    4.2.2 Establishing a New Comparison Collection ............... 75
    4.2.3 Number of Mineralisation Coefficients ................ 75
    4.2.4 Possible Variability in Tooth Development ............... 75
    4.2.5 Selection of Teeth for Model Construction ............... 77
    4.2.6 Adapting the Reference Population ...................... 77
  4.3 Age Groups as Yet Inaccessible ............................. 80
    4.3.1 Estimating Age at Death for Infants .................... 80
    4.3.2 Estimating Age at Death for Adolescents
        and Young Adults ......................................... 80
Part II Reconstructing Demographic Parameters

5 Age at Death: Current Approaches and Methods ........................................... 85
  5.1 General Methodological Principles ........................................................ 85
  5.2 Estimation by the “Probability Vector” Method ....................................... 86
    5.2.1 Outline of the “Probability Vector” Method ..................................... 86
    5.2.2 A New Age Estimation for a Set of Buried Adults ............................. 87
    5.2.3 Estimating Age at Death of a Sample of Buried Immature Subjects .......... 87
  5.3 “Estimator” Method ........................................................................... 95
    5.3.1 Outline of the “Estimator” Method ................................................ 95
    5.3.2 “Revised Estimators” ...................................................................... 96
    5.3.3 Brainstorming ............................................................................. 98

6 Current Demographic Models ........................................................................ 99
  6.1 Review of Basic Hypotheses in Palaeodemography ................................... 99
  6.2 Population Models ................................................................................. 100
    6.2.1 The Stable Population Concept in Palaeodemography ...................... 100
    6.2.2 Semi-stable and Quasi-stable Populations ....................................... 101
    6.2.3 Migration .................................................................................. 102
  6.3 Various Mortality Regimes ..................................................................... 103
    6.3.1 Model Life Tables ....................................................................... 103
    6.3.2 Main Life Tables Used by Demographers ...................................... 104
    6.3.3 Main Mortality Models Used by Palaeodemographers ..................... 106
  6.4 Should Population Dynamics Be Modelled by Fertility or by Mortality? .... 111

7 Finding the Right Models for Pre-industrial Populations ............................. 113
  7.1 Constraints To Be Included in the Models ............................................. 114
    7.1.1 A Mortality Pattern Specific to Pre-industrial Populations .............. 114
    7.1.2 Models Constructed from Inputs Accessible to Palaeodemographers .... 114
    7.1.3 Margin of Error and Palaeodemographic Sample Size: Two Variables to Consider .............................................................. 116
    7.1.4 Growth Rate Is Difficult to Measure, but Cannot Be Ignored .......... 116
  7.2 Modelling ............................................................................................ 117
    7.2.1 Collecting the Sample of Observed Tables ...................................... 117
    7.2.2 Choice of Mathematical Model ..................................................... 118
    7.2.3 Choice of Entry Parameters .......................................................... 119
    7.2.4 Including the Population Growth Rate .......................................... 119
    7.2.5 Quality and Presentation of the Models .......................................... 120
8 Model Tables for Pre-industrial Populations

8.1 Logarithmic Model

8.1.1 Preliminary Hypotheses for the Multiple
Linear Regression

8.1.2 Preliminary Hypotheses for the Simple
Linear Regression

8.1.3 Quality of Proposed Regressions

8.2 Estimating of Probabilities from Palaeodemographic
Variables

8.2.1 Juvenility Index (JI) and Indicator P

8.2.2 Mean age of Deceased Children Aged 5
to 14: $a_{5-14}$ (Both Sexes)

8.2.3 Mean Adult Age at Death ($a_{20}$)

8.3 Regressions from Probabilities of Dying

8.3.1 Regressions from the Preceding Probability

8.3.2 Regressions from the Following Probability

8.4 Multi-input Models

8.5 Models with Migration

8.5.1 Models for Emigration of Young Adults
of Both Sexes

8.5.2 Models for Immigration of Mature Men

8.6 Conclusions and Recommendations

9 Definition and Exploration of a Pre-industrial Standard

9.1 The Brass Method

9.2 Necessary Adaptations for Palaeodemographic Data

9.3 Pre-industrial Standard

9.3.1 Characteristics

9.3.2 Differential Mortality

9.4 Establishing Model Tables with the Brass Method

9.4.1 Construction Method

9.4.2 Panels of Proposed Life Tables
(Both Sexes Combined)

9.4.3 Atypical Life Tables

9.5 Conclusions

Part III Developing a Study Protocol

10 Final Overview

10.1 Assessing the Usefulness of the Study

10.2 Sample Representativeness

10.2.1 Importance of Sample Size

10.2.2 Population Structure
10.3 Basic Anthropological Data: A Pragmatic Choice of Methods ............................................ 168
  10.3.1 Determining Sex .............................................................. 168
  10.3.2 Estimating the Age at Death of a Skeleton ....................... 168
10.4 Estimating Age at Death for a Buried Population ......................... 170
  10.4.1 Why Shift from Individual Ages to Collective Age? .................. 170
  10.4.2 Maintaining a Probabilistic Approach to Age ..................... 171
  10.4.3 Use of a Pre-industrial Reference Standard ....................... 171
10.5 New Palaeodemographic Tools ............................................... 171
  10.5.1 The Revised “PFP” Method (Probability Vectors) ................. 172
  10.5.2 New Life Tables for Palaeodemographers ......................... 172

11 Examples of Archaeological Applications ................................................. 177
  11.1 Sites for Which Only Biological Sources Are Available ............... 178
    11.1.1 Fréouville Rural Cemetery (Calvados, N.W. France, Fourth Century AD Sector) ..................... 178
    11.1.2 Lisieux Urban Cemetery (Calvados, N.W. France, Fourth Century AD Sector) ..................... 190
  11.2 Examples from Sites for Which Biological and Statistical Sources Are Available ......................... 198
    11.2.1 Monastic Cemetery at Maubuisson, Val d’Oise (Paris Region) (Seventeenth and Eighteenth Century Convent Population) ..................... 199
    11.2.2 The Urban Cemetery of Antibes, Alpes-Maritimes (Small Port and Garrison Town, End Nineteenth Century) ..................... 204

Part IV Further Analysis

12 Critique of Current Methods ....................................................... 217
  12.1 Tables of Minimum Distance Between Each Cell ...................... 218
    12.1.1 Historical Background .............................................. 218
    12.1.2 Table Subject to Constraints .................................... 219
    12.1.3 Table Subject to Constraints and Coming as Close as Possible to an Initial Table ..................... 220
    12.1.4 Critique .............................................................. 226
  12.2 Tables of Minimum Distance Between Each Column .................... 226
    12.2.1 Historical Background .............................................. 227
    12.2.2 Maximum Likelihood Estimator ................................... 233
    12.2.3 Approximation Method ............................................. 235
    12.2.4 Summary of the Two Methods ...................................... 237
    12.2.5 Critique .............................................................. 246
  12.3 Conclusions ................................................................. 253
Handbook of Palaeodemography
Séguy, I.; Buchet, L.
2013, XXII, 329 p. 78 illus., Hardcover
ISBN: 978-3-319-01552-1