Report on the work of Mrs Sylva Kaupová
For the defence of a co-supervision PhD thesis in front of
The University of Aix-Marseille
ED 355 – Espaces, Cultures, Sociétés
&
The Charles University of Prague
Faculty of Sciences

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The thesis presented by Mrs Sylva Kaupová is entitled «Bioarcheology of the Medieval
population of central Europe: relationships among health status, social context and
nutrition».

This thesis mainly aims to provide information on the diet of populations from Great Moravia
in the Middle Ages. The influence of the state of health as well as socio-economic and
religious factors on the diet is considered. The interest of this work lies in the
multidisciplinary approach that combines data from isotopic biogeochemistry and
paleopathology. Coupled isotopic analyses of immature bone and dental tissue provide
information on weaning patterns in these populations. The results obtained are original and
interesting. They show, among other things, an influence of biological factors (age at death,
sex and health status) and social status on the diet as well as a diachronic evolution of dietary
strategies. They allow to document a geographical area whose food habits in the Middle Ages
are little-known.

This thesis contains 258 pages. In addition to a summary in French and Czech, it is divided
into eight chapters: 1) Introduction, 2) Biocultural context, 3) Stable isotope analysis in
bioarchaeology, 4) Skeletal indicators of health and their relation to diet, 5) Material, 6)
Methods, 7) Results and discussion, 8) Conclusion: diet and health patterns in Medieval
Moravia. The individual results are presented in tables in an appendix.

In the introduction, Sylva Kaupová presents in a clear, concise and precise way a state of the
art and the objective of her work. She then elaborates eleven working hypotheses in relation
to the study of the impact of biological and cultural factors on diet. A thesis plan closes this
chapter.

The second chapter, entitled "Biocultural Context", "sets the scene". It provides the
essential elements for understanding the chrono-cultural, socio-economic, political and
geographical contexts in which the studied samples are inserted. Particular emphasis is placed
on the great upheavals that have marked the history of the people of Great Moravia such as
christianization and urbanization. This chapter also mentions the contribution of archaeobotanical and archaeozoological data to the knowledge of the plant and animal species consumed by these populations. These data are gathered under the title "Archaeological perspectives on Great Moravian diet" that do not adequately reflect the contents of this sub-chapter. I would rather have called it "Contribution of plant and animal remains to the knowledge of Great Moravian diet".

The third chapter, "Stable isotope analysis in bioarchaeology" introduces the different isotopes studied in biogeochemistry. It clearly describes their sources of variation, the materials analysed (collagen or apatite) and contamination problems. I regret, however, the total lack of illustrations. Didactic diagrams and graphs to illustrate, for instance, the effect of trophic level and breastfeeding would have facilitated the understanding of this section.

The fourth chapter is devoted to the bone and dental indicators of health and their relation to diet. It begins with general information on the relation between health and nutrition. Sylva Kaupová then briefly reviews the six bone and dental health markers selected for this study. The choice of these six markers is unfortunately not argued. Why was the hypoplasia of dental enamel not chosen when it was widely selected in this type of study? Conversely, why was dental wear placed in this chapter? Although I think it is a good idea to include it in this work, it is not a health marker but rather an age-related and dietary trait. Here too, I regret the total absence of illustrations: photographs of the bone and dental pathologies would have been welcome.

In the fifth chapter entitled "Material", Sylva Kaupová presents the eight Moravian sites studied. Her number of studied individuals is impressive. It comprises:
- 230 human individuals (189 adults, 41 children) and 74 animals selected for isotopic analyses,
- 404 human individuals (102 adults, 302 children) for bone and dental indicators of health.

The sixth chapter presents the anthropobiological (age at death, sex, pathology), isotopic (sampling, sample preparation, analysis) and statistics methods in a clear and well-structured way. I appreciated the use of the Index of Intensity of Caries (ICE) which takes into account ante-mortem tooth loss and is rarely applied in paleopathology. The isotopic analysis deserves to be further developed with a section dedicated to mass spectrometry (principles, apparatus, coupling, standards, analytical precision). This could already be included in Chapter 3 "Stable isotope analysis in bioarchaeology". Statistical methods are appropriate and Sylva Kaupová paid attention to check the normality of the distributions and the homogeneity of the variances in order to choose a suitable test.

The seventh chapter, "Results and discussion" discusses first the results of isotopic analyses and then the results of the study of health indicators. The results are interpreted and supported by multiple data from other disciplines. Sylva Kaupová judiciously explored the different sources of variability of isotopic signals and manifestations of health markers. She tested the quality of collagen extracted for each individual. Comparisons with specimens from other medieval sites or from the same region allow to place the isotopic results in their
geographical and chronological contexts. This comparison was not performed for health indicators. Why? If there are no data for the region (it exists for contemporary sites from other parts of Central Europe), it should have been mentioned. I find it unfortunate that the eleven hypotheses presented in the introduction have not been taken up one by one in this chapter. They are indeed discussed but we must go through the whole chapter to find them. A global statistical analysis taking into account the isotopic data and all biological variables (sex, age group and pathologies) such as a correspondence analysis would have been welcome. It would have made it possible to identify the redundant variables and to designate those that have the most weight in the variability of the data.

The manuscript ends with a conclusion in which Sylva Kaupová summarizes her contributions and their limitations. She considers only one perspective to her work: the serial sampling of the dentine. In my opinion, it is too light: it could have considered other research themes (such as the mobility of individuals via strontium isotope analyses, diets of children over 6 years of age, etc.) and increasing the number of studied individuals and samples (she repeatedly deplores that her sample sizes are too small to be able to draw solid conclusions). This point could be raised during the defence.

The bibliography is abundant, neat and relevant.

**Strong points:**
- the thesis is clear and well written;
- the presentation is neat;
- the methodology is rigorous and well controlled;
- the candidate has managed to integrate various biological and cultural factors giving a multidisciplinary dimension to her study;
- she is careful in interpreting her results.

**Weak points:**
- the thesis does not contain enough illustrations;
- there is no multivariate analysis combining the different factors accounting in the variability of isotopic signals;
- the candidate gives very little perspectives to her work.

**Conclusion**
Given the importance of the work presented and its overall quality, I give a favourable opinion that Mrs Sylva Kaupová should defend her thesis in front of a jury.

Done in Brussels, the 6th February 2017

Caroline Polet