# Introduction

On July 25-29, 2005, The Paleopathology Association (PPA) held its first-ever Meeting in South America (PAMinSA I) at the Escola Nacional de Saúde Pública Sérgio Arouca-Fundação Oswaldo Cruz. PAMinSA I Organizers Adauto JG Araújo and Luiz Fernando Rocha Ferreira, both long-time faculty members at ENSP-Fiocruz, have been active members of the Paleopathology Association since 1980, and Sheila Maria Mendonça de Souza, a PPA member since 2000, was the Host of this richly historic scientific conference. Rio de Janeiro was a highly appropriate venue for PAMinSA I because of the outstanding contributions to paleopathology (and in particular, to paleoparasitology) made by Brazilian scholars at Fiocruz over the past quarter century. It was a great pleasure to meet PPA members from many parts of South America and to hear presentations on their important and innovative research into the history of human disease and disorders in the New and Old Worlds.

This Special Volume of *Memórias do Instituto Oswaldo Cruz* consists of 20 research papers. Eleven of the 20 papers (those by da Rocha et al., Dittmar et al., Guichón et al., Lessa & Mendonça de Souza, Marcsik et al., Mendonça de Souza et al., Raff et al., Ribeiro Marinho et al. Rosa, Wesolowski, and Wilbur & Buikstra) were presented at PAMinSA I, and an additional five papers (those by Lambert, Rosado & Vernacchio-Wilson, Rose, Wentz et al., and White et al.) were presented in March 2006 at the Paleopathology Association's 33rd Annual Meeting (North America) in Anchorage, Alaska.

Five of the papers in this volume focus on **infectious disease experience** in prehistoric and historic populations of the Old and New Worlds. Three of them deal with the history and nature of tuberculosis, a disease responsible for millions of deaths each year. Marcsik et al. describe skeletal evidence for tuberculosis in Hungarian populations spanning nearly two millennia in the Great Hungarian Plain, and Raff and colleagues report their findings of aDNA of *Mycobacterium tuberculosis* complex organisms in rib samples from Late Prehistoric Native Americans (1000 – 1200 AD) from the US Midwest. Buikstra and Wilbur present a critical overview of theoretical and methodological aspects of paleopathological investigations of tuberculosis in the Americas, concluding with a new explanation for its seeming absence in the Maya world. A case study (Mendonça de Souza et al.) from XVIII Century Portugal provides the first paleopathological diagnosis in that country of congenital venereal syphilis, another of mankind's greatest scourges. Lambert's study describes skeletal evidence for both of these deadly diseases (among other indicators of poor health) in the bones of enslaved African-Americans from a mid-XIX Century plantation cemetery in North Carolina.

Three papers address important **methodological** issues affecting the interpretation of biological data. Wesolowski tackles the difficult task of comparing published prevalence rates of dental caries in different populations in the absence of universal standardized data collection techniques. Dittmar and colleagues address several crucial problems in phylogenetic analysis and interpretation of aDNA data sets, and make valuable suggestions to assist researchers in avoiding erroneous phylogenetic recon-structions and interpolations of missing data. Rosa illustrates the linguistic concept of 'tradition' in textual analysis through her comparison of a very early printed medical text in Portuguese (*Regimento Proueytoso contra ha Pestenença,* 1496?) with two XVI Century medical texts that were based on this late XV Century original. She argues that the variations among the three texts (e.g., the inclusion of medical advice on treating 'the frenche pockes' in the later English text, *A Moche Profitable Treatise against the Pestilence*, 1534), reflect the different authors' perceptions of the interests and needs of their targeted audiences, rather than faulty translations or compilations.

One paper addresses the use of paleopathology as a window on ancient social behaviors. Lessa and Mendonça de Souza interpret non-random patterns of healed minor facial **trauma** in male crania (primarily nasal fractures) from the Atacameño cemetery of Coyo Oriente (associated with the Tiwanaku period) in Northern Chile as reflecting ritual combat between representatives of competing *ayllus*, based on bioarchaeological data and ethnographic reports of similar socially-controlled conflicts in historic times. By contrast, the less focused distribution of female facial trauma in this series suggests a more likely origin in domestic violence.

Seven papers describe recent research on **Old or New World populations**, some studies focusing on a single topic and others surveying a broad range of pathological conditions. Szathmáry and Marcsik present the results of discriminant function analysis of selected cranial measurements from X Century crania from the Great Hungarian Plain in the Carpathian Basin, testing the hypothesis that higher-status burials (defined by rich grave contexts and symbolic trephinations) contain members of the genetically homogenous ruling military class of Turkic origin. Symbolic trephination is post-mortem removal of a small portion of the external table (Marcsik et al. 2002). Rose examined commingled skeletal remains of commoners from a low-status cemetery at Tell Amarna in Egypt, the short-lived new capital city (occupied 1350-1330 BCE) of the heretic pharaoh Akhenaten. Skeletal evidence of heavy work loads (arthritis and DJD), social strife (trauma), and infection

(periostitis) was not surprising, but the high prevalence of cranial markers of anemia suggests that diet and living conditions at Amarna were less salubrious than expected for a riverine location not contaminated by previous occupations.

In the New World, Wentz and colleagues applied the criteria of the Western Hemisphere Health Index (age at death, stature, robusticity, trauma, developmental markers, DJD, infection, anemia, and dental disease) to the 7000-year-old skeletal series from the Windover site in Florida to compare quality of life in males and females from this remarkable Archaic mortuary context. White et al. measured stable carbon- and nitrogen-isotope ratios in collagen and stable carbon-isotope ratios in structural carbonate from human and faunal bones from two post-Classic coastal sites in Belize. Pathological individuals typically exhibited higher dietary levels of $C_4$ plants and low-trophic level protein than their non-pathological compatriots, but the synergistic effects of cultural (e.g., prolonged breastfeeding) and ecological factors (e.g., parasitic infections) evidently exerted a greater effect than diet alone upon observed patterns of anemia, scurvy, enamel hypoplasia, non-specific infections, and spondyloarthropathy. The relatively low prevalence of anemia in these two populations (perhaps due to regular consumption of marine fish, crustaceans, and shellfish) is interesting to consider regarding Wilbur and Buikstra's hypothesis (described in their paper in this volume) concerning the role of dietary iron in tuberculous pathology in the Maya world.

In their detailed discussion of the impact of taphonomic forces upon bone preservation in the *sambaquis* (shell middens) of Brasil, Ribeiro Marinho and his colleagues carefully describe the microscopic techniques necessary to evaluate the potential of individual specimens as well as their specific protocols for mtDNA analysis. This report should encourage researchers disappointed with the poor macroscopic appearance of their archaeological bone samples not to despair of other useful modes of analysis. By contrast, the excellent preservation of complete skeletons from the site of Peñuelas on Chile's dry northern coast permits the construction by Rosado and Vernacchio-Wilson of individual osteobiographies (sex, age at death, artificial cranial deformation, skeletal metrics, and pathology including dental caries, osteoarthritis, trauma, periostitis and osteomyelitis, and Harris lines) for many inhabitants of the farming/pastoralist/maritime people of the Diaguita culture some 500 years ago. Moving southwards, Guichón et al. provide a useful overview of previous bioarchaeological and paleopathological research on human societies in Southern Patagonia (the provinces of Santa Cruz and Tierra del Fuego in Argentina, and the Magellan region in Chile), as well as presenting new information from paleoparasitological studies of coprolites from Southern Argentina, four burials excavated at the short-lived Spanish settlement of Nombre de Jesús (1584) in the Strait of Magellan, and historic documents from La Candelaria Mission (1896) at Rio Grande, Tierra del Fuego.

In 2003, a special Supplement to *Memórias do Instituto Oswaldo Cruz* was devoted to the topic of **paleoparasitology,** a special branch of paleopathology with a strong historical connection to the Fundação Oswaldo Cruz. This publication was edited by four scholars (Adauto JG Araújo, Luiz Fernando Rocha Ferreira, Françoise Bouchet, and Karl Reinhard) of international renown for their contributions to this field of study. The 28 papers in the 2003 volume provide a comprehensive overview of 'the state of the art' of paleoparasitology, and, as Arthur Audferheide notes in his Introduction (p. 3-4) to the volume, "…how appropriate that this book should be the product of the Instituto Oswaldo Cruz in Rio de Janeiro whose professional staff has contributed so much to bring this specialty to its present distinguished status". The *Memórias* Supplement of 2003 follows two previous compilations of research in paleopathology, *Paleoparasitologia no Brasil* (edited by Araújo, Ferreira, and Confalonieri, 1988) and *Paleopatologia e Paleoepidemiologia, Estudos Multidisciplinares* (edited by Araújo and Ferreira, 1992). The four papers on paleo-parasitology in the present *Memórias* volume described below present ongoing research by many of the same authors who contributed to the 2003 Supplement, continuing their investigations into the one of the most important ecological determinants of health and disease in human populations worldwide.

The methodological paper by Fugassa, Araújo, and Guichón compares current analytical techniques developed by Jones, Reinhard, and Dittmar and Tejen to extract paleoparasitological remains from archaeological sediments; a modified version of Jones' technique recovered *Trichuris* sp. eggs from the abdominal soil sample of one burial from the Nombre de Jesús site in Southern Patagonia (described by Guichón et al. in their paper in this volume). Da Rocha and colleagues describe the remarkable record of human/parasite interactions preserved in latrines and other archaeological contexts from Roman-Gallo times to the XIX Century at Namur, Belgium. Helminth eggs (*Ascaris, Trichuris, Capillaria,* and others) track variations in diet, animal domestication, sanitary facilities, reuse of site areas and structures, and social status of particular households, all with important implications for human health throughout the different periods. The scope of the investigations by Le Bailly et al. is much smaller: soil samples from five burials in a late XIX Century cemetery in Kansas. No helminth eggs were found but enzyme-linked immunosorbent assay (ELISA) revealed antigens characteristic of *Entamoeba histolytica*, a potentially deadly parasite associated with amoebic dysentery and liver abscesses. The identification by Andrade Filho and colleagues of a new species of sand

fly [*Pintomyia* (*Pifanomyia*) *paleotownsendi*], preserved in Miocene amber, documents the antiquity of this insect family (Phlebotominae) in the New World. This family includes modern vectors of a deadly disease, leishmaniasis, with a long history in human populations in Central and South America. These four papers all merit the accolade awarded by Aufderheide in 2003 (p. 4) to paleoparasitology in general – that "it has passed through its initial, descriptive stage and now takes its proper place [as a subdiscipline] capable of extracting unique information, generating hypotheses, and testing them – a status that will surely be welcomed by the scientific community".

These 20 papers are international in scope, as was the PAMinSA I conference. Just two (Wesolowski as well as Ribero Marinho and colleagues) address paleopathology of ancient Brazilian populations. Four more (Lessa & Mendonça de Souza, Rosado & Vernacchio-Wilson, Guichón & colleagues, and Fugassa, Araújo & Guichón) report on materials from other parts of South America. North America is represented by four papers, Central America by three, Europe by five, and Africa by one paper. This volume thus gives only a limited view of the wealth of information that was presented on paleopathology in Brazil. There was a pre-conference field trip to Lagoa Santa. Conference participants visited the paleoparasitology labs at Fundação Oswaldo Cruz in one workshop, examined skeletal material from the extensive holdings of the Museu Nacional in a second workshop, and enjoyed the newly renovated displays, including a special exhibit devoted to the earliest inhabitants of Brazil that reflects both Walter Neves' new discoveries at Lagoa Santa and treasures from the museum's collections. We hope that this fourth volume on paleopathology in Brazil will be followed by others exploring these rich resources and the lively community of scholars who study them.

**REFERENCES**

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*Mary Lucas Powell*
Editor, Paleopathology Newsletter
Lexington, Kentucky, US

*Della Collins Cook*
Professor of Anthropology
Indiana University
Bloomington, Indiana, US