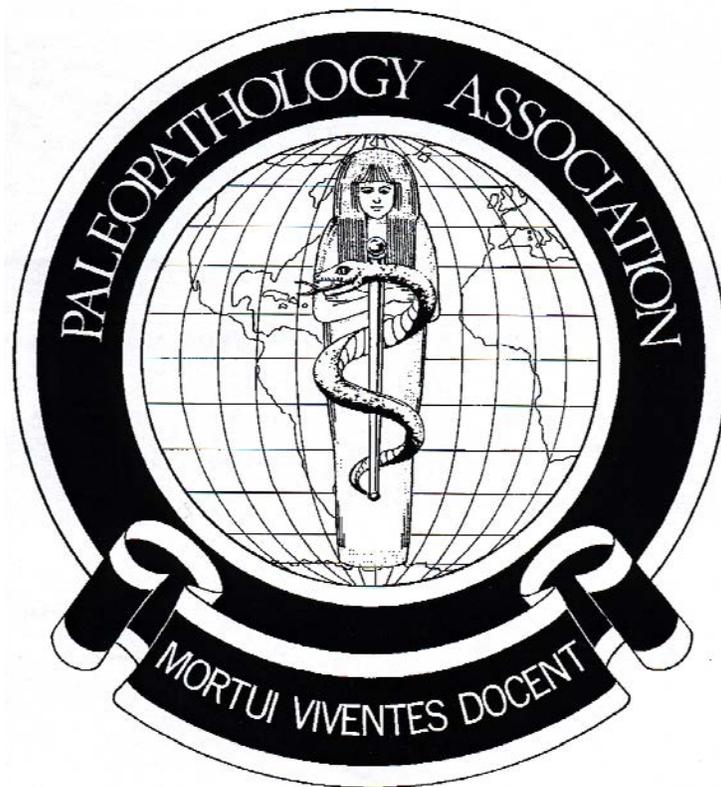


Supplement to the *Paleopathology Newsletter*

PALEOPATHOLOGY ASSOCIATION
1ST Meeting in South America
(PAMinSA I)

Scientific Program & Abstracts



25-29 July, 2005
Rio de Janeiro, Brazil

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The Paleopathology Association would like to express the sincere gratitude of our members to the Organizers and Sponsors of this historic first meeting of PPA in South America. Their hard work and generosity brought together 150 participants from 20 countries to share their scientific research and friendship at the Fundação Oswaldo Cruz, the Museu Nacional, and the Hotel Florida in the beautiful city of Rio de Janeiro, Brazil.

Cover design originated by Patrick D. Horne

1st PALEOPATHOLOGY ASSOCIATION MEETING IN SOUTH AMERICA (PAMinSA)

A FEW WORDS OF WELCOME

What a wonderful opportunity it is for the Escola Nacional de Saúde Pública Sérgio Arouca, Fundação Oswaldo Cruz, to host the 1st PALEOPATHOLOGY ASSOCIATION MEETING IN SOUTH AMERICA here in Rio de Janeiro! For the first time, many different professionals devoted to the study of history and prehistory of human diseases in the past are joined here to discuss the process of health and disease through time, and to share their experience and interests with scholars involved in the study of both ancient and modern populations. The Escola Nacional de Saúde Pública Sérgio Arouca (ENSP) is a 50-year-old institution totally dedicated to health research, teaching, and administration. Investigations of public health conditions and the dissemination of knowledge are our primary goals. ENSP helps to develop technical, social and political solutions for health problems in Brazil as well as in other American and African countries. Part of its mission is to investigate changes in disease conditions in time and space, and the impact of cultural and social change upon health. From the purest epidemiology to the social sciences, from engineering to medical assistance, ENSP supports health research in theory and practice.

Among its many academic interests, this eclectic School has housed a permanent team of paleopathologists since the 1960s. The study of the past has a permanent role in investigating the history and biocultural aspects of diseases. Paleopathology, paleoepidemiology, and paleoparasitology contribute to a transdisciplinary integrated perspective on the complex balance of health and disease in populations. Looking deep into the past helps to open the mind to the present, and helps us to understand the emergence and re-emergence of diseases such as tuberculosis, Chagas' disease, bubonic plague, leishmaniasis, hanseniasis and many other endemic and epidemic conditions .

HUMAN DISPERSAL, ADAPTABILITY AND DISEASE is the main theme for the 1st PALEOPATHOLOGY ASSOCIATION MEETING IN SOUTH AMERICA, a topic of great interest to everyone dealing with modern health because prehistoric and historic population mobility has dramatically affected human health scenarios. Investigations of the origins of American Indians and their diseases, and of their migrations and contacts between different human groups are all part of this theme. Reports on recent research in paleopathology in the Old World are also welcome, especially when related to diseases common to the Old and New Worlds. Changes in natural and cultural environment strongly affect health and disease, now as in the past. The study of health problems in past South American populations helps us to develop models for the interpretation of modern environmental impacts on health. The different waves of migrants who entered the Americas over the millennia brought with them native illnesses and faced emergent diseases in the New World. To analyze health processes in the past helps us to think about emergent diseases in the present, a very up to date discussion. Finally, discussions of theory and methods are always necessary to create new proposals and experiments and to improve old methods.

We have worked hard to provide the best conditions to assure a pleasant and productive meeting. To feel we have really succeeded, we want this to be the first of many future PPA meetings in South America. We look forward to biannual PAMINSAs in many different South American countries, where the results of future research will stimulate scholars who have chosen paleopathology as their subject of scientific interest.

Welcome!

Sheila M.F. Mendonça de Souza
Host of the 1st PAMINSA

WITH COMPLIMENTS OF THE PRESIDENT OF HONOUR of PAMinSA!

It is a great pleasure to welcome our friends in the Paleopathology Association to Brazil, especially here in Manguinhos, the cradle of medical research in our country. At the beginning of the 20th century, the baton of *Oswaldo Cruz* pushed the creation of an Institution to produce serum and vaccines. That Institution, located on the old farm of Manguinhos, far from Rio de Janeiro's urban center, was later called the Instituto Oswaldo Cruz. The man, *Oswaldo Cruz*, had just finished his academic studies in France, and he returned to Brazil full of ideas and enthusiasm to create a "*Pasteur Institute below the Equator*". On the 25th of May this year, we celebrated the 105th birthday of the Instituto Oswaldo Cruz.

Although the plans for the Institute were conceived in Europe, our country has its own peculiarities and local colors..... and so "Europe in the Tropics" came to be contradictory, playful, tasteful, and delightful, better than the original model, especially here in Manguinhos! At the time of the creation of the Instituto Oswaldo Cruz, the Republic of Brazil had been recently established but the spirits of Imperial times were still strong. Pioneering efforts had already begun: the Astronomical Observatory and the Natural History Museum had been created, and musicians like *Father José Maurício* and the *maestro Carlos Gomes* were already well known. Here in the Tropics, men of different origins worked together far from the formal European academies. *Fritz Müller* of Desterro— under the protection of the Princess of Brasil — was a pioneer in the fundamental laws of biogenetics, like *Haeckel* in Berlin and *Huxley* in London. When Müller was invited to fill a high academic position in Berlin, his answer tasted of freedom, like so many things in the tropics: "No, thanks, I prefer to teach the kids here. Furthermore, I love to walk barefoot". And there was also *Machado de Assis*: an impressive writer, mulatto, epileptic, self-taught, and undoubtedly a genius.

At this time there were no universities in Brazil, but everything that was done in the European universities was done here in professional schools, or even at home. As in so many countries, men of strong will struggled to create science and art – for example, physiology in Brazil was born in *Osório de Almeida's* basement. *Belle Époque* furniture came from Europe for private and public rooms, as did the actresses of the lyrical theater and the S. Pedro de Alcântara theatre. Everybody dreamed of being *Victor Hugo*. The United States was barely mentioned – but that would come in the future. France and Germany were the highest models: everyone from the high social levels wanted a *fräulein* to help with their children's education, and ordering goods was only possible by the *Collie-Posteux*. Nothing really changed immediately after the Republic was created - change came only after 1914. The Brazilian people felt comfortable with the Empire. My grandmother told me that when the Republic was proclaimed in Brazil, people cried in the streets, already missing the old Emperor! This is what Brazil was like in the time of *Oswaldo Cruz*, and Manguinhos, of course, was hardly as it is today.

Aragão has written about the pioneering times and the first campus: "*The two hills were separated by a valley with tamarind, mango, Brazilian cherry, guava and a dozen cashew trees; they were Oswaldo's favorites.....Over the hills, two old kitchens, almost in ruins, were selected to be repaired and adapted for the future laboratories*". Headed by *Oswaldo*, everything advanced, both in the physical aspect and in the quality of scientific research. And the beautiful Castle gradually became a reality, inspired by what he had seen in France.

The history of paleoparasitology in the Oswaldo Cruz Foundation has its own charm, dreams, and courage. Our first paleoparasitological studies aimed to test an unorthodox hypothesis; although it was proved to be wrong, paleoparasitology stayed on to develop and mature. The Paleopathology Association, a long-term partner of the paleoparasitologists of FIOCRUZ, was part of this development. For this reason, we now dedicate a special homage to *Aidan Cockburn*. He came to Rio de Janeiro when he was the leader of the Paleopathology Association, to offer an excellent conference during the Brazilian Congress of Parasitology. His presence certainly helped paleoparasitology to be recognized by our scientific peers. In 1979 we sent our first letter to the Paleopathology Association. *Aidan* wrote in the *Paleopathology Newsletter*: "*We also received a report from the Fourth Congress of Parasitology, 1979, but ALAS! It was written in Portuguese, which is somewhat outside our competence. May we have a volunteer to translate?*" That was so typical of *Aidan*! In June 1980, the *PPA Newsletter* reported our first results in a brief note: "Following our appeal for help in translating Portuguese, we received assistance from two members and are now able to report the discovery of parasites in coprolites by LF Ferreira, AJG Araujo and U. Confalonieri". That was our debut.

To meet *Aidan* was extremely pleasing. His straightforward spirit left everyone at ease. *Adauto* knew that he loved music, and so he was invited to a concert by a famous Brazilian popular singer. After 10 minutes of that quite unusual music *Aidan* said to *Adauto*: "*Let's go. I cannot understand a word! And, in fact, my African soldiers' drums were better*". That was *Aidan Cockburn*! Some weeks later *Aidan* passed away in Detroit. We

received a kind letter from *Eve Cockburn* telling us how much he had enjoyed his trip to Brazil, and how warmly he spoke about the friends he had left here. Thank you, *Aidan* and *Eve* - you were very important for us!

Finally, we cannot forget to make an especial mention of our own *Sheila Mendonça de Souza*. She organized this congress, with her typical dynamic energy and competence, and all of the credit is hers.

To all of you, Brazilians and colleagues from Colombia, Peru, Venezuela, Argentina, Chile, Portugal, Spain, Italy, Canada, United States, Turkey, Austria, Germany, Hungary, Netherlands, Jamaica, New Zealand and other countries, students and professionals, all those who are participating in the 1st PALEOPATHOLOGY ASSOCIATION MEETING in Rio de Janeiro, thank you for coming to attend our congress.

You are all welcome!

Luiz Fernando Ferreira
President of Honor of the 1st PAMINSA

SHORT COURSES IN PALEOPATHOLOGY

25th - 26th July - 9:00 to 17:00

PALEOPARASITOLOGY IN BRAZIL

Laboratory of Instituto Politécnico Joaquim Venâncio - FIOCRUZ CAMPUS

Adauto Araújo, Marcelo Gonçalves, Karl J. Reinhard

BONE PALEOPATHOLOGY IN BRASIL: A SHORT COURSE

Classroom of the PPGAS, Palácio de São Cristóvão, Museu Nacional, Quinta da Boa Vista

Della Collins Cook, Claudia Rodrigues-Carvalho, Verônica Weslowski

SCIENTIFIC PROGRAM

Wednesday, 27th July

7:30 –Registration (ground floor) and PPA Desk (Room 1, 4th floor)

9:00 – Opening of the Meeting – Auditorium (ground floor, FIOCRUZ)

Paulo Marchiori Buss – President of FIOCRUZ

Luiz Fernando Ferreira – President of Honour of the 1st PAMINSA

Sheila M.F. Mendonça de Souza – Host of the 1st PAMINSA

Diana Maul de Carvalho – Universidade Federal do Rio de Janeiro

Sabine Eggers – Universidade de São Paulo

Karl J. Reinhard - Vice-President of the Paleopathology Association

9:30 – Plenary Lecture – Auditorium (ground floor)

CHINCHORRO MUMMIES: MYTH AND REALITY - *Bernardo Arriaza*

10:45 – Symposium: MIGRATIONS TO AMERICA AND DISEASES (Organizer & Chair: Sheila M.F. Mendonça de Souza) Auditorium (ground floor)

Cranial Morphology of the First South Americans – Implications for the Settlement of the New World -*Walter Alves Neves*

Ancient and Modern DNA in the Americas: Implications for the Peopling of the New World - *Frederika Kaestle, Ripan S. Malhi, Jason A. Eshleman, David Glenn Smith*

Mitochondrial Genomic and Anthropological Implications - *Andrea Kelly Ribeiro-dos-Santos*

Different in Bones, Different in Health: is that True for Lagoa Santa Groups? - *Sheila M.F. Mendonça de Souza*

12:30 – Lunch and Poster Presentations (Room 2, 4th floor)

14:00 Symposium: BIOARCHAEOLOGY OF COASTAL POPULATIONS (Organizer & Chair: Sabine Eggers) (Auditorium, ground floor)

Arseniasis as a Hypothetical Environmental Explanation for the Origin of the Oldest Artificial Mummification Practice in the World - *Bernardo Arriaza*

The Cost of Lifestyle: Skeletal Markers of Occupational Stress (MOS) in Brazilian Prehistoric Coastal Populations - *Claudia Rodrigues-Carvalho*

Bacterial Diseases of Coastal Populations in Evolutionary Perspective - *Luz Andrea Pfister*

14:00 Symposium: HISTORICAL RESEARCH OF DISEASES OF THE PAST (Organizer and Chair: *Diana Maul de Carvalho*) (International Room, 4th floor)

Quilombos in Western Minas Gerais Hinterland: a Proposal of a Typology for Archaeological Analysis of These Structures - *Marcia Amantino*

Ancient Texts: Modern Problems - *Maria Carlota Rosa*

Medical Diagnosis in Ancient Texts: from Middle Age to Enlightenment - *Diana Maul de Carvalho*

16:00 - SHORT COMMUNICATIONS (Chair: *Adauto Araújo*) Auditorium (ground floor)

First Paleoparasitological Record of Anoplocephalid Cestodes in Patagonia Austral - *Martin H. Fugassa, G.M. Denegri, N.H. Sardella, Ricardo A Guichón, P A Martinez, Adauto Araújo*
Paleoparasitological Analysis of a Human Coprolite Dated of 7880±150 Years from Austral Patagonia - *Martin H. Fugassa, Adauto Araújo*
Paleoparasitological Remains Revealed by Seven Historic Contexts From Square of Arms, Namur, Belgium - *Gino C. Rocha, Françoise Bouchet, Adauto Araújo, Luiz Fernando Ferreira*
Treponemal Disease in Prehispanic Populations of Chile - *Mario Castro, Aryel Pacheco, Ivo Kuzmanic, Eugenio Aspillaga*
Lytic Lesions by Leishmaniasis in Makat-Tampu, Ancient Peru - *Alfredo José Altamirano, João Soares Moreira, Mauro Célio Marzochi*
Of Mulberries and Raspberries: In Search of the Diagnostic Value of Mulberry Molars in a Pre-Contact Population in the Lesser Antilles - *Raphaël G.A Panhuysen, Menno L.P. Hoogland*
Genetic Anemia Among Maya? - *Della Collins Cook, Mark Nathan Cohen*

16:00 – SHORT COMMUNICATIONS (Chair: *Veronica Wesolowski*) International Room (4th floor)

Is Auditory Exostosis a Good Aquatic Activity Marker? - *Maria Mercedes Okumura, Celia H. Boyadjian Sabine Eggers*
Caries Prevalence in Skeletal Series: Is it Possible to Compare? - *Veronica Wesolowski*
The Toothless Woman of Choquequirrao - *Rose Drew*
Multiple Metastasis in Hunter-Gatherers From the Argentine Pampean Region - *Luis Bosio, Claudia Aranda, Leandro Luna, Mónica Berón*
Infections in the Subadults Skeletons of San Pedro de Atacama: a Case of the Osteological Paradox? - *Pedro José Tótoro da Glória, Maria Antonietta Costa, Walter Alves Neves*
Pathological Analysis of Precolumbian Skulls from Hellshire, Jamaica - *Ana Luiza Santos, Phillip Allsworth-Jones, Michael Gardner*

18:30 – RECEPTION AND OPENING OF THE EXHIBITION "OSSOS ANTIGOS E PALEOPATOLOGIA: OS ACHADOS EM LAGOA SANTA" (Ancient Bones and Paleopathology: Discoveries at Lagoa Santa). Auditorium, Palácio de São Cristóvão, MUSEU NACIONAL, QUINTA DA BOA VISTA.

Thursday, 28th July

9:00 - Plenary Lecture – Auditorium (ground floor)
A PALEOPATHOLOGICAL PERSPECTIVE ON THE EVOLUTION OF COASTAL ADAPTATION IN THE EASTERN HEMISPHERE - *Phillip L. Walker*

10:15 – Symposium: CHAGAS' DISEASE: AN AMERICAN PLAGUE (Organizer: Karl J. Reinhard, Chair - Katharina Dittmar) Auditorium (ground floor)

The Natural History of the Transmission of *Trypanossoma cruzi* and *Trypanossoma evansi* is a still unsolved puzzle - *Ana Jansen*

Molecular Characterization of *Trypanossoma cruzi* in Brazil and Texas - *Katharina Dittmar, Ana Maria Jensen, Sheila M.F. Mendonça de Souza, Luiz Fernando Ferreira, Karl J. Reinhard, M. Whiting, and Adauto Araújo*

Cave Living and Transmission of Chagas in Ancient Times – *Karl J. Reinhard*

10:15 – Symposium: INFECTIONS AND PREHISTORIC AMERICA: ANCIENT AND EMERGING DISEASES (Organizers: Jane Buikstra & Sheila M.F. Mendonça de Souza, Chair: Jane Buikstra)

Tuberculosis in the Ancient Americas - *Jane Buikstra*

Treponematoses in the New World: Why Less is More in the Tropics - *Della Collins Cook*

The Evaluation of Quantitative Shifts in Prehistoric Infection Rates - *Mark Nathan Cohen*

Lifestyle and the Emergence of Diseases: the Case of the Sambaqui People - *Sheila M.F. Mendonça de Souza*

12:30 – Lunch and Poster Presentations (Room 2, 4th floor)

14:00 – Symposium: PALEOPATHOLOGY AND FORENSIC ANTHROPOLOGY (Organizers: Eugénia Cunha & Conrado Rodríguez-Martín, Chair: Conrado Rodríguez-Martín) Auditorium (ground floor)

Medicolegal Identification of Skeletal Remains Through Antemortem Bone Changes – The Experience of the Medical Examiner's Office in Porto Alegre, Brazil - *Márcia Vaz*

Traumatic Lesions and Cause of Death: a Forensic Anthropology Challenge - *João Pinheiro*

The Value of Paleopathology to Forensic Anthropology - *Eugénia Cunha*

14:00 – Symposium: THEORY AND METHODS IN PALEOPATHOLOGY (Organizers: Sabine Eggers & Charlotte Roberts, Chair: Sabine Eggers)

Do not Run Before You Can Walk: Issues in Analytical Methods in Paleopathology - *Charlotte Roberts*

Paleofragments and Epidemiological Evidence - *Diana Maul de Carvalho*

The Importance of Numbers: what Large Skeletal Samples can Reveal About the Health Status of Earlier Human Populations - *Phillip L. Walker*

16:00 – **Paleopathology Association Assembly** – Auditorium (ground floor)

Friday, 29 July

9:00 – Plenary Lecture – Auditorium (ground floor)

ECOLOGICAL ASPECTS OF PAST HUMAN HEALTH: THE EFFECT OF INDOORS AND OUTDOORS ENVIRONMENTS AND CLIMATE ON HEALTH: *Charlotte Roberts*

10:15 – Symposium: PALEOBOTANY AND PALEOPATHOLOGY: CROSSING THE BRIDGE

(Organizers: Karl J. Reinhard & Veronica Weslowski, Chair: Karl J. Reinhard) Auditorium (ground floor)

Diet, Parasitism and Skeletal Indicators of Stress - *Karl J. Reinhard*

Vegetal Microresidues on Human Ancient Dental Calculus: a Way to Better Understanding Diet and Dental Disease - *Veronica Weslowski*

Diet and Poisoning of the Dos Cabeças Giants: a Critical Review - *Vaughn Bryant & Karl J. Reinhard*

Coprolite Evidence of Medicinal Plant Use, Piauí, Brazil - *Sérgio Augusto de Miranda Chaves*

Vegetation, Climate, Plant Use and Diet During Coastal Occupations in Brazil from 6000 to 1400 years BP - *Rita Scheel-Ybert*

Symposium: ANCIENT DNA AND PALEOPARASITOLOGY (Organizers: Mark Spigelman & Katharina Dittmar; Chair: Mark Spigelman (Israel) International Room (4th floor)

Tuberculosis in 18th Century Hungarian Adults and Children Determined by the Detection of Mycobacterium Tuberculosis DNA - *Mark Spigelman*

Molecular Identification of Leishmania DNA in Mummies from Ancient Egypt - Albert R. Zink, Bettina Schraut, Andreas G. Nerlich

Pathologies in Ancient Inhabitants of Southern Italy - *Marilena Cipollaro, Giovanni di Bernardo, Stefania del Gaudio, Alessandro Lanza, Nicola Cirillo, Luigi Guida, Antonino Cascino*

12:30 – Lunch and Poster Presentations (Room 2, 4th floor)

14:00 – Symposium: PALEOPATHOLOGY IN THE ANDEAN REGION (Organizer & Chair: *Guido Lombardi*) International Room (4th floor)

Human Offering in Architectural Contexts: an Insight from Caral, Peru - *Guido Lombardi*

Ritual Continuity in Burial and Sacrifice on the Northern Peruvian Coast - *Catherine Gaither, Jonathan Kent, Victor Vasquez, and Teresa Rosales*

Curated Corpses and Scattered Skeletons: Recent Taphonomic Studies of the Moche Dead - *Alana Cordy-Collins*

Human Sacrifice in Prehispanic Peru: New Discoveries, New Patterns - *John Verano*

Political Violence in the Inca Skeletal Data from XV - XVI Centuries in the Rimac Valley - *Alfredo José Altamirano, João Soares Moreira, Mauro Célio Marzochi*

16:00 – SHORT COMMUNICATIONS (Chair: Trisha Biers) Auditorium (ground floor)

Ancient aDNA Analysis of Pre-contact TB -*Frederika Kaestle, Jennifer E. Raff, Della C. Cook*
Health and Disease of Native Human Populations in Austral Patagonia, First Steps, Results and Perspectives - *Martin H. Fugassa, J A Suby, Ricardo A Guichón, Conrado Rodríguez Martín*
The Impact of Spanish Colonization: Paleopathological Evidences of Oral Health and Diet in Native Colonial Societies from the Colombian South West - *Miguel Eduardo Delgado-Burbano*
Scurvy in the Old and New Worlds: an Important Tool for Social, Economic and Cultural Interpretation - *Megan Brickley, Rachel Ives*
Identification of Microorganisms in Tissue Samples in the Ancient Remains Found in a Glacier in British Columbia - *Maria Victoria Monsalve, Paul Hazelton, Derrick Horne, Elaine Humphrey*

16:00 – SHORT COMMUNICATIONS (Chair: Claudia Rodrigues-Carvalho) International Room (4th floor)

From the Cradle to the Grave: Aspects of Subadult Mortality in Tenerife (Islas Canarias) During the 17th– 19th Centuries AD - *Chryssi Bourbou, Conrado Rodríguez-Martín, Rafael González-Antón*
Congenital Segmental Failure: Klippel-Feil Syndrome in a Juvenile Skeleton from the Early Hungarian Period (1000 A.D.) - *Doris Pany, Maria Teschler-Nicola, Thomas Prohaska, Mathias Kucera*
Bony Evidence of Beheading - *Karin Wiltschke-Schrotta*
Pattern of Traumatic Lesions in a 20th Century Portuguese Population. Preliminary Results - *Francisca A. Cardoso, Charlotte Roberts*
Schmorl's Nodes: Indicators of Stress? - *Handan Üstündağ-Aydin*
First Results of Non-Invasive Studies of the Egyptian Human Mummies of the National Museum, Brazil: the Roman Mummy - *Sheila M.F. Mendonça de Souza, Antonio Brancaglioni Júnior, Iugiro Roberto Kuroki, Jorge Roberto Lopes dos Santos*
Violence Patterns in Atacama: Comparative Results for Different Periods - *Andrea Lessa, Sheila M.F. Mendonça de Souza*

17:00 – Closing Session and Music with FIOCRUZ CHORUS

21:00 – Cocktails and Dinner (Hotel Florida)

POSTER PRESENTATIONS

Gila Kahila Bar-Gal, Mary Carrington, Helen Donoghue, Ildico Pap and Mark Spigelman: Host Genetic Influence on Tuberculosis Infection in 18th Century Hungarian Mummies
Rafael Bartolomucci and Sabine Eggers: Human Taphonomic Analyses Applied to the Fluvial Shell-Mounds of the Valley of Ribeira de Iguape, São Paulo
Ligía B.G. Bartolomucci and Sabine Eggers: Study of the Biological Affinity between a 9000bp Burial and the Sambaqui Population by Discrete Dental Analysis
Cristiane Calza, Jurema Godoy, Marcelino José dos Anjos, Sheila M.F. Mendonça De Souza, Tania Andrade Lima, Antonio Brancaglioni Jr and Ricardo Tadeu Lopes: X-Ray Fluorescence Applications in Archaeological Material Analysis
Flávia De Carvalho, CM Cerqueira and Claudia Rodrigues-Carvalho: Enamel Hypoplasia in a Coastal Prehistoric Population, Rio de Janeiro, Brazil
Maria Antonietta Costa, Carney Matheson, Lucia Iachetta and Otto Appenzeller: Leishmaniasis in the Oases of San Pedro de Atacama, North of Chile
Francisco Curate: A Case of Os Odontoideum in the Paleopathological Record
George J Dias and Ana Luísa Santos: Pathogenesis of Apical Periodontal Cysts: Diagnosis in Paleopathology and their Management in the Early 20th Century

- Adilson Dias Salles, M.F. Mendonça de Souza, RA Araújo, DJA Alexandre, and Adriana SM Teixeira: Facet Tropism and the Relationship to Lumbar Spine Degenerative Lesions Investigation on Skeletal Remains of the Furna do Estrago Population, Pernambuco State, Brazil
- Adilson Dias Salles, Adriana SM Teixeira, RA Araújo, and DJA Alexandre: Musculoskeletal Stress Markers on Skeletal Remains of Cabeçada Shellmound Population, Laguna, Santa Catarina, Brazil: a Biocultural Approach
- Angélica Estanek and Andrea Lessa: Study of Acute Trauma in Tenetehara-Guajajara Indians
- Jorge Ferigolo and Maria Da Glória Demamann: Anthropological Skeletal Collection of the Museu De Ciências Naturais, Fundação Zoobotânica, Rio Grande Do Sul State, Brazil
- Jorge Ferigolo, Francisco Ricardo Negri, Francisco Sekiguchi Buchmann: Chronic Osteomyelitis and Infectious Arthritis in a Ground Sloth (Mammalia, Mylodontidae) from Upper Pleistocene of Rio Grande do Sul State, Brazil
- Jorge Ferigolo, Max C Langer, and Francisco Ricardo Negri: Triassic Ornithischia Pathology from Rio Grande do Sul State, Brazil
- Alexandre Fernandes, Ana Carolina Paulo Vicente, Aduino Araújo, Ana Maria Jansen, and Luiz Fernando Ferreira: The Natural History of Chagas' Disease as Told by the Presence of Trypanosoma Cruzi DNA in Archaeological Material
- Luiz Roberto Godolfim: Presence of Auricular Exostoses in Individuals of the Tapera Archeological Site (Sambaqui Man Museum)
- Luiz Roberto Godolfim: Agenesis of the Third Molar in Pre-Historic Brazilians
- Alena M Iñiguez, Karl J. Reinhard, Aduino Araújo, Luiz Fernando Ferreira, and Ana Carolina P Vicente: Primary and Secondary Structure of Splicing Leader S11 RNA Gene (S11 RNA) from Enterobius Vermicularis Retrieved from Amerindian Coprolites
- Matthias Kucera: Applications of Scanning Electron Microscopy (SEM) in Paleopathological Investigations Rheta Lanehart, Robert Tykot, Jennifer Kelly, Nicole Falk, Helen D Donoghue, Mark Spigelman, Kim Vernon, and David Himmelgreen: Presence of Mycobacterium Tuberculosis Complex Dna at the Crystal River Archaeological Site: Initial Findings
- Daniela Leles De Souza, Marcelo Luiz Carvalho Gonçalves, Alena Mayo Iniguez, Ana Carolina Paulo Vicente, and Aduino Araújo: Paleoepidemiology of Ascaris Lumbricoides and Trichuris Trichiura infection
- Daniela Leles De Souza, Rita De Maria Seabra Nogueira De Candanedo Guerra, and Aduino Araújo: Acari Found in a Mummy Bundle from the Valley of the Chillón River, at the Lima Plains, Peru (Late Inca Burial)
- Andersen Liryo and Carlos Etchevarne: A Case Study of Bilateral Symmetric Ankylosis from the First Cathedral of Brasil
- Martha Locks and Claudia Rodrigues-Carvalho: Dental Pathology Among Tenetehara-Guajajara, Maranhão State, Brazil
- Anderson N R Marinho, Terezinha Palha, Valéria Silva Braz, Claudia Rodrigues-Carvalho, M.F. Mendonça de Souza, S E B Santos, and Andrea Kely Campos Ribeiro dos Santos: Analysis of Ancient Dna From Moa and Beirada Sambaquis – RJ
- Anderson N R Marinho, Terezinha Palha, Valéria Silva Braz, and Andrea Kely Campos Ribeiro dos Santos: Comparison Between Tafonomic Effects and Ancient Dna Preservation
- Antónia Marcsik, Erika Molnár, and László Szathmáry: The Antiquity of Tuberculosis and Leprosy in Hungary: the Skeletal Evidence
- Dario Piombino Mascali, Francesco Mallegni, Gino Fornaciari, and Fulvio Bartoli: Trepanation in Prehistoric Italy: Three Cases from Saint-Martin-De-Corléans (Aosta)
- Diogo Jorge de Melo, Deise Dias Rêgo Henriques, and Claudia Rodrigues-Carvalho: Dental Enamel Defects Analysis in the Genus Toxodon – A New Methodological Proposal
- Sheila M.F. Mendonça de Souza, Sónia Codinha, and Eugénia Cunha: Congenital Syphilis in a 18th Century Child Mummy From Portugal
- Sheila M.F. Mendonça de Souza and Aduino Araújo: A Strong Man and His Fate
- Sergio Francisco Monteiro Da Silva, Rogério Nogueira Oliveira, and José L F Antunes: Tooth Damage and Unusual Dental Wear from Masticatory and Extramasticatory Uses: Cases From the Piaçaguera Shellmound, Sao Paulo, Brazil
- Sergio Francisco Monteiro da Silva and Rogerio Nogueira Oliveira: Forensic Archaeology in the Academy of Civil Police, São Paulo State, Brazil
- Alvaro Montenegro, Aduino Araújo, Michael Eby, Luiz Fernando Ferreira, Renée Hetherington, and Andrew J. Weaver: Parasites, Paleoclimate and the Peopling of the Americas: The Hookworm and the Clovis Migration

- Joseli Maria Da Rocha Nogueira, Cassius S Palhano-Silva, Marcelo Luiz Carvalho Gonçalves, and Aduino Araújo: The Importance of Ethical Aspects in Paleoparasitological Research
- Rogério Nogueira Oliveira, Sergio Francisco Monteiro Da Silva, Alcimara Kawano, and Jose L F Antunes: Estimating Age by Tooth Wear of Prehistoric Human Remains in Brazilian Archaeological Sites – Sambaqui
- Stephanie Panzer, Albert R. Zink, Monika Cohen, and Andreas G Nerlich: Palaeopathological and Radiological Evidence of Goldenhar Syndrome in a South German Ossuary
- Maria S. Parks: Unicoronal Synostosis in Two Individuals from Furna do Estrago, Pernambuco
- Cecília Petronilho and Sabine Eggers: Articular Degeneration and Other Activity Markers in the Sambaqui Jaboticabeira II
- Claudia Rodrigues-Carvalho, Andersen Líryo, Maria Cristina Tenório, and Diogo Cerqueira Pinto: Boqueirão Shellmound, Burial I, Arraial do Cabo, RJ, Brazil: an Osteobiographic Analysis
- Salvatore Siciliano, Lucas B Hassel, Vinicius C Alves, Katharina Dittmar, and Sheila MF Mendonça de Souza: Pathological Findings in the Skeletons of Small Cetaceans from Rio de Janeiro, Brazil
- Mark Spigelman, Charles L Greenblatt, Kim Vernon, Susan G Sheridan, Dennis P Van Gerven, Z Shaheem, and Helen D Donoghue: Paleomicrobiological Study of 400 Naturally Mummified Human Remains from Upper Nubia: Preliminary Results
- Eduardo Gonzalez Toledo, Susana Salceda, and Horacio Calandra: Multiple Myeloma in a Mummy from the Hellenistic Period Studied with Plain Xrays and Computed Tomography
- Ana Carolian P. Vicente, Alena Mayo Iniguez, Koko Otsuki, LD de Souza, and Aduino Araújo: Origin of HTLV-1 Infection in South America: Paleoparasitological and Theoretical Analysis
- Agueda Maria Vieira Alves: Sambaqui Inhabitants: Could Harmful Algae Blooms (HAB) Signify Stress To Them?

ABSTRACTS

LYTIC LESIONS BY LEISHMANIASIS IN MAKAT-TAMPU, ANCIENT PERU. Alfredo José Altamirano, João Soares Moreira, and Mauro Célio Marzochi

Paleopathologic evidence of mucosal alteration deforming human population of ancient Peru suggests the presence of mucosal leishmaniasis (LM) in the agricultural population living the endemic area between XV-XVI centuries. The pathologic anatomy study was divided in two phases: 1) pattern of mucosal form in human crania was defined among selected patients, from the Research Center Clinical Evandro Chagas' (IPEC – Fiocruz), with clinical history and destruction of the facial bones, principally oro-nasal cavity. Seven cases were selected. All caused by *Leishmania (V.) braziliensis*: 6 men and 1 woman with age up to 35 years old. X-ray pictures and axial tomography of the cranium were performed in order to define the pathologic pattern in the bones; 2) archeological material was analyzed and compared in 241 skulls from the Department of Physical Anthropology of the National Museum of Anthropology, Archaeology and History, Lima, Peru. Material was well preserved and we identified five cases (4 men and 1 woman) with age up to 35 years old preserving naso-palatine destruction, compatible with mucosal form defined by clinical casuistic. They were found in the Inca cemetery of Makat-Tampu, Rímac valley. The rate of mucosal lesions (2.07%) compatible with LM may suggest that there was a high prevalence of *L. braziliensis* complex infection in the pre-hispanic times, confirming our hypothesis. This study was based on biocultural focus, aiming to reconstruct the quotidian life of the agricultural population of the Rímac valley during the Inca occupation.

POLITICAL VIOLENCE IN THE INCA EMPIRE: SKELETAL DATA FROM THE 15th – 16th CENTURIES IN THE RIMAC VALLEY. Alfredo José Altamirano, Edinilsa Ramos de Souza, and Marli de Albuquerque Navarro

Paleopathological evidence suggests political violence (PV) among the agricultural populations concentrated at Rimac Valley, Lima, Peru, during the 15th and 16th centuries. 241 skulls from the Inca cemetery of Makat-Tampu were analyzed at the National Museum of Anthropology, Archaeology and History, in Lima. The skeletal material was well preserved and 9 men and 2 women, aged up to 30 years (4.56% of the skulls), had peri- and pre-mortem nasal, frontal, and parietal fractures. The lesions were probably produced by stone “macanas”. Interpretation of the archeological and ethno-historic contexts showed that during the Inca occupation thousands of *mitmaq* people, Lima highlands (Huarochiri), were brought by Inca administration, with the aim of controlling

water (acequias) and agricultural lands. This policy caused several conflicts and PV in this region. Old interpretations proposed that the central coast was conquered by Inca by non-violent means because the god Pachacamac was similar to the god Wiracocha. Our evidence contradicts this idea and show conflicts, as in the Chillón valley. The Huarochiri people invaded the Rimac Valley during Inca times, around 1470, when Tupac Yupanqui was governor and they also were brought to occupy the central coast. Inca military action assured the peace, and *tambos* were established in this area, extending to the Lurin and Chillon valleys. In colonial times, the “ritual dances” in Lima’s highlands *ayllus* remind Inca times.

QUILOMBOS IN WESTERN MINAS GERAIS HINTERLAND: A PROPOSAL OF A TYPOLOGY FOR ARCHAEOLOGICAL ANALYSIS OF THESE STRUCTURES. Marcia Amantino

We present a typology for the analysis of the *quilombos* (settlements of runaway slaves) located in the geographical area known as the Western Hinterland of Minas Gerais in the XVIII century, using historical sources. This typology allows the establishment of different patterns of occupation of a given area by specific social groups – runaway slaves, indigenous groups, and other segments of the population. It also allows a more precise identification and organization of data that will provide helpful information for historical archaeological research, as it develops discussions based on the social organization of the *quilombolas*, including political, economical and cultural issues, particularly considering the findings of material culture.

ARSENIASIS AS A HYPOTHETICAL ENVIRONMENTAL EXPLANATION FOR THE ORIGIN OF THE OLDEST ARTIFICIAL MUMMIFICATION PRACTICES IN THE WORLD. Bernardo Arriaza

This presentation debates the origin of Chinchorro artificial mummification practices. Chinchorro was a preceramic Andean culture that, contrary to expectations, developed complex mummification systems starting about 5000 B.C. The dead were transformed into statue-like figures by the addition of sticks, clay, and mineral pigments to human skin and bones. Scholars have debated how and where Chinchorro artificial mummification developed; but the question of why has not received much attention. The first Chinchorro mummies were those of children, and it is shown here that arseniasis is a plausible hypothesis to explain the origin of this unique practice. The Chinchorros began to mummify their dead in the Camarones Valley in northern Chile where presently the ground water has arsenic levels 100 times in excess of 10µg/L, the standard deemed acceptable by the World Health Organization. Arsenic poisoning produces spontaneous abortions, stillbirths, and preterm births. Arseniasis threatened Chinchorro survival, and the toxic environment of the Camarones that triggered the development of the Chinchorros’ artificial mummification practices.

CHINCHORRO MUMMIES: MYTHS AND REALITIES. Bernardo Arriaza

The Chinchorro, an intriguing preceramic culture, created the oldest mummies in the world, starting 7000 years ago. The Chinchorro lived along the coast of the Atacama Desert in southern Peru and Northern Chile. Four myths associated with this culture and their mummies are discussed: 1) Did the Chinchorro people practice cannibalism? 2) Were Chinchorro mortuary practices democratic, with everyone within a particular period receiving similar treatment after death?) 3) Were the Chinchorros mobile hunters-gatherers? and 4) Were they a peaceful and harmonious early society?

HOST GENETIC INFLUENCE ON TUBERCULOSIS INFECTION IN 18TH CENTURY HUNGARIAN MUMMIES. Gila Kahila Bar-Gal, Mary Carrington, Helen Donoghue, Ildico Pap, and Mark Spigelman

The emergence of infectious diseases such as TB as a multidrug resistant threat requires us to develop new insights into the molecular biology and genetic history of disease resistance/susceptibility. A study of 240 naturally mummified bodies interred in coffins in a church crypt in Vac, Hungary, from the 18th century offers a unique collection, with well-preserved DNA, for the study of host genetic influence on pathogenicity. The results from 600+ samples confirm that 38% were free of TB DNA. Of the other 62%, some died from the disease while others failed to succumb but had persistent latent infection. In addition to studying the pathogen DNA, we have started to investigate the genetic basis of the host immune responses, especially the KIR genes which are considered to be the most rapidly evolving regions of the human genome. The study of the host susceptibility/resistance factors in the mummies and their descendants should give information on the role of host genetics in the pathogenesis of infectious disease, and contribute to the design of new therapeutic strategies.

HUMAN TAPHONOMIC ANALYSES APPLIED TO THE FLUVIAL SHELL-MOUNDS OF THE VALLEY OF RIBEIRA DE IGUAPE, SÃO PAULO. Rafael Bartolomucci and Sabine Eggers

In Brazil, the archaeological sites known as shell-mounds are geographically distributed along the coast line and also along some rivers. Taphonomic analyses have been applied to the study of the human burials from the sites Capelinha (9250 to 6090 AP), Estreito (4125 to 3655 AP) and Moraes (5985 to 4510AP), all them from the Valley of the river Ribeira de Iguape, in southern São Paulo State. In these analyses, the fragmentation of the bone was considered as one source of information to distinguish ante-mortem, peri-mortem, and pos-mortem fractures. Relationships between types of fractures, biomechanical features and the position of the bones in the burials were also considered in the analysis of possible taphonomic influences on bone fragmentation. Recent fractures can be distinguished from old ones, and the excavation and post-excavation (laboratory) treatment should be seen as one taphonomic agent too. The degree of weathering was used as an indicator of the exposure of bone to the sun: some burials were evidently covered only lightly with soil or shell and the bones were therefore left somewhat exposed to the sun.

STUDY OF THE BIOLOGICAL AFFINITY BETWEEN A 9000 BP BURIAL AND THE SAMBAQUI POPULATION BY DISCRETE DENTAL ANALYSIS. Ligia B G Bartolomucci and Sabine Eggers

Capelinha is an archeological site found in the Southwest of Brazil, along the Ribeira de Iguape Basin/São Paulo, 30 km from the coast. This archeological site is marked by an accumulation of mollusc shells together with other evidence left by fisher/hunter/gatherer groups. There are similar sites in this region and all are culturally very similar to coast sites called “Sambaquis” (this word in Tupi, a horticultural/potter group, means ‘accumulation of mollusc shells’), but up to this day there is no certainty about the biological relationship between these groups. The oldest burial found in a “Sambaquis” site is Capelinha number II (Luzio) dated from 9000 years BP. The objective of this research was to analyze the biological affinity between the Capelinha burial II and other “Sambaquis” populations by discrete dental analysis. A total of 36 discrete dental traits were analyzed using the Arizona State University (ASU) system (Scott & Turner II, 1997). This method has been extensively used by anthropologists around the world for the understanding of similar questions, but this is its first application towards solving a bioarcheological problem concerning the “Sambaquis” population.

MULTIPLE METASTASIS IN HUNTER-GATHERERS FROM THE ARGENTINE PAMPEAN REGION. Luis Bosio, Claudia Aranda, Leandro Luna, and Mónica Berón

The Chenque I site is a prehistoric cemetery located in Lihué Calel National Park (La Pampa province), in the western Pampean Region. This site was used by hunter-gatherer groups during the Final Late Holocene, for at least 700 years. To date, 33 burial structures have been excavated. Great variability in mortuary modalities of inhumation have been recorded (simple, multiple, primary, secondary burials, and also some variants not previously registered in the region). Moreover, through the evaluation of several biological and cultural aspects, the lifeway of these groups has been investigated. Several pathologies have been identified in this cemetery. Burial N° 12 contains a skeleton of an adult male that shows multiple pathological lesions, compatible with those of neoplastic disease. These lesions have been analyzed using several methods, including macroscopic, radiological and microscopic examinations. This is the first identification of neoplastic disease in a prehistoric burial in Argentina. In this presentation the localization and characteristics of the lesions are evaluated, and different neoplastic diseases that could have produce them are discussed. Since the people buried in this cemetery belonged to groups that had a high logistic mobility, one key issue in inferring the consequences for group dynamics and mobility is that this individual’s illness could have been produced because of the gradual deterioration of his health and physical strength.

FROM THE CRADLE TO THE GRAVE: ASPECTS OF SUBADULT MORTALITY IN TENERIFE (ISLAS CANARIAS) DURING THE 17th– 19th CENTURIES AD. Chryssi Bourbou, Conrado Rodríguez-Martín, and Rafael González-Antón.

Data from subadult skeletal material are widely believed to represent the most demographically variable and sensitive barometer of biocultural changes within a society. In 1996, during restoration works at the Exconvento de San Bernardo (Los Silos, Tenerife, Canary Islands), an ossuary containing mainly the commingled remains of subadult individuals came to light at the North aisle. Additional subadult *in situ* burials were recovered from the surface of the ossuary and the surrounding area. The bioarchaeological analysis brought together data derived from archaeology, history and anthropology, in order to shed more light on subadult mortality patterns in Tenerife

during the 17th-19th centuries AD. Anthropological analysis included the estimation of the minimum number of individuals, estimation of age at death, and growth profiles. In addition, a thorough paleopathological investigation focused on the prevalence of stress indicators (i.e., metabolic disorders, infections, dental enamel hypoplasias, etc). The sample offered a unique opportunity to investigate in detail aspects inherent to the study of subadult remains, such as taphonomy, mortality and growth patterns, pathological conditions, cultural beliefs and practices (i.e., infanticide) that influence mortuary treatment of children and their role within the society during the era in question.

SCURVY IN THE OLD AND NEW WORLDS: AN IMPORTANT TOOL FOR SOCIAL, ECONOMIC AND CULTURAL INTERPRETATION. Megan Brickley and Rachel Ives

In the past, discussion relating to scurvy in archaeological skeletal material (including some by Brickley) has tended to equate scurvy with extreme conditions such as war, famine, or long sea voyages. However, more recent work on skeletal manifestations of infantile scurvy suggests that far less severe socio-cultural and socio-economic factors may have caused many cases of scurvy in the past. In particular, the work of Ortner and his co-workers has moved away from the more severe skeletal changes often seen in pathology museum specimens, and which tends to be the focus of clinical work, towards identification of less severe skeletal changes. Building on this research, recent work by Brickley & Ives identified a number of porous and proliferate bone lesions that are almost certainly associated with less severe cases of infantile scurvy. Importantly, diagnoses were suggested without the presence of the wings of the sphenoid, which are often missing in archaeological specimens. As more cases of scurvy are identified in archaeological human bone from both sides of the Atlantic, it is likely that an understanding of the expression and prevalence of scurvy will enable researchers to provide information on a far wider range of past experiences than events such as wars, sieges, and sea voyages. Conditions such as scurvy have the potential to provide information on changes in diet, agricultural practice, and access of different socio-economic groups to food and resources.

DIET AND POISONING OF THE DOS CABEZAS GIANTS, PERU: A CRITICAL REVIEW. Vaughn M. Bryant Jr. and Karl J. Reinhard

The published pollen analysis of the Dos Cabezas Giants lists a variety of purported dietary pollen types. The paper also hypothesizes that the Giants were poisoned with plant toxins. We have severe reservations about the pollen evidence of diet and poisoning. We suggest that the analysts made several errors in their interpretation. First, some of the discovered pollen types are not endemic to the Dos Cabezas region of coastal Peru. These include the pollen of fava beans (cultivated in the Old World), and specified species of agave and sage. We believe that some or all of the identifications of pollen from arracacha, maca, yuca, oca, potato, peanut, ciruela, and tarwi are in error based on the distance they grow from Dos Cabezas and their ecological/pollination requirements. We think that it is unlikely that the Giants were poisoned because the poisons made from these plants are not made from the flowers and the poisonous plants grow on the opposite side of the Andes from Dos Cabezas. We present an alternative dietary interpretation of the Dos Cabezas Giants and suggest methods by which our interpretations and the published interpretations could be tested. Until pollen data are interpreted in ecological context, the integration of palynology in paleopathology will be flawed.

TUBERCULOSIS IN THE ANCIENT AMERICAS. Jane E. Buikstra

As recently as 1988, tuberculosis was described as a “conquered disease”. Yet today it is the most common of mycobacterial afflictions, causing over 5,000 deaths daily. Predictions are that it will become one of the top five causes of death by 2020. The evolutionary history of tuberculosis remains obscure, however, especially in the Western Hemisphere. Understanding this history can aid our understanding of the present affliction and help in predicting our co-evolutionary future with this persistent pathogen. Nearly a century of scholarly debate has centered upon the evolutionary history of tuberculosis in the Americas. Theoretical arguments about host-parasite relationships have been used to argue against *M. tuberculosis* in the ancient New World, yet an abundance of lesions from skeletal and desiccated human remains provide compelling empirical evidence for believing otherwise. Recent applications of PCR technology as a test for the presence of *M. tuberculosis* complex genes have isolated insertion sequence IS6110 in South American and North American examples, thus identifying the pathogen responsible for disease in Western Hemisphere humans for over a millennium prior to the Columbian encounter. This presentation will briefly review the spatial and temporal distribution of skeletal lesions attributable to tuberculosis in the pre-contact New World. Key unresolved issues concerning origin and

relationship to Old World tuberculosis will be explored. Recent molecular evidence concerning phylogeny and species identification is considered in relationship to these issues.

X-RAY FLUORESCENCE APPLICATIONS IN ARCHAEOLOGICAL MATERIAL ANALYSIS.

Cristiane Calza, Jurema Godoy, Marcelino José dos Anjos, Sheila M.F. Mendonça de Souza, Tania Andrade Lima, Antonio Brancaglioni Junior, and Ricardo Tadeu Lopes

X-Ray Fluorescence analysis is a widely used spectroscopic technique in archaeometry to investigate the composition of pigments (in manuscripts, paintings), metal alloys, ceramics and others. It is a non-destructive technique to make possible qualitative and quantitative multielemental analysis with a precision close to 5%. This work reports three applications of XRF in archaeometry performed at the Nuclear Instrumentation Laboratory (LIN). In the first case, it was analyzed a fossilized skull cap # 2296 from Lagoa Santa, using the EDXRF technique. It was concluded that the cap was a forgery, set up with various pieces from different origins. In the second, were analyzed some fragments of coffin cartonage from the mummy # 158 and a linen wrapping fragment, using μ XRF. This female mummy is considered the most rare piece of the Egyptian Collection from the National Museum, because it was embalmed with arms and legs swaddled separately. It was verified that linen wrapping and all cartonage fragments presented the same provenance. Further, the possible pigments used in each color are according to those used in Ancient Egypt, during the Roman Period. The last case involves the study performed with decorated pottery pubic covers from the Marajoara culture using EDXRF. It was verified that all samples analyzed presented the same provenance; despite of a fragment with different design patterns.

PATTERN OF TRAUMATIC LESIONS IN A 20TH CENTURY PORTUGUESE POPULATION.

PRELIMINARY RESULTS. Francisca Alves Cardoso and Charlotte Roberts

This study focuses on a sample of 303 skeletons from the Luis Lopes Skeletal Collection (L.L.S.C.), curated at the Museum Bocage of Lisbon University (Lisbon). This skeletal collection consists of individuals living in Lisbon during the 20th century. A total of 151 males and 153 females were examined; only results concerning long bones and clavicles are presented here. Traumatic lesions were recorded in 7.9% (24/303) of the sample. The lesions were mostly found in individuals whose age at death was over 71. The majority of the individuals exhibiting evidence of traumatic episodes were males (16/24). The lower limbs account for more than half of the lesions recorded (femurs, tibiae and fibulae). All the traumatic lesions analyzed were most probably the result of accidental injuries. There are cases of very well-healed fractures, which probably indicate medical/surgical treatment, as well as unhealed fractures. Differential treatment may have been given to individuals. In the cases in older individuals, femoral neck fractures may be related to osteoporosis.

ENAMEL HYPOPLASIA IN A COASTAL PREHISTORIC POPULATION, RIO DE JANEIRO,

BRAZIL. Flávia de Carvalho, C.M. Cerqueira and Claudia Rodrigues-Carvalho

The goal of this study is to analyze enamel hypoplasias in a skeletal series recovered at Sambaqui Zé Espinho (Guaratiba, Rio de Janeiro, Brazil) for comparison with available data from other skeletal series recovered in Brazilian shellmounds. This study may contribute important information on patterns of childhood stress in those prehistoric populations. We analyzed upper and lower incisors and canine teeth, deciduous and permanent, from individuals of all ages and both sexes. Each tooth was visually divided in three sections: cervical, middle and occlusal. The results point to a high prevalence of hypoplastic defects in the population, with 85% of individuals presenting at least one hypoplastic line or pitting. Most of the enamel hypoplasias occurred at 5 years old and the results suggest a pattern of repeated stress episodes during childhood.

TREPONEMAL DISEASE IN PREHISPANIC POPULATIONS OF CHILE.

Mario Castro, Aryel Pacheco, Ivo Kuzmanic, and Eugenio Aspíllaga

In Chile, probable cases of treponemal diseases have been described in Prehispanic populations of the northernmost part of the country and in historic native groups of the south. Arriaza & Standen (2000) identified a significantly higher incidence of yaws in archaic coastal populations of Arica than in agricultural groups from the valleys. This paper examines the evidence for treponemal disease in Chilean prehistoric populations with special consideration of a new case found in the region of Antofagasta dated around 400 – 1000 AD, which appears to show a different pattern from the one observed in the other paleopathological cases. The paleoepidemiological implications of this finding are discussed as well as the criteria used for its diagnosis.

PATHOLOGIES IN ANCIENT INHABITANTS OF SOUTHERN ITALY. Marilena Cipollaro, Giovanni di Bernardo, Stefania del Gaudio, Alessandro Lanza, Nicola Cirillo, Luigi Guida, and Antonino Cascino

This research is focused on the study of ancient DNA extracted from human skeletal remains buried at Pompeii and other archeological sites in Southern Italy. Analysis of ancient mtDNA from Pompeii focused on detailed documentation of the thirteen skeletons buried in 79 AD in the house of Caius Iulius Polybius, a very large and well-preserved house located in the "Via dell'Abbondanza". Among them were two individuals with "spina bifida" and mtDNA analysis confirmed their supposed familiar relationships. Analysis of 16S rDNA made possible the identification of aDNA from bacteria causing periodontal disease in human skulls found in ancient Caudium (modern Montesarchio), an archeological site in Southern Italy. This information will enable us to understand the role of bacteria in provoking dental pathology in the past and allow us to infer information about the food habits of the inhabitants of Caudium. We designed primers to amplify 150 b.p. DNA fragments, appropriate for bacteria involved in periodontal disease such as *Prevotella intermedia*, *Treponema denticola*, *Bacteroides forsythus*, *Eikenella corrodens*, and *Porphyromonas gingivalis*.

THE EVALUATION OF QUANTITATIVE SHIFTS IN PREHISTORIC INFECTION RATES. Mark Nathan Cohen

New data from analyses of prehistoric burial series presented at a conference in 2004 (to be published as *Ancient Health*, University Press of Florida 2006) provide mixed information on many pathology trends in prehistory. However, the papers uniformly report an increase in levels of general infection (or at least periostitis) and a concentration of identifiable diseases (TB, syphilis/yaws, and leprosy) in later periods. A rebuttal to the Osteological Paradox reinforcing the reality of the prehistoric trend is presented.

GENETIC ANEMIA AMONG THE MAYA? Della Collins Cook and Mark Nathan Cohen

Pictured is the cranium of a 12 years old unsexed individual from the 16th century Tipu Spanish *visita* mission among the Maya of Belize, excavated in 1985. The cranium was photographed during cleaning as soon as it became evident that the extraordinary cranial shape was biologically determined rather than an artifact of burial and mud. Note the extraordinary thickness of the top, but not the sides, of the cranial vault. When cleaned, the separated section of cranium displays the classic hair-on-end appearance to a thickness of two cm or more, with inner but no outer table and a very irregular outer surface. Some cribra orbitalia is visible in the fragmentary eye sockets. Some mild periostitis on preserved long bone diaphyses and some mild LEH are evident. The cranium has variously been diagnosed as sickle-cell anemia and thalassemia but the burial is of the standard style, and is well integrated among burials in the cemetery. If the individual were from the Old World we would have to assume that a homozygote individual had accompanied the explorers. Moreover, the individual has shovel-shaped incisors whose association with the skull cannot be disputed. This makes such diagnoses of diseases, then confined to the Old World, extremely problematical. Discussion and suggestions are encouraged.

TREPONEMATOSIS IN THE NEW WORLD: WHY LESS IS MORE IN THE TROPICS. Della Collins Cook

There is extensive evidence for a yaws-like disease in pre-Columbian skeletal remains from many localities in the Americas. The natural history of the most attenuated forms of treponemal infection in the New World tropics suggests that this group of diseases originated in the Americas. The ubiquity of pinta, *carate*, and even less pathogenic forms limited to skin infection may explain the relative paucity of skeletal evidence for treponematoses in Mesoamerica and Lowland South America.

CURATED CORPSES AND SCATTERED SKELETONS: RECENT TAPHONOMIC STUDIES OF THE MOCHE DEAD. Alana Cordy-Collins

"The dead are difficult subjects. What is most remarkable about them is their constancy. They will be dead *in just this way* a thousand years from now [emphasis mine]." (Cunningham 1990: 251-252). One doubts that novelist Michael Cunningham had the Moche in mind when he wrote the above lines. Previous research has proposed that some Moche individuals were 'dead' in at least two ways (Nelson 1998; Verano 1997). These Moche were curated in locales that may never have been intended as permanent resting-places. These deceased remained in their initial repositories only long enough for the elements to desiccate their bodies, after which they were wholly or partially disinterred to be deposited in the tombs of the newly and important dead. Recent taphonomic studies

indicate that some individuals were 'dead' in three or more ways, apparently by being repeatedly *recurred*: curated, interred, *disinterred*, and then *reinterred*. Such practice hitherto has been undocumented, and requires a reassessment of what we thought we knew about ancient Peruvian burial rituals and ancestor worship.

LEISHMANIASIS IN THE OASES OF SAN PEDRO DE ATACAMA, NORTH OF CHILE. Maria Antonietta Costa, Carney Matheson, Lucia Iachetta, and Otto Appenzeller

Leishmaniasis is a pathological condition caused by a protozoan species of the genus *Leishmania*, transmitted by insect species such as *Lutzomyia braziliensis* and *L. peruviana*. It is a tropical illness endemic to Central and South America (excepting Chile), producing destructive lesions in the mouth and nose many years after the person has been infected. Five female skulls from the archaeological burial site of Coyo Oriente evidenced extensive lesions in the mouth and orbits, suggesting the occurrence of leishmaniasis. Two of the samples that were analyzed allowed the successful extraction and amplification of *Leishmania* DNA. These analyses were conducted under proper laboratory conditions so the possibility of modern contamination is excluded. The sequence does not coincide with *L. Donovanii* and research to identify the species continues. The establishment of human communities in different ecological backgrounds is well established archaeologically for the South Central Andean area, but questions remain about the implications for health. The incidence of leishmaniasis in this region, and the fact that it only has shown up in females, suggests that exchanges between groups might not only have involved objects but also people (through marriage?). This would contribute to a greater understanding of the interaction between San Pedro de Atacama communities and their neighbors.

THE VALUE OF PALEOPATHOLOGY TO FORENSIC ANTHROPOLOGY. Eugénia Cunha

Forensic identification and definition of the cause of death are the main aims of forensic anthropology (FA). Paleopathology can contribute significantly to those objectives. Concerning individual identification, it is well known that in many cases, biological identity is not enough to achieve positive identification and bone lesions may be unique skeletal features that distinguish one person from another. Yet bone lesions are very homogeneous in their manifestation, early phases of certain diseases may be barely detectable, and the diagnosis of pathology is not simple. Differential diagnosis is mandatory, and we argue that considerable experience in the interpretation of dry bone lesions is essential. In this respect, paleopathologists have an advantage since they deal with skeletal remains in their work. But to connect accurately the alterations observed on bare bones with disorders of the living is another complex step in the forensic anthropological analysis. We discuss the pitfalls of those tasks through some case examples. The main role of the forensic anthropologist is to differentiate among ante-mortem, peri-mortem, and post-mortem injuries, and the experience acquired from hundreds of cases from past populations can be very helpful for identification of taphonomic alterations. One of the foremost conclusions is that FA is multidisciplinary: paleopathological expertise is essential but it should always be combined with forensic experience.

A CASE OF OS ODONTOIDEUM IN THE PALEOPATHOLOGICAL RECORD. Francisco Curate

Os odontoideum is an uncommon abnormality of the second cervical vertebra, the aetiology of which is contentious. Whether congenital or acquired, the condition often results in atlantoaxial instability and subsequently compression of cervical cord or vertebrobasilar vessels. The bioarchaeological study of a medieval sample from the Christian Necropolis of Cacela Velha (Algarve, South of Portugal) provided the opportunity to describe one of the first cases of this rare anomaly ever reported in the paleopathological record.

THE IMPACT OF SPANISH COLONIZATION: PALEOPATHOLOGICAL EVIDENCES OF ORAL HEALTH AND DIET IN NATIVE COLONIAL SOCIETIES FROM THE COLOMBIAN SOUTH WEST.

Miguel Eduardo Delgado-Burbano

American Native Societies suffered a deep deterioration of health under European colonization. Health, diet diversity, and nutritional quality decreased as workloads increased considerably. Social, cultural and biological consequences of such contact and interaction have been well documented by archaeology, history and ethno-history. This paper reviews the biological impact of the European arrival on native societies through the study of human remains from the post-contact period in the Colombian South West. The post-contact skeletal series correspond to two Native Colonial communities, the first from "El Tambo Alto del Rey" (c 1200-1600 a.C), Cauca Department, and the second from "Maridías" (1615-1720 a.C), Nariño Department. Dental indicators of physiological stress and stable isotopes suggest deep changes in health, nutrition, and lifestyle. Bioarchaeological analysis considers the increase of caries, dental calculus, periodontal disease, antemortem tooth loss, enamel

hypoplasia and abrupt increase in the consumption of carbohydrates and C4 plants as corn, compared with pre-contact groups. Changes were more considerable in Maridías than in El Tambo, since the former were exposed to a longer and more direct colonial contact. Bioarchaeological analysis of human remains provides here important advantages, compared with other types of analyses, since it shows the biological impact on Native people who had contact with Europeans. This is an important source for understanding the dynamics of biocultural change resulting from colonization in Colombia.

PATHOGENESIS OF APICAL PERIODONTAL CYSTS: DIAGNOSIS IN PALEOPATHOLOGY AND THEIR MANAGEMENT IN EARLY 20TH CENTURY. George J. Dias and Ana Luísa Santos

Apical periodontal cysts are benign lesions developing in relation to the apices of non-vital teeth due to inflammatory response from the infective pulp. The cysts are epithelium lined bony cavities containing fluid. Despite being well known in medical/dental literature, this frequent condition is poorly diagnosed and documented in archaeological publications. Three identified skulls from the International Exchange Collection, housed in the Museu Antropológico at the University of Coimbra, illustrate the progression of this condition from a small periapical granuloma to a large apical periodontal cyst with expansion of bone. These skulls were examined with the naked eye under good lighting conditions and the lesions were measured using a caliper and a curved probe. The pathogenesis of this condition is described together with its surgical management in the early 20th century, i.e., during the lifetime of the individuals in the Collection. The prevalence of apical periodontal lesions in archaeological populations remains unknown since the diagnosis of these cysts has previously been made primarily with regard to large lesions. In order to avoid the confusion resulting from different terminologies, the terms 'periapical granuloma' for lesions smaller than 3mm and 'apical periodontal cyst' for larger lesions are recommended. A lower frequency of these advanced stages could be the reason for the relatively small number of cysts described in the paleopathological studies.

FACET TROPISM AND THE RELATIONSHIP TO LUMBAR SPINE DEGENERATIVE LESIONS. INVESTIGATION ON SKELETAL REMAINS OF THE FURNA-DO-ESTRAGO POPULATION, PERNAMBUCO STATE, BRAZIL. Adilson Dias Salles, Sheila M.F. Mendonça de Souza, R.A Araújo, D.J.A Alexandre, and Adriana S.M Teixeira

Previous studies on human skeletal remains exhumed from the archeological site named Furna do Estrago, Pernambuco State, Brazil (2000 years b.p.) showed a high incidence of degenerative lesions of the lumbar vertebrae. These lesions were related to economic activities and affected both vertebral body and (zygo)apophyseal facets. The existence of asymmetries between the right and left inclination angles of the apophyseal facets, named facet tropism, has been frequently associated with such lesions. Facet tropism could be involved with alterations in the mechanical load distribution along the lumbar spine and thus promote an overloading on vertebral body and/or apophyseal facets. Seventy-seven lumbar vertebrae of 17 adult individuals (male=9; female=8) were examined. The horizontal inclination angles of the superior right and left apophyseal facets were measured using an osteometric board and a transferrer (precision=0,1°). Facet tropism was defined as a difference between right and left angles equal to or superior to 7° (Grobler et al., 1993). Description and localization of lumbar degenerative lesions in these specimens were obtained from Mendonça-de-Souza (1992). Relationships between apophyseal facet asymmetries and degenerative lesions, at each level of the lumbar spine, were investigated to define a possible role of facet tropism in the chronic-degenerative lumbar vertebral lesions. The influence of the sex in this association was also examined.

MUSCULOSKELETAL STRESS MARKERS ON SKELETAL REMAINS OF CABEÇUDA SHELLMOUND POPULATION, LAGUNA, SANTA CATARINA, BRAZIL: A BIOCULTURAL APPROACH. Adilson Dias Salles, Adriana S.M Teixeira, R.A Araújo, and D.J.A. Alexandre

Analysing cortical bone hypertrophy on muscle attachment sites - Musculoskeletal Stress Markers (MSM) - as a direct response to the magnitude of applied loads, it was possible to discuss proposed daily tasks for a fisher/hunter/collector group which inhabited the Cabeçuda Shellmound, Laguna, south coast of Santa Catarina State, Brazil, about 4120±220 years b.p. The attachment sites of seven muscles (deltoid, lateral epicondylans, biceps brachii, triceps brachii, brachialis, pronator quadratus and supinator) which attach to the humerus, radius, and ulna were examined bilaterally in 28 adult individuals (16 male and 12 female). All the MSM were visually scored as 0 (no alterations), 1 (moderate hypertrophy), or 2 (severe hypertrophy), according to the magnitude of the mechanical stress. Asymmetries in MSM scores between right and left sides in both sexes allowed us to investigate several patterns of tasks which involve both upper limbs, although accomplishing different

movements. The results of MSM scores analysis, taken together and isolated for specific muscles, were related to the basic upper limb movements of tasks attributed to men and women in this population, such as throwing spears, archery, swimming, rowing, preparation of food, ornaments, and skins, and the construction of the shellmound. Comparisons were made with similar activities of athletes and other ancient human groups.

MOLECULAR CHARACTERIZATION OF *TRYPANOSOMA CRUZI* IN BRAZIL AND TEXAS.

Katharina Dittmar, Ana Maria Jansen, Sheila M.F. Mendonca de Souza, Luiz Fernando Ferreireira, Karl J. Reinhard, M. Whiting, and Aduino Araújo

The partially mummified burial of a 35-40 year old male was recovered from the rock shelter Lapa do Boquete in the Peruaçu River Valley of Minas Gerais. A large mass of accumulated feces was found in the pelvic girdle, consistent with Chagas' disease-induced megacolon. The mass contained manioc, beans, and fish. Hookworm and *Echinostoma* parasite eggs were found. DNA was extracted from muscle tissues to search for the disease-causing pathogen. Multiple polymerase chain reactions (5) targeting two different pathogen genes- 18S rDNA (126bp and 159 bp) and 12S rDNA (148 bp) were conducted. All extractions (5) yielded an amplification product in all PCRs. The cloning of the amplicons, and subsequent sequencing of the inserts (10 clones per PCR) resulted in no sequence diversity between cloned inserts. BLAST searches in GenBank (Altschul et al., 1997) revealed high sequence similarity (98%) to respective *T. cruzi* 18S and 12S rDNA sequences in the database. Phylogenetic analysis using the MCMC approach with the TVM+G model of sequence evolution of the 18S rDNA placed the Lapa do Boquete sequence within a *T. cruzi* II cluster composed of strains of Brazilian origin. Our results confirmed that the individual was infected by *T. cruzi*, and with high probability the strain can be classified as *T. cruzi* IIe.

THE TOOTHLESS WOMAN OF CHOQUEQUIRAU. Rose Drew

One adult female from a collection of 11 burials found in a single cave had lost or had removed all of her teeth. 68 human teeth were collected from her burial area. 47 of these retain the roots, have slight or no wear, and are drilled with 1 mm holes. 24 are deciduous, 23 are permanent. Her alveoli are completely healed; her dentition was lost or removed several years pre-mortem. Choque Quirau is described as "the site of the famous Apurímac oracle". Choquequirao is listed as an "Inca site near the Apurímac [River]. The name means 'cradle of gold' in Quechua." It has been termed a major settlement, and "a sister-site to Machu Picchu." In Peru, oral histories describe traditional Indians curating teeth lost to decay or injury, wearing them on a leather string; researchers describe necklaces of teeth lost to decay, or acquired in battle. The drilled teeth found with this adult female have no evidence of disease, attrition, or unusual wear. Most individuals in this cave are adult males. This female's remains reflect mild physical activity, and inadequate diet. Anemia, scurvy, or treponemal infections are not indicated. There are no signs of skeletal trauma or partially healed fractures. Was her status as wife, servant, or relative? Although Peruvian Highlanders would string teeth lost to decay, the apparent removal of healthy teeth is uncommon. I welcome input from specialists familiar with Andean mortuary practices, cultural habits regarding deliberate tooth extraction, and rare dental disease.

STUDY OF ACUTE TRAUMA IN TENETEHARA-GUAJAJARA INDIANS. Angélica Estanek and Andrea Lessa

Paleopathology seeks to reconstruct some aspects of the history of past populations through study of the conditions of life and health interpreted from their remains. The present work focused on signs of acute trauma, caused by violence, accidents, labor, etc, in skeletal remains of the Indian population called Guajajara, who inhabit Maranhão. This population, also known as the Tenetehara, is one of the biggest in Brazil, estimated in 2000 to be 13,100 individuals. Their contact with Europeans is not recent, reaching back to the 17th century. In this study, 21 Tenetehara-Guajajara individuals from the Indian villages of Camirang and Januária in Maranhão state were analyzed; they are part of the Federal University of Rio de Janeiro's National Museum (Museu Nacional da Universidade Federal do Rio de Janeiro) collection. Macroscopic and radiological analyses were conducted to seek evidence of acute traumatic bone injuries: signs of bone neoformation, absence, and/or destruction, and of variants in anatomical structures of texture, shape, and/or size. As a result, we have confirmed our expected model of the Guajararas as a peaceful people. Traumatic injuries were found in only five individuals, and of these, only one showed signs that suggested violence. The remaining injuries observed probably resulted from ordinary activities such as the collection of copaíba, babaçu and jenipapo seeds, with associated accidents related to the height of these trees which may be up to ten meters tall.

ANTHROPOLOGICAL SKELETAL COLLECTION OF THE MUSEU DE CIÊNCIAS NATURAIS, FUNDAÇÃO ZOOBOTÂNICA, RIO GRANDE DO SUL STATE, BRAZIL. Jorge Ferigolo and Maria da Glória Demamann

This collection, the only recent skeletal series in Brazil for reference studies, includes 86 complete or almost complete identified individuals who died during the 1960s-1980s with data on age at death, sex, *causae mortis*, birth place, and profession. An additional 55 individuals are represented by nearly complete skeletons, skull or spine segments, or isolated (pathological) bones. The collection was made between 1985 and 1992. The majority are adult skeletons, 51 masculine (neonate to 90 years old), and 35 feminine (between 10 and 94 years old). For some specimens there are also hospital records (diagnosis, laboratory treatment). Until now the most frequent signs of pathology observed are intervertebral osteochondrosis, arthrosis, osteoporosis, fractures, and signs of advanced aging; and in the teeth: periodontal disease, caries, attrition (including pulp chamber exposure), and periapical lesions. Signs of metabolic/nutritional diseases, anomalies, osteomyelitis, autoimmune diseases, surgeries, tumors and enamel hypoplasia are relatively rare findings. For other diseases such as anemia there is no data to date.

TRIASSIC ORNITHISCHIA PATHOLOGY FROM RIO GRANDE DO SUL STATE, BRAZIL. Jorge Ferigolo, Max C. Langer, and Francisco Ricardo Negri

Triassic Ornithischia were until now represented almost entirely by fragmentary, isolated bones and teeth from Argentina, Morocco, and North America. However, a new taxon, from a new outcrop of the Caturrita Formation (Late Triassic) was collected by the staff of the Museu de Ciências Naturais during the last few years. Most of the outcrop specimens, many hundred isolated bones and teeth, including mandible and skull bones, represent this dinosaur. Other specimens include a few isolated teeth of very derived cynodonts and one unique small tooth of a probable Saurischia. This new Ornithischia material will permit inference of some paleoecological relationships with their predators on the basis of the observed pathologies. Several of the femora show one to five (MCN-PV 10014) rounded, depressed fractures (anterior surface, distal third), the larger ones with ~10mm, without any evidence of healing. However, one specimen (MCN-PV 10098) shows anteriorly at the proximal extremity two small, rounded depressions of different size (from two different-sized teeth) with radiating line fractures and posteriorly an irregular callus indicating a certain degree of recovery. Such fractures were caused by predator teeth, most probably a basal Saurischia. However, as is evident from specimen MCN-PV 10098, such interactions did not always result in death.

CHRONIC OSTEOMYELITIS AND INFECTIOUS ARTHRITIS IN A GROUND SLOTH (MAMMALIA, MYLODONTIDAE) FROM UPPER PLEISTOCENE OF RIO GRANDE DO SUL STATE, BRAZIL. Jorge Ferigolo, Francisco Ricardo Negri, Francisco Sekiguchi Buchmann

During vertebrate evolution, osteomyelitis probably was as common as it is today; however, in ancient specimens, osteolysis, osteoporosis, and diagenetic factors all contribute to bone destruction. This specimen (distal right tibia; MCN-PV 2565) from Sta. Vitória do Palmar Municipality presents an unusual degree of preservation due to the large size of the bone and to its permineralization. The pathological findings include small and large (5cm) lytic areas, cortical thickening, osteoporosis, enlarged vascular foramina, and fractures. The astragalar surface presents six fistulae into the joint cavity and is very irregular due to superficial erosions, some extending into the subcortical trabecular bone. Osteophytosis and sequestra were not preserved. Although the signs could indicate pyogenic osteomyelitis, the fistulae strongly suggest a mycobacterial infection, which seems to be corroborated by the marginal erosions, (inferred) slow progression, and the absence of ankylosis. Pyogenic arthritis following osteomyelitis is not typical; when present it spreads through blood vessels, not directly through fistulae as do mycobacterial infections (hematogenous spread to bones from lung infection). Mycobacterial infections were possibly introduced by North-American immigrants into South America during Pleistocene times. The extensive lesions permit us to suggest that escaping predators was very difficult. It is not possible to exclude for this animal a hematogenous spread of pathogens and septicemia leading to death.

THE NATURAL HISTORY OF CHAGAS' DISEASE AS TOLD BY THE PRESENCE OF *TRYPANOSOMA CRUZI* DNA IN ARCHAEOLOGICAL MATERIAL. Alexandre Fernandes, Ana Carolina Paulo Vicente, Adauto Araújo, Ana Maria Jansen, and Luiz Fernando Ferreira.

One interesting aspect of *Trypanosoma cruzi* is the huge genetic heterogeneity of the taxon. Two main lineages or genotypes are recognized in the taxon, TCI and TCII. The association of these genotypes to habitats and hosts is

under debate regarding the origin and dispersion of the human disease. An Andean origin of the human infection has been proposed. In this scenario, as a consequence of human acquisition of sedentary habits, *Trypanosoma infestans* and small wild mammals turned synanthropic. This is hypothesized to have enabled the inclusion of humans in the *T. cruzi* transmission cycle. In Brazil the human disease is supposed to be a consequence of *T. infestans* domiciliation in the mud covered houses very typical after European colonization. These aspects still need to be proven. Here our main purpose was to detect aDNA of *T. cruzi* in human remains, mostly bones, from the pre-colonization period. We standardized a PCR on experimentally desiccated bones derived from rats experimentally infected with *T. cruzi*. We are starting to examine bones of humans derived from an archaeological site highly endemic for Chagas' disease, with a series of five successive burials ranging from 7,000 to 600 BP. Our data should shed light on Chagas' disease in Brazil before European colonization.

HEALTH AND DISEASE OF NATIVE HUMAN POPULATIONS IN AUSTRAL PATAGONIA: FIRST STEPS, RESULTS AND PERSPECTIVES. Martín Horacio Fugassa, J.A Suby, Ricardo Anibal Guichón, and Conrado Rodríguez-Martín

The health and disease of hunter-gatherer populations in the austral extremity of South American has been barely studied in pre and post native - European contact periods. Its exploration requires an interdisciplinary collaboration, which must include data from archaeology, anthropology, biology and history. The aim of this communication is to present the first steps of the collaboration between specialists in these areas. At the outset, we were interested in investigating which diseases may have been associated with hunter-gatherer populations in high latitude environments, as well as the diseases that were prevalent in the contact process in Tierra del Fuego. Additionally, we analyze the epidemiology of direct and indirect contact from a historical-biological point of view. We have begun paleoparasitological analysis of coprolites from archaeological sites, and of sediments associated to the archaeological human record. Since the human bone assemblages are of key-importance to our studies, we have started to examine skeletal series in several museums and excavations and to assess human bones from archaeological sites of pre and post contact periods. We are exploring the relationships between survivorship frequencies and intrinsic bone properties throughout time and geographical parameters. In this communication we present our preliminary results and discuss further investigative strategies.

FIRST PALEOPARASITOLOGICAL RECORD OF ANOPLOCEPHALID CESTODES IN PATAGONIA AUSTRAL. Martín Horacio Fugassa, G.M Denegri, N.H Sardella, Ricardo .Anibal Guichón, P.A Martinez, and Aauto Araújo

We examined organic remains identified as fox (*Pseudalopex* sp.) coprolites, dated to 6540±110 years, collected in the National Park Perito Moreno, Santa Cruz, Argentina. Paleoparasitological analysis was performed following standard procedures. Coprolite fragments were rehydrated in a trissodium phosphate aqueous solution and submitted to spontaneous sedimentation for microscope analysis. Eggs identified as those of a Eucestode (Anoplocephalidae), presumably *Moniezia* sp., were found. This is the first record of Anoplocephalide eggs in archaeological material.

PALEOPARASITOLOGICAL ANALYSIS OF A HUMAN COPROLITE DATED 7880±150 YEARS BP FROM AUSTRAL PATAGONIA. Martín Horacio Fugassa and Aauto Araújo

We present the first results of the paleoparasitological analysis of a human coprolite collected in the archaeological site of Cerro Casa de Piedra 7 (CCP7), Santa Cruz, Argentina. The archaeological layer was dated at 7880 ±150 years BP. Surface and interior fragments of the coprolite were extracted, rehydrated in trisodium-phosphate, and processed by spontaneous sedimentation. Forty slides of each fragment were analyzed. *Hymenolepis* sp. and *Ancylostoma* sp. eggs were identified. Coccidian oocysts were also present. This is the oldest confirmed example of those parasites in South America.

RITUAL CONTINUITY IN BURIAL AND SACRIFICE ON THE NORTHERN PERUVIAN COAST. Catherine Gaither, Jonathan Kent, Victor Vasquez, and Teresa Rosales

Investigations at several northern Peruvian coastal archaeological sites by archaeologists and physical anthropologists are beginning to provide details on long-term patterning of mortuary behavior. Some of these patterns include retainer sacrifice, child sacrifice, and the principle we refer to as "like with like". In this paper, we discuss the data relating to these patterns discovered during the last two field seasons in the Moche component

of the site of Santa Rita B in the middle Chao Valley. These finds are compared to other north coastal sites, both earlier and later, and the extent of continuity spanning the time between Moche and Inca is discussed.

PRESENCE OF AURICULAR EXOSTOSES IN INDIVIDUALS OF THE TAPERA ARCHEOLOGICAL SITE (SAMBAQUI MAN MUSEUM). Luiz Roberto Godolfim

This poster presents an analysis of auricular exostoses in individuals of the Tapera archeological site (Sambaqui – Shell mound - Man Museum). Auricular exostoses appear as bone growths inside the external acoustic meatus. They have been interpreted by a number of researchers as lesions caused by constant trauma, often associated with chronic hypothermia, as they are more frequent in individuals with prolonged exposure to cold water in professionals involved in marine activities, such as surfers, scuba divers and lifeguards. The size of the bony growth has been described as proportional to time exposure to cold water, being more severe in individuals with longer time exposure. Auricular exostoses were observed in 23 of 70 crania examined (9 females 14 males). In ancient peoples, this condition has been attributed to economic activities, more frequent in maritime peoples with subsistence based on fishing and shellfish collecting.

AGENESIS OF THE THIRD MOLAR IN PRE-HISTORIC BRAZILIANS. Luiz Roberto Godolfim

This study is part of ongoing research by the author on the skulls of pre-historic Brazilians at the Sambaqui Man Museum. The skulls range in date from 2550 BC to 1100 AD and were found in six archeological sites along the Santa Catarina seashore. The motivation for this study stems from the observation of missing third molars (3M) in a number of skulls. 3M agenesis was observed macroscopically and radiographically confirmed in 20.93% of the 86 skulls with upper and lower jaws. In assessing variation in the number of missing teeth, it was noted that double absences (9 individuals) were most common, followed by single agenesis (6 individuals). Triple agenesis was less frequent (2 individuals) while only one individual presents quadruple agenesis. The literature on the subject offers diverse explanations of likely causes for such agenesis. Some authors have mentioned an evolutionary trend to account for the disappearance of these teeth, based on the reduction of masticatory stimulation in modern man, but a number of studies agree that agenesis is a genetic inheritance anomaly.

PRIMARY AND SECONDARY STRUCTURE OF SPLICING LEADER SL1 RNA GENE (SL1 RNA) FROM *ENTEROBIUS VERMICULARIS* RETRIEVED FROM AMERINDIAN COPROLITES. Alena M. Iñiguez, Karl J. Reinhard, Adauto Araújo, Luiz Fernando Ferreira, and Ana Carolina P. Vicente

As evidenced by microscopic findings of parasite eggs in coprolites from latrines and mummies, *Enterobius vermicularis* was an ancient parasite in the Americas, Europe, and Egypt. Aiming to study *Enterobius vermicularis* infection in pre-Columbian Native American populations, ancient DNA (aDNA) was recovered from 27 coprolites from North American and Chilean archaeological sites. Reported here are *E. vermicularis* 5S ribosomal RNA (5S rRNA) spacer region sequences retrieved from 9 human coprolites. The analysis of ancient and contemporary *E. vermicularis* sequences from North and South American samples revealed the presence of motives corresponding to SL1 RNA sequence, spliced donor site, and the *Sm* antigen site that characterize the splicing leader (SL1) RNA gene. We inferred the secondary structure of SL1 RNA gene from *E. vermicularis* ancient sequences, which has a functional role in *trans*-splicing process in other nematodes. Here we show that *E. vermicularis* aDNA sequences retrieved from archaeological remains supply reliable genetic information to perform studies on primary and secondary gene structures.

THE NATURAL HISTORY OF THE TRANSMISSION OF *TRYPANOSOMA CRUZI* AND *TRYPANOSOMA EVANSI* IS A STILL UNSOLVED PUZZLE. Ana Maria Jansen

Molecular tools offer a singular opportunity to unravel the phylogeography of Trypanosomatids of mammals, a 100-year-old debate. Here we present the main questions concerning *Trypanosoma cruzi* and *T. evansi* (Kinetoplastida, Trypanosomatidae). The etiological agent of Chagas' disease is a multihost parasite that circulates in the wild among hundreds of mammalian and dozens of Triatomid species in complex transmission cycles that may or not overlap. Several subpopulations of this extremely heterogeneous taxon have been recently grouped in two main genotypes. Their origin and dispersion are still not clear, nor is the distribution of these lineages among the wild mammal hosts. The factors that determine the distinct types of human disease also need to be clarified. *T. evansi*, a multihost parasite in the contrast to *T. cruzi*, is an extremely homogeneous taxon. The origin and dispersion of this trypanosomatid also remains doubtful. The hypothesis of the entrance of this parasite in America through infected horses of the European colonizers is insufficient. This kinetoplastid was probably

introduced into South America much earlier, when caviomorph rodents arrived. The possibility of recovering and typing ancient DNA from archaeological organic remains will certainly elucidate these questions.

ANCIENT AND MODERN DNA IN THE AMERICAS: IMPLICATIONS FOR THE PEOPLING OF THE NEW WORLD. Frederika A. Kaestle, Ripan S. Malhi, Jason A. Eshleman, and David Glenn Smith

There has long been debate over the number, timing, source and pattern of the peopling of the Americas. In addition, the possibility of failed migrations has also been raised, especially in light of the morphological analyses of the earliest Americans. In the past twenty years, molecular genetics methods have allowed DNA evidence to be included in this debate. More recently, ancient DNA techniques have allowed a temporal aspect to be added to our genetic knowledge. We summarize the implications of current modern genetic evidence for the peopling of the Americas, and discuss new genetic evidence from more than twenty North American Paleoindians, as well as other ancient peoples, analysed in our laboratories.

ANCIENT DNA ANALYSES OF PRE-CONTACT TB. Frederika A. Kaestle, Jennifer A. Raff, and Della Collins Cook

The presence of tuberculosis in the New World prior to European contact, confirmed by multiple morphological and molecular analyses, has generated a number of questions as to its origin and evolution. New World tuberculosis may have been transferred to human populations from an animal host already in the New World, or it may have migrated to the New World within the first human populations. Classification of tuberculosis within ancient American populations by means of genetic analysis may help to resolve this problem; likely strains include *M. bovis* (a primarily animal-infecting species) and *M. tuberculosis* (a primarily human-infecting species). We have recently amplified the IS6110 insertion, found in all modern tuberculosis complex members, from five individuals buried in the Mississippian cemetery at the Schild site in Illinois. Two of these individuals did not exhibit any morphological signs of tuberculosis, and in all cases tuberculosis DNA was detected in rib samples without lesions. This method of tuberculosis detection will allow us to estimate the infection rate at this site more accurately than a morphological study alone would permit. Sequence analysis of the Gyrase B gene from several of these individuals suggests that they may have been infected by a new strain belonging to the *Mycobacterium* complex.

APPLICATIONS OF SCANNING ELECTRON MICROSCOPY (SEM) IN PALEOPATHOLOGICAL INVESTIGATIONS. Matthias Kucera

Scanning Electron Microscopes provide a reliable technique in analyzing structural and topographical information from the surface of different materials such as bone, including brilliant focus depth. Depending on the composition and preparation of the specimen, a resolution of one hundredth part of a micrometer may be achieved. In combination with an Energy Dispersive X-ray Detection System (EDX) it is also possible to determine the main chemical elements of a specimen in the range of a few parts per mill. The Vienna Institute for Archaeological Science (VIAS) has a SEM (Zeiss, EVO 60 VP) including an EDX-system (Oxford) at its disposal for the investigation of archaeological objects. This SEM offers the opportunity to analyze non-conductive materials without preparation, e.g., without dehydrogenating or sputtering the specimen. Discharging is obtained in running the specimen chamber under low-vacuum. Significant results for paleopathology have been achieved, as for example, investigating the circumstances of an unhealed trauma in the elbow joint of a juvenile skeleton to determine whether the lesion was perimortal. The examination of cut marks on human cervical vertebrae with a SEM can shed light on the question of which kind of weapon was used to behead the individuals. In some cases cut marks were identified where they were not presumed, as on carpal bones of a severed hand from Neolithic period. Comparison with recently made experimental cut marks on animal bones proved that a flint tool (silex) was used as a knife.

PRESENCE OF *MYCOBACTERIUM TUBERCULOSIS* COMPLEX DNA AT THE CRYSTAL RIVER ARCHAEOLOGICAL SITE: INITIAL FINDINGS. Rheta Lanehart, Robert Tykot, Jennifer Kelly, Nicole Falk, Helen D. Donoghue, Mark Spigelman, Kim Vernon, and David Himmelgreen

The occurrence of the *Mycobacterium tuberculosis* complex (MTB) is rare in pre-Columbian North America and no cases have been previously documented at an archaeological site in Florida. A morphological analysis of a young female excavated from Crystal River revealed cranial lesions indicative of infection with a member of the MTB complex. Tubercular postcranial features included circumferential pitting on a vertebral body and surface

lesions on the right ilium. Cranial and postcranial X-rays were consistent with other tubercular radiographs. For confirmation of infection, samples were drilled from the remains and analyzed at University College London using a nested polymerase chain reaction (PCR) and a 123 bp target sequence on the repetitive element IS6110 specific for the MTB complex. Initial results from a tibia and an ilium were positive, in addition to a control rib, suggesting possible infection of other remains. Further research will be done to confirm the initial results and to obtain data on the strain of MTB by spoligotyping. The Crystal River archaeological site was occupied during Florida's prehistory (ca. 500 BC -AD 1200) long before European contact with the region. The *M. tuberculosis* complex may predate the Viking arrival in North America. Accelerator Mass Spectrometry dating will be performed on selected bone fragments to securely place the remains within the pre-Columbian and pre-Viking context.

PALEOEPIDEMIOLOGY OF ASCARIS LUMBRICOIDES AND TRICHURIS TRICHIURA INFECTION.

Daniela Leles de Souza, Marcelo Luiz Carvalho Gonçalves, Alena Mayo Iniguez, Ana Carolina Paulo Vicente, and Aduino Araújo

Ascaris lumbricoides and *Trichuris trichiura* are human parasites commonly found together today. These species have a long history with their human hosts. Well preserved eggs of both parasites have been found in archaeological material throughout the world. However, it seems that *T. trichiura* was a common infection in American pre-historic populations, but *A. lumbricoides* infection was very rare. The latter began to appear only during colonial times. Interestingly, Old World findings showed a different paleoparasitological picture. Preliminary results showed that *A. lumbricoides* and *T. trichiura* were found in the same samples in more than 80% of European archaeological sites, some dated up to 9,000 years ago. Our goal is to study *A. lumbricoides* and *T. trichiura* distribution in the past. The main hypothesis is that *A. lumbricoides* reached a high prevalence in the Americas only after the first urban centers were created in the New World. It is important to call attention to the sibling species, *A. suum* and *T. suis*, both pig parasites, which have similar egg shape and size to *A. lumbricoides* and *T. trichiura*, respectively, and are also found associated with human parasites in European archaeological sites. We use standard microscope and molecular biology techniques to detect and differentiate eggs found in archaeological samples from the New and Old Worlds through time.

ACARI FOUND IN A MUMMY BUNDLE FROM THE VALLEY OF THE CHILLON RIVER, AT THE LIMA PLAINS, PERU (LATE INCA BURIAL).

Daniela Leles de Souza, Rita de Maria Seabra Nogueira de Candanedo Guerra, and Aduino Araújo

Studies of organic remains contribute to our knowledge about infectious diseases, paleoenvironments, and host-parasite relationships. We have examined the mummy bundle enclosing the mummified body of a 4 to 6-month-old child. The body was found in the Valley of the Chillón River, at the Lima Plains, Peru, and dated to the Late Inca Burial period. The body belongs to the collection of the National Museum, Federal University of Rio de Janeiro, Brazil. We collected samples from 10 different sites, both inside and outside of the bundle. From each sample we prepared 20 slides for microscopic analysis. We found the following mite specimens: 17 Tarsomenidae; 3 Acari, 3 Oribatida, 2 Actinedida; 1 Astigmata and possibly an Acari parasite. The number of Tarsomenidae, which are commonly found in plants, may be due to the intensive agricultural practice of the Inca group. Oribatida are decomposers, and therefore it was not surprising to find them in this kind of material. The high diversity of mite specimens found points to different moments of colonization of the body as well as to the environment where the population lived.

VIOLENCE PATTERN IN ATACAMA: COMPARATIVE RESULTS FOR DIFFERENT PERIODS.

Andrea Lessa and Sheila M. F. Mendonça de Souza

Violence in Atacama pre-Columbian populations is discussed here based on the comparison of different periods and sites. The goal of this analysis is to test the hypothesis that time and cultural change may have also changed the distribution of some kinds of violent trauma. Samples from five cemeteries - Solcor-3, Coyo Oriente, Coyo-3, Quito-6 and Catarpe - comprising about 400 individuals (males and females) were studied. Classic violent lesions were considered: arrow wounds, skull and face fractures, and ulna fractures of the so-called 'parry' type. Males were more affected by violent fractures than women in general. Significant inversion of the prevalence of violent lesions follows the interaction between the original Atacamenho culture and Tiwanaku, a culture from the Bolivian Plateau. The pattern of higher levels of violence is sustained in the following periods, even after Tiwanaku's influence disappears. Different distribution of each kind of lesion occurs in different periods, but their similar morphology indicates that the same kinds of weapons were used through time. This result supports

the hypothesis that violence increases along the Tiwanaku and Post-Tiwanaku periods but the kinds of violent lesion did not vary through time and space, despite the social and cultural specificities of each period.

A CASE STUDY OF BILATERAL SYMMETRIC ANKYLOSIS FROM THE FIRST CATHEDRAL OF BRASIL. Andersen Líryo and Carlos Etchevarne

The excavation of the first cathedral of Brazil (the old cathedral of Salvador, Bahia) took place between 1999 and 2001. The cathedral was built in 1553 and remained in use until 1759, consequently being ruined in 1933. According to the tradition brought by Portuguese colonists, burials of Christian citizens were distributed inside and around the churches, and this practice persisted in Salvador until 1856. During excavation, burials were found both inside and outside the perimeter of the old church. Among the burials of the churchyard, one of the skeletons exhibited ankylosis in the tibial-fibular joint in both legs. Taking into account the history of the site and the city, and the possible socio-ethnic origin of the burials found in the churchyard, there are several hypothesis about this condition. This type of alteration may be a consequence of lesions caused by dracunculosis, a parasite infection very common among African slaves in Brazil. Alternatively, other hypothesis must be considered, such as trauma from punishment of slaves.

DENTAL PATHOLOGY AMONG TENETEHARA-GUAJAJARA, MARANHÃO STATE, BRAZIL. Martha Locks and Claudia Rodrigues-Carvalho

The Guajajara indigenous people belong to the Tenetehara family of the Tupi-Guarani linguistic group. The Tenetehara-Guajajara inhabit a region drained by the Mearim, Grajaú and Pindaré rivers in Maranhão State, Brazil. The group studied here is distributed along the Pindaré River in two villages – Kamirang and Januária. The climate is hot and humid, and the landscape dense, high Amazon forest. Twenty individuals from the collection of the National Museum, Rio de Janeiro Federal University (UFRJ), exhumed in the 1940s, were examined for linear hypoplasias and dento-maxillary pathology (caries, abscesses, calculi and tooth loss in life). The results show high frequencies of hypoplasias: 87.5% for upper canines in the most affected arch and 100% among incisors, upper second premolars and molars. Caries were observed in 39.33%, abscesses in 6% and tooth loss in life in 45.55% of cases. Calculi were observed in 68.75% of the individuals. The results (high frequency of pathologies, low degree of sexual dimorphism) point to a population suffering the continual biological stress unfortunately to be expected of indigenous peoples under the impact of ongoing contact with White society.

HUMAN OFFERINGS IN ARCHITECTURAL CONTEXTS: AN INSIGHT FROM CARAL, PERU. Guido P. Lombardi

Different human remains have been found associated with monumental architecture in Caral (Late Archaic Period). Though still scarce, the evidence of varied burial patterns – primary, secondary, cremation, sacrifice – in ritualistic archeological contexts, suggests a complex ideology that intimately associated funerary practices with construction cycles.

ANALYSIS OF ANCIENT DNA FROM MOA AND BEIRADA SAMBAQUIS – RJ. Anderson N. R. Marinho, Terezinha Palha, Valéria Silva Braz, Claudia Rodrigues-Carvalho, Sheila M.F. Mendonça de Souza, S. E. B Santos, and Andrea Kely Campos Ribeiro-dos-Santos

Mitochondrial DNA (mtDNA) represents one of the best tools in studies of ancient samples with a reduced amount of biological material, such as bones and tissues. In the last decades, the study of the human genome has helped in the characterization of human populations, because of the presence of mutations that identify specific population groups. One of the applied methods is mtDNA sequencing, in which the populations are characterized through distinctive groups of mutations (haplogroups). According of this method, the Amerindians are characterized by four prevalent haplogroups: A, B, C and D. In pre-colombian samples, we observe other marker groups different from these. The aim of this study was to characterize pre-colombian populations from Moa and Beirada sambaquis (Saquarema, RJ) through mtDNA sequencing. We analyzed three bone fragments from Moa and four from Beirada. Standard procedures to avoid contamination in these bones were followed. The material was cleaned and minced, and the DNA was extracted and purified (Centricom kit), followed by PCR amplification and sequencing. The finished analysis of samples (3 from Moa and 1 from Beirada) showed a total of 22 mutations, which places them in haplogroup C; mtDNA analysis was therefore able to identify more than 50% of the analyzed samples.

COMPARISON BETWEEN TAFONOMIC EFFECTS AND ANCIENT DNA PRESERVATION. Anderson N. R. Marinho, Terezinha Palha, Valéria Silva Braz, and Andrea Kely Campos Ribeiro-dos-Santos

The state of preservation of bones seems to be directly related to their size and density, because longer and denser bones require a longer period of time to decay. In diagenesis the bone components are hydrolyzed and substituted with mineral components found in the soil. The factors which influence this process can have various origins: biological (nucleic acid action), chemical (pH changes and oxygen free radicals), and physical (temperature action, soil pressure which can deform bones). All of these processes seem to influence directly DNA quality. Hence, bone conservation is important in analyses of ancient DNA, because taphonomic agents may destroy DNA and make its analysis impossible. The aim of this study is to characterize the pattern of conservation of DNA found in ancient bones from the Moa and Beirada sites, Saquarema –RJ, in different types of soil, and compare the results to the state of preservation of the bones. Three samples from Moa and four from Beirada were analyzed. Standard procedures to avoid contamination in these bones were followed. Direct sequencing positive results were obtained in three samples from Moa and one sample from Beirada. These results were in agreement with the samples' histological analysis.

THE ANTIQUITY OF TUBERCULOSIS AND LEPROSY IN HUNGARY: THE SKELETAL EVIDENCE. Antónia Marcsik, Erika Molnár, and László Szathmáry

The analysis of the skeletons of past human populations provides some of the best biological data regarding the history of significant diseases such as tuberculosis and leprosy. The purpose of this study is two-fold: firstly, to present the pathological alterations of the bones in these diseases, and secondly, to review their epidemiology from ancient times in the territory of present-day Hungary. More than 2000 dry skeletons were analyzed using macroscopic observation and radiographic methods. The bone changes in tuberculosis were mainly manifested in the vertebrae and the hip, with additional alterations observed on the surface of the endocranium, ribs, and in the vascularisation of the vertebrae. Skeletal involvement in leprosy predilected mainly the rhinomaxillary area of the skulls (RMS) and, in some cases, the peripheral appendicular bones. Beside the destruction of RMS, the leprogenic odontodysplasia (LOD) was also studied. Skeletal tuberculosis appeared in the 4th century AD and its prevalence was highest in the 8th century and during the Middle Ages. Until now, no evidence of osseous leprosy was found prior to the 8th century AD. Most cases originated in the 10th and 11th centuries. The study was supported by the "Széchenyi" project (5/081) and the National Scientific Research foundation (OTKA grant No.T049614).

TREPANATION IN PREHISTORIC ITALY: THREE CASES FROM SAINT-MARTIN-DE-CORLÉANS (AOSTA). Dario Piombino Mascali, Francesco Mallegni, Gino Fornaciari, and Fulvio Bartoli

Megalithic monuments are located at the west boundary of the town of Aosta, next to the old church of Saint-Martin-de-Corléans. Excavations headed by F. Mezzena between 1969 and 1990 revealed a cult area used throughout the 3rd Millennium BC. Five phases of use could be identified and eight tombs, dated 2300/2000 BC, were found. The complex culture of this human group included sacred ploughing of the area, 'seeding' with human teeth, and the erection and demolition of anthropomorphic steles whose alignment is believed to be astronomically connected to the solar and lunar cycles. The ongoing bioanthropological investigation has concentrated so far on two sets of skeletons from tomb II. Three of the 15 skulls were diagnosed with trepanation; each specimen was analyzed both radiographically and microscopically. One case does not display evidence of healing. Due to the lack of evidence for cranial trauma, a ritual function could be implied. However, the incompleteness of both contextual and biological data does not allow for further conclusions.

MEDICAL DIAGNOSIS IN ANCIENT TEXTS: FROM MIDDLE AGE TO ENLIGHTENMENT. Diana Maul de Carvalho

The *Regimento proueytoso contra ha pestenença* and *Modus curandi cum balsamo* are probably the first texts to be published in Portugal on disease prevention and treatment. We point out some aspects relative to the medical terminology present in those texts and discuss them in contrast with eighteenth century European authors: the Portuguese João Curvo Semedo and his treatise *Atalaia da Vida contra as Hostilidades da Morte*; and the English John Huxham, famous author of a *Treatise on fevers* that includes an extensive discussion on smallpox, the XVIIIth century European 'pestilence'. These works, written at the dawn of 'scientific medicine', may be seen as a bridge between the medieval/renaissance texts and today's medical treatises, allowing us to identify some relevant aspects of diagnostic and therapeutic criteria present in the documents.

PALEOFRAGMENTS AND EPIDEMIOLOGICAL EVIDENCE. Diana Maul de Carvalho

In the 1960s, Lawrence Angel produced the first paleoepidemiological studies explicitly labeled by this term (Ortner & Kelley 1990), although in 1930 Hooton had published a comparative study of Pueblo skeletal series that is considered by many authors to be the first paleoepidemiological analysis in paleopathology (Buikstra & Cook 1980). These studies and those that followed apply to archaeological human remains analytical methods developed in demographic and epidemiological studies of current populations, while they also consider adaptations and even propose new models such as the pathocenosis of Mrko Grmek (1983). Waldron (1994) presents a comprehensive text on epidemiological methods applied to skeletal populations, the 'state of the art' at the end of the twentieth century. We propose to go back in time and re-examine the meaning of 'epidemiological evidence' in the light of the arguments presented by Grmek (1983) in his definition of 'patocenosis' and Ginzburg (1986) in the discussion of his 'indiciary paradigm'. We present results from two research projects – on smallpox and Chagas' disease – to illustrate how the study of documents, oral history, and 'biological evidence' can merge to help clarify an 'epidemiological enigma'. We suggest that this approach, with necessary adaptations, may be at least as fruitful to paleopathological reasoning as 'evidence-based' paleoepidemiology.

DENTAL ENAMEL DEFECTS ANALYSIS IN THE GENUS *TOXODON* – A NEW METHODOLOGICAL PROPOSAL. Diogo Jorge de Melo, Deise Dias Rêgo Henriques, and Claudia Rodrigues-Carvalho

The occurrence of hypoplastic enamel defects were analyzed in *Toxodon* remains from three Brazilian fossiliferous regions (Rio Grande do Sul, São Paulo and Pernambuco States). The preservational conditions led us to analyze the material in sets of four groups of teeth, to avoid identification mistakes: one group of incisors only, a second group with upper premolars and molars, and the other two groups represented separately by lower premolars and molars. Considering the fragmentary state of the material and the fact that those teeth grow continually, each tooth was divided in strips of one centimeter. The results indicate that the individuals from Rio Grande do Sul were more affected than those of the Southeast and Northeast of the country. These data reinforce the idea that the animals in South America had suffered greater ecological pressures with the increase of glaciation. The higher level of physiological stress in the Southern series is concordant with the paleoenvironmental model for migration to tropical areas by the Pleistocene South American fauna.

CONGENITAL SYPHILIS IN AN 18TH CENTURY CHILD MUMMY FROM PORTUGAL. Sheila M.F. Mendonça de Souza, Sónia Codinha, and Eugénia Cunha

About 70 bodies partially or completely mummified were found inside the crypt of the Church of Sacramento in Lisbon, a very rare finding in Portugal. Their systematic anthropologic analysis was begun only recently. The corpse of an 18-month-old girl was found in a somewhat damaged wooden coffin, arranged in Christian *decubitus dorsalis* position. She was completely dressed with clothes that suggest high socio-economic level. Her state of mummification, probably natural, was not homogeneous: the face and hands were preserved, included the nails, and the feet were still inside the socks and shoes. As usual, the back side of the body was more deteriorated than the front. The skin, though dry, maintained a certain flexibility, and the skeleton was very well preserved, with all of the joints *in situ*. Macroscopic and radiologic analysis was performed. Sex could be diagnosed by external genitalia, whereas age at death was estimated by dentogenesis and osteogenesis. X-Ray analysis of the skeleton revealed layers of new bone on the diaphyses, notably on the humeri and femora with bone thickening. Metaphyseal destructive areas were present, suggesting osteochondritis, especially at the knees. The left tibia displays a rarefaction area compatible with Wimberger's sign, a pathognomic sign of early congenital syphilis. The neuropathic osteoarthropathy of Charcot is the most probable cause for the necrotic destructive lesions in both knees, especially at the left side. The enamel malformation noted for some teeth reinforces the diagnosis of a rare case of congenital syphilis.

FIRST RESULTS OF NON INVASIVE STUDIES OF THE EGYPTIAN HUMAN MUMMIES OF THE NATIONAL MUSEUM, BRAZIL: THE ROMAN MUMMY. Sheila M.F. Mendonça de Souza, Antonio Brancaglioni Junior, Iugiro Roberto Kuroki, and Jorge Roberto Lopes dos Santos

Application of sophisticated technological methods to the study of mummified bodies provides detailed information by non-invasive techniques in an interdisciplinary approach. The Egyptian collection in the National Museum in Brazil, the most important in South America, is finally being studied after almost two centuries of

curation. CT scanning, 3D-image reconstruction and rapid prototyping techniques enable us to see what is inside the coffins and wrapped bodies. General biological data help us to identify the individuals, their mummification processes, and pathological features such as dental decay, osteoarthritis, perimortem fractures, and others. One of the most important studied specimens is the Roman Mummy, a well-preserved young female from Thebes. Her corpse received unusual preparation after her death and she shares with one of her possible relatives in Leiden strange bilateral perimortem fractures of her arms, and extraction of the brain by the left nostril and the lungs and abdominal viscera by a low abdominal incision at the left side. A nasal fracture may be related to the brain extraction, but cervical vertebra dislocation is possibly taphonomic. In this presentation a detailed description of the Roman Mummy and the 3D tomographic images will be provided for discussion.

A STRONG MAN AND HIS FATE. Sheila M.F. Mendonça de Souza and Adauto Araújo

Lapa do Boquete is a site in the Peruaçu valley, Minas Gerais, Brazil. Food storage pits and burials, some of them with partially mummified soft tissues dating 600 to 1200 B.P. were excavated there. Burial IV had a well preserved skeleton equipped with a rich funerary set of goods. The paleopathological analysis of bones and coprolites may shed light to the cause of his death. The skeleton was of a well built and strong male, about 40 years old, with a few signs of degenerative disease in the joints and no signs of chronic nutritional problems. Spondilolysis, Schmorl nodes and a healed phalanx fracture were the only trauma in the skeleton. No weapon associated to the body suggested a violent death. No periosteal reactions on the long bones, ribs or vertebrae, but only in the maxillary and mandibular region, associated to acute and very spread apical infections. When death occurred, active drainage through cloacas had affected the facial bones and the skin, part of which is still adherent to one of the draining sinuses. Besides the acute dental decay, a big coprolite mass in the form of the sigmoid and rectum suggested intestinal paralysis and possibly megacolon. Nematoda eggs and an impressive number of Echinostoma eggs in the coprolites were associated to aDNA positive for *T. cruzi*. Could Chagas' megacolon be a synergic condition favouring parasitic infestation weakness and other bacterial infections at the moment of the death?

DIFFERENT IN BONES, DIFFERENT IN HEALTH: IS THAT TRUE FOR LAGOA SANTA GROUPS?

Sheila M. F. Mendonça de Souza

The Paleoindian populations of Brazil, primarily represented by the Lagoa Santa ancient bones, are dated 8.000 years BP or more. They have been associated with early migrations of non-Mongoloid groups from Asia, people who differed biologically in some way from the later Mongoloid groups who crossed the Bering Strait land bridge. This first migratory wave to America is distinguished from the later groups by a peculiar skull morphology. Might they have had different genetic frequencies related to other morphologic features? Living at the end of the Pleistocene and facing the most recent world climatic transition, they may have dealt with special health conditions. Could they have had differential frequencies of skeletal anomalies and pathologies? Is it possible to propose a special pattern of pathocenosis of Lagoa Santa human groups? In theory, yes, and suggestive data have emerged from the first detailed analysis of Lagoa Santa skeletons. Skull developmental anomalies affecting the prechordal cartillages, first branchial arch, and paraxial mesoderm plus peculiar frequencies of epigenetic traits have been described. Arrested development of the third molar and pathological signs point to a peculiar pathocenosis. Both genetic composition and environmental stresses may explain paleopathological findings suggesting more differences than just craniometric variation for this Brazilian Paleoindian group.

LIFESTYLE AND THE EMERGENCY OF DISEASES: THE CASE OF THE SAMBAQUI PEOPLE.

Sheila M.F.Mendonça de Souza

Adaptation to salt-water coastal environments by many Brazilian prehistoric groups during the Holocene created new lifeways and diet and stimulated population growth. Abundant food was available in the coastal ecotones year-round, and fishing, gathering of mollusks, and hunting were complemented by collection of wild plants and probably some horticulture in the fertile plains. The large, stable, and probably interactive communities provided the epidemiological conditions to develop new lethal as well as non-lethal infections, and intense exposure to salt water environments brought new environmental risks. In Brazil the different types of shellmounds (*sambaquis*) represent differences in time periods, subsistence strategies, and cultural expressions through the building and use of mounds. Bioarchaeological analyses of different skeletal series by various researchers suggest that patterns of mortality and disease may have varied considerably by time period and locale. Particular aspects of health, including higher prevalence of porotic hyperostosis, periostitis, maxilla and mandibular tori, and absence of caries

may have been related to the emergence of new living conditions associated with the intense exploitation of salt water biota.

COPROLITE EVIDENCE OF MEDICINAL PLANT USE, PIAUÍ, BRAZIL. Sérgio Augusto de Miranda Chaves and Karl J. Reinhard

Human coprolites dating from 8,500 to 7,000 years BP were collected from the rock-shelter of Boqueirão da Pedra Furada, in Piauí, Brazil. These dates fall within the "Serra Talhada" cultural traditions I and II of the Tradição Nordeste, a paleohuman culture of northeastern Brazil. Archaeoparasitological analysis of the coprolites revealed whipworm eggs and hookworm eggs. Analysis of Tradição Nordeste skeletons and hair shows a variety of pathology including dental diseases, osteoarthritis, and head louse infestation. Palynological analysis of the coprolites revealed 12 genera that were potentially medicinal. The pollen data were critically analyzed to assess the potentiality that the pollen represented medicinal use. Strong cases could be made that three of the genera, *Anacardium*, *Borreria*, and *Terminalia*, were actually used for medicinal purposes, probably to treat symptoms caused by the intestinal parasites.

IDENTIFICATION OF MICROORGANISMS IN TISSUE SAMPLES IN THE ANCIENT REMAINS FOUND IN A GLACIER IN BRITISH COLUMBIA. Maria Victoria Monsalve, Paul Hazelton, Derrick Horne, and Elaine Humphrey

Human remains discovered in a glacier near the Pacific coast in Canada in 1999 were determined to be 550 years old by radiocarbon dating. Using an electron microscope we looked at the state of preservation of cellular components in the spine, arm muscle, and arm bone of the ancient remains. We identified both Gram positive and negative microorganisms such as: 1) capsule forming Gram positive cocci in the interstitial, vascular, and submucosal arm tissue, 2) a collapsed cytoplasmic membrane of a Gram positive coccus, indicating lack of internal cytoplasmic material, 3) Gram positive bacilli in arm muscle tissue, including the lamellar mesosome, a cellular component of Gram positive bacilli that plays a role in cell division and spore formation, and 4) Gram negative bacilli in the spine. An extensive pathological examination of different tissues in the ancient remains did not indicate inflammation caused by infection. The identification of these microorganisms by bacteria culture, however, will allow insights to the role of specific microorganisms in the decay of human tissues.

TOOTH DAMAGE AND UNUSUAL DENTAL WEAR FROM MASTICATORY AND EXTRAMASTICATORY USES: CASES FROM THE PIAÇAGUERA SHELLMOUND, SAO PAULO, BRAZIL. Sergio Francisco Monteiro da Silva, Rogério Nogueira Oliveira, and José L F Antunes

Some of the anomalous features on the dentition involve the use of the teeth as instruments in nonmasticatory functions, as much so in current populations as in the past. In the Piaçaguera shellmound, dated in 4930 ± 140 BP, several cases of unusual wear dental patterns were discovered. The constant use of the central and lateral maxillary and mandibular incisors resulted in non-occlusion between upper and lower teeth. That feature was caused as much by masticatory attrition (physiologic or physiopathologic wear) of the teeth as by abrasion related to cultural (non-alimentary) habits. A pathological loss of dental substance resulted from the friction between foreign materials in the mouth and the teeth. In this sample, others dental modifications resulting from cultural, dietary, or curative activities include slight chipping of occlusal margins, fractures, microcutting in lingual and palatine crown surfaces, interdental wear, and intentional interdental perforation. There are clear patterns of tooth damage resulting from cultural behavior and life-style - both masticatory and extra-masticatory use - in the Piaçaguera sample. The tooth damage occurs in 12% of the sample and unusual dental wear in 57%. This poster illustrates the macroscopic aspect of the unusual wear and damage.

PARASITES, PALEOCLIMATE AND THE PEOPLING OF THE AMERICAS: THE HOOKWORM AND THE CLOVIS MIGRATION. Alvaro Montenegro, Aduino Araújo, Michael Eby, Luiz Fernando Ferreira, Renée Hetherington, and Andrew J. Weaver

Based on paleoparasitological findings and paleoclimate modelling simulations we determine whether early peoples migrating via the Clovis First route across Beringia into North America could have traversed the required distance in time to provide a reasonable explanation for the presence of the hookworm parasite in the pre-Columbian Americas. We show that the introduction of the hookworm into the Americas could only happen under extraordinary circumstances, and even then, would require very rapid displacement rates, that appear to

have no parallel in the archaeology of the continent. This implies that while the Clovis people may have been the first migrants to the Americas, they were almost certainly not the only such early migrants.

FORENSIC ARCHAEOLOGY IN THE ACADEMY OF CIVIL POLICE, SÃO PAULO STATE, BRAZIL. Sergio Francisco Monteiro da Silva and Rogerio Nogueira Oliveira

Criminal investigation training in the Sao Paulo Police Academy started in 1970. The study of archaeological practice and methods by policemen constitutes a new tool to help these professionals conduct crime scene interpretations of buried human skeletal remains. Analytical and descriptive textbooks written about human bones by Sao Paulo policemen in the past considered only the identification of the human bones, not the recovery/forensic context of physical evidence. In the absence of a legal context, the exhumation procedures in cemeteries and other sites are a medicolegal expert's job. Because of this partnership of crime scene teams and archaeologists, it is necessary to improve methods for evidence collection in the investigation of exterminated groups of people, drug traffic murders, serial crimes, and suicides. A *Forensic Archaeology Special Course* was taught at the Police Academy in March and April of 2005, for two classes of 50 students (policemen, forensic experts, legal medicine specialists, detectives, forensic photographers, and others). The topics covered included: Principles of Forensic Archaeology; Scene of Crime; Criminology; Forensic Medicine; Forensic Dentistry; Field Methods in Archaeology; Archaeological Burial Excavation; Forensic Anthropology - human identification processes to the human bones: individual osteological traces, trauma, pathology and anomalies; Principles of Forensic Taphonomy; Laboratory Methods in Archaeology - human and non-human bone identification; and Criminal Burial Scene Simulation (a practice simulation). Simulations and theory classes are included in the initial project for the development of police studies and methodologies in Forensic Archaeology.

CRANIAL MORPHOLOGY OF THE FIRST SOUTH AMERICANS - IMPLICATIONS FOR THE SETTLEMENT OF THE NEW WORLD. Walter Alves Neves and Mark Hubbe

Information derived from several comparative morphological studies of the earliest human skeletons from this continent suggests a more complex scenario for the influx of humans to the New World than the one indicated by the genetic variation of extant Native Americans. While late prehistoric, recent, and present Native Americans tend to exhibit a cranial morphology similar to late and modern Northern Asians (short and wide neurocrania; high, orthognatic and broad faces; and relatively high and narrow orbits and noses), the earliest South Americans tend to be more similar to present Australians, Melanesians, and Sub-Saharan Africans (narrow and long neurocrania; prognatic, narrow and low faces; and relatively low and broad orbits and noses). The latter pattern is known in the literature as Paleoamerican morphology. However, most of the studies carried out so far regarding the morphology of the first Americans were based on small cranial samples, because human burials older than 8,0 kyr are rarely found in the Americas, especially in North and Central America. Here we present results derived from the largest sample of early American skulls ever studied (81 skulls of the Lagoa Santa region). The results obtained by different multivariate statistical tests show that the Paleoindian South American population was in fact morphologically different from recent Amerindians and similar to extant Australo-Melanesians.

THE IMPORTANCE OF ETHICAL ASPECTS IN PALEOPARASITOLOGICAL RESEARCH. Joseli Maria da Rocha Nogueira, Cassius S. Palhano-Silva, Marcelo Luiz Carvalho Gonçalves, and Adauto Araújo

Paleoparasitology is a branch of paleopathology that aims to study infectious agents which affected ancient populations. Thus, paleoparasitology allows us to understand the evolution of infectious diseases and contributes to our knowledge about paleoenvironments and host-parasite relationships. Epistemological and ethical aspects of this kind of study should be carefully considered. An important aspect concerns the existence (or absence) of defined ethical behavior in the analysis of organic remains of extinct populations. Inferences made by paleoparasitologists about ancient social activities raise questions about the position of the descendents of the studied populations. It is necessary to establish limits and to regulate practices that concern the dignity of individuals and peoples. Caution should be exerted not to regard elements of the human body as 'things' or private appropriations. The study of the ethical implications of this research is important, not simply as a debate but also for the development of the Paleoparasitological "State of the Art". Considering the pluralistic contemporary context, only a multidisciplinary agreement will lead to a recognized system of rules for all interested parties. Serious consideration of the responsibility of research and its corresponding limits cannot be delayed. Specific ethics related to conservation of the ancestral inheritance should respect and preserve ancient cultures.

IS AUDITORY EXOSTOSIS A GOOD MARKER OF AQUATIC ACTIVITY? Maria Mercedes Okumura, Celia Helena Cezar Boyadjian, and Sabine Eggers

Brazilian shellmounds are archaeological sites dated between 7000 and 1000 years BP. Most of them are located at the coast, but there are some riverine sites inland. Several studies have shown that the subsistence of the coastal groups associated with these sites was based mainly on aquatic resources. In this work, we analyze the frequency of auditory exostoses in adult individuals from 29 coastal sites and one riverine site. As the aetiology of auditory exostoses is associated with cold water diving, high frequencies of this trace are expected in the coastal sites. No significant difference in the frequencies of this trait between meatii was found, thus we base the analyses on the right meatus only. Differences between sites and sexes are tested. The environmental hypothesis of this trait is discussed in the light of the results obtained.

ESTIMATING AGE BY TOOTH WEAR OF PREHISTORIC HUMAN REMAINS IN BRAZILIAN ARCHAEOLOGICAL SITES – SAMBAQUI. Rogerio Nogueira Oliveira, Sergio Francisco Monteiro da Silva, Alcimara Kawano, and Jose L F Antunes

The occlusal surface of 298 permanent maxillary and mandibular molar teeth of prehistoric shellfish-gatherer specimens from Piaçaguera and Tenorio sites (4930 to 1875 BP), central-northern coastline of Sao Paulo, Brazil, were examined for classification of macro wear stages. Molar tooth wear, an indication of masticatory activity, was used in the estimation of age at death. The examination of visual and schematic aspects of occlusal macro wear referenced a visual chart proposed by Brothwell, which includes the three superior and inferior, left and right, permanent molars. The observation was performed twice by three examiners under the same conditions. The resulting age estimates were compared with previous information of age estimates from skeletal examination. Reduced intra- and inter-observer variation was observed with re-examination: discrepancies were lower than two years for age estimates. The procedure was also considered consistent with the skeletal method used for age estimation of human remains excavated in Brazilian archaeological shell mounds, with a lower than 8.22 years discrepancy between the methods. Age classification by occlusal molar wear may be a useful tool for the classification of archaeological findings, mainly when only fragmentary skeletal remains are excavated. The current results indicate that the application of the Brothwell chart for Brazilian archaeological series presented satisfactory results of reliability and validity, and its expanded use may represent a relevant adjunct for research.

OF MULBERRIES AND RASPBERRIES: IN SEARCH OF THE DIAGNOSTIC VALUE OF MULBERRY MOLARS IN A PRE-CONTACT POPULATION IN THE LESSER ANTILLES.

Raphaël G.A.M. Panhuysen and Menno L.P. Hoogland

At the site of Anse à la Gourde on the Caribbean Island of Guadeloupe (France), 74 graves were excavated. Most individuals were buried in a sitting or half-sitting position with flexed lower extremities in shallow oval burial pits. The graves were situated in and around an extended settlement and date from the 11th to 12th centuries AD. In this pre-contact population infectious disease was among the most frequently found pathological conditions. Five individuals had gummatous lesions, which in four individuals were found in combination with subperiosteal new bone formation, osteomyelitis and sabre shin tibia. The combination of these bone changes is considered indicative for an infection with *Treponema pertenu*, probably yaws (also known as framboesia). Additionally, at least two individuals in this population show changes in the enamel of the second molar, which morphologically resemble "mulberry molars". Generally the distinct morphology of mulberry molars is encountered in the first molars, in which case it is often considered pathognomonic for congenital syphilis, caused by *Treponema pallidum*. This paper will present the physical, anthropological and paleopathological data of the Anse à la Gourde population and will focus on the interpretation of changes in the dental enamel associated with treponemal disease.

CONGENITAL SEGMENTAL FAILURE: KLIPPEL-FEIL SYNDROME IN A JUVENILE SKELETON FROM THE EARLY HUNGARIAN PERIOD (1000 A.D.). Doris Pany, Maria Teschler-Nicola, Thomas Prohaska, and Mathias Kucera

Documenting rarely described pathologies can sometimes provide helpful information for population-based studies. The skeletal remains from an Early Hungarian Period (10th century A.D.) boy, buried with his horse, were excavated recently in Gnadendorf (Austria). The excellently preserved juvenile skeleton displayed fused cervical vertebrae 2 and 3, and fused thoracic vertebrae 3 and 4 - typical attributes for Type II congenital "Klippel-Feil

Syndrome” (KFS). Moreover, his skeleton displayed other features commonly associated with KFS: the base of the skull exhibits bilateral symmetrical hypoplasia of the basilar part of the occipital bones, and a basilar impression is present. The nature of the connection to the *Corpus ossis sphenoidalis* remains unclear, and possibly it was cartilaginous. A computerized tomographic analysis (CT) helped to resolve the alteration visible in the external acoustic meatus: the lumen appears to be normal, but in the marginal sector a narrow area of stronger bone apposition is visible. The constricted external acoustic openings almost surely led to hearing impairment. Enamel hypoplasia, maxillary and frontal sinusitis, hematomas, and general porosities point to malnutrition or immune/chronic deficiencies. Unusual characteristics in the right elbow joint were investigated with a scanning electron microscope; these might be related to perimortem injury. Sr- investigations using LA-ICPMS were used to determine the origin of the individual. Healed skull trauma might be associated with the cause of death.

PALAEOPATHOLOGICAL AND RADIOLOGICAL EVIDENCE OF GOLDENHAR SYNDROME IN A SOUTH GERMAN OSSUARY. Stephanie Panzer, Albert R. Zink, Monika Cohen, and Andreas G. Nerlich

We describe a rare case of Goldenhar syndrome in the skull of a male juvenile from an ossuary in Rain/Lech, Southern Germany. Skeletal remains of more than 2500 individuals were buried in this cemetery between 1350 and 1803 AD. The pathological skull was investigated by Multislice computer tomography in spiral mode technique (80 kV, 120 mAs, collimation 0,625 mm and pitch 1 in axial orientation). The resulted 400 axial slices were used for 3 D-reconstructions of the complete cranium by volume-rendering technique. In a second step, 2.5 mm thick oblique slices through the regions of interest of the petrous bone were produced by volume-rendering technique separately for both sides. Finally, virtual otoscopy of the middle ear cavity of both sides was performed. The paleopathological and radiological investigations showed a marked facial asymmetry of the skull with reduction of the left side. In detail, aplasia of the zygomatic process, displaced mastoid process, elevation of the orbit and palatine bone, bony atresia of the external auditory canal, agenesis of the ossicles, and underdevelopment of the middle ear cavity could be observed. Virtual otoscopy revealed abnormalities of the eustachian tube, and a facial nerve with a relatively long labyrinthine segment, short tympanic segment, and a mastoid segment running anterolaterally to the tympanic cave. The present osseous hemifacial microsomia in combination with the anomalies of the petrous bone strongly suggest the diagnosis of Goldenhar syndrome.

UNICORONAL SYNOSTOSIS IN TWO INDIVIDUALS FROM FUNA DO ESTRAGO, PERNAMBUCO. Maria S. Parks

This research reports two possible cases of unicoronal synostosis, or premature unilateral fusion of the coronal suture, from the archaeological site Furna do Estrago, Pernambuco. The underlying causes of premature fusion of cranial sutures are discussed, as well as their known frequency in the archaeological record. Additionally, I will examine developmental problems and diseases that are sometimes associated with premature sinostosis of coronal suture, and describe each of the two cases of unicoronal synostosis from Furna do Estrago. Other pathological indicators associated with these individuals will also be considered.

ARTICULAR DEGENERATION AND OTHER ACTIVITY MARKERS IN THE SAMBAQUI JABOTICABEIRA II. Cecília Petronilho and Sabine Eggers

The aim of this work is to evaluate articular degeneration (AD) as an activity marker in skeletons recovered from a Brazilian *sambaqui*. The main goal of these analyses is to better comprehend the lifestyle of the shellmound dwellers from the Sambaqui Jaboticabeira II (2880-1805 BP). This archaeological site is one of more than 30 shellmounds scattered around the Lagoa do Camacho (Santa Catarina - Brasil). The recurrent pattern of funerary layers alternating with shell layers suggests that the whole architecture of Jaboticabeira II is based on funerary rituals. The lack of sterile layers in the stratigraphic record, on the other hand, indicates a long period of occupation. Moreover, the numerous burials reflect a high demographic density in the region. Indeed, the Jaboticabeira II is being interpreted as a great cemetery, used by many nearby shellmound peoples. This work evaluates AD in the following joints: temporomandibular, shoulder, elbow, wrist, hand, hip, knee, ankle, foot and spine (cervical, thoracic and lumbar). We classify the severity of AD into light (1), moderate (2) and severe (3) and construct osteobiographies for the individuals who scored higher than 1. Other aspects of palaeopathology, stature, and squatting facets are also described in the osteobiographies, which are discussed in the context of detailed archaeological information.

BACTERIAL DISEASES OF COASTAL POPULATIONS IN EVOLUTIONARY PERSPECTIVE.

Luz-Andrea Pfister

The maritime foundation of Andean civilization has been proposed by many scholars. The earliest sites in the South Central Andes are located at the coast and date back to 11,000-12,000 years B.P. Archaeological evidence demonstrates that these groups of people were able to exploit the sea with remarkable effectiveness, enabling the establishment of large sedentary populations earlier on the desert coast of the South Central Andes than in any other part of the New World. Population density and sanitation problems are associated with increased prevalence of bacterial infections. Research on ancient bacterial diseases has centered on conditions that leave traces in the skeleton (i.e., syphilis and tuberculosis), and the prevalence of other bacterial diseases remains unknown. The purpose of this paper is to critically review bacterial infections afflicting prehistoric coastal populations as inferred from paleopathology, paleodemography, paleoenvironment, and subsistence strategies, as well as theories of co-evolutionary histories of humans and their bacterial pathogens. I will further present laboratory findings on the detection of ancient bacterial DNA in bone marrow samples of prehistoric individuals that inhabited the Pacific Coast of Northern Chile (4,500 - 600 B.P). I have used universal bacterial primers targeting a diagnostic segment of the 16S rDNA gene. The presence of human pathogenic bacteria in the bone marrow is an indicator of bacteremia before death and will shed light on the type of bacterial infections causing severe disease among this people.

TRAUMATIC LESIONS AND CAUSE OF DEATH: A FORENSIC ANTHROPOLOGY CHALLENGE.

João Pinheiro

Cause and manner of death are the main objectives of an autopsy. They often pose a challenge to our medical knowledge, even when we are dealing with fresh cadavers. Paleopathologists, too, often extrapolate cause of death from diverse lesions on bones. While this type of speculation is legitimate in the context of past populations, such interpretations must be avoided in forensic contexts when making decisions that will affect the administration of justice. The aim of this paper is to find the common point of these two perspectives, by discussing some examples of pathologies in fresh bodies that, if seen in skeletonized corpses, could lead paleopathologists to possible errors. The proper application of knowledge acquired from anthropological studies of bones to diagnose cause of death is particularly important in the context of human rights violations. The presentation is based on forensic pathologist-forensic anthropologist experience developed in Portugal during the last five years in cadavers displaying different states of putrefaction/preservation. As this type of collaborative work is today more and more requested, anthropologists with paleopathology experience must be extremely careful when working in the forensic arena, because their decisions can have tremendous consequences for living people in terms of penal or civil law, or concerning job accidents or occupational health.

CAVE LIVING AND TRANSMISSION OF CHAGAS' DISEASE IN ANCIENT TIMES.

Karl J. Reinhard

Prehistoric cave life in the deserts of Mexico and the United States promoted a complex web of infection with *Trypanosoma cruzi* due to human activity. Ancient people used the caves for thousands of years because caves protected them from the winter cold and summer heat. They used the caves for food preparation, cooking, storage, trash, sleeping, and for daily activities. Because grass beds were made and used in the caves, transmission occurred when infected triatomid bugs bit sleeping people at night. In addition, wood rats were a main source of meat for the people. 80% of the people had abscessed teeth at some point in their lives. It is very possible that eating uncooked, infected meat resulted in infection as well. Finally, triatomid bug feces in stored food and on food preparation areas could have resulted in infection. This is because triatomid bugs live in the caves and infest the vegetal deposits made by humans. These deposits include trash, beds, storage baskets, bedrock mortars in cave recesses, and potentially latrines. Thus, humans created a pathoecology ideal for the transmission of Chagas' disease.

DIET, PARASITISM, AND SKELETAL INDICATORS OF STRESS.

Karl J. Reinhard and Sara LeRoy-Toren

Although archaeobotany and paleopathology have obvious connections, very few studies directly address the role of diet in promoting skeletal disease. The dietary analysis of two Ancestral Pueblo sites, Antelope House, Arizona and Salmon Ruin, New Mexico, shows how ecological collapse caused dietary deterioration and increase

in parasitism. As the environment around Antelope House entered a long drought, less maize and more starvation foods rich in phytoliths were eaten. Because more people used dwindling water sources, parasitic disease became severe. The skeletal data from Antelope House show very high frequencies of porotic hyperostosis and dental wear with low frequencies of dental caries. In contrast, Salmon Ruin had a stable ecology and food sources. Salmon Ruin skeletons exhibit the opposite patterns of pathology from Antelope House. This study demonstrates the ability of archaeobotanists and archaeoparasitologists to explain the pathology patterns found by paleopathologists.

MITOCHONDRIAL GENOMIC AND ANTHROPOLOGIC IMPLICATIONS. Ândrea Kely Campos Ribeiro-dos-Santos

The study of genomics has brought the opportunity to identify and describe events occurring thousands of years ago. However, the best approach to questions such as the pre-historic settlement of South America involves the interaction of different scholars such as social-cultural anthropologists, linguists, and archaeologists. From this point of view, molecular biology has been proposed as an adequate tool to answer questions such as: What are the origins of Indian groups? When did the colonization phenomena occur, and what was the structure of these phenomena? Today it is possible to quantify the diversity found in the first colonizers, individuals as well as populations, using samples from contemporary groups. However, the most reliable phylogenetic analysis aimed at these questions utilizes pre-colombian materials (ancient samples) which may encompass a range of variability distinct from the range observed in contemporary human populations. Hence, aDNA samples from different regions of South America were investigated, in order to understand evolutionary human processes. In this present investigation, we have used human mtDNA in evolutionary and populational studies, involving contemporary and pre-historic tissues such as bones, skin, teeth, and hair. In general, we have found a higher degree of diversity in the mitochondrial lines, mainly in ancient samples. This fact led us to a re-evaluation of the main mitochondrial haplogroups which participated in the human colonization process in South America, because most of the demographic and evolutionary studies of these populations consider only samples from contemporary Amerindian peoples.

ECOLOGICAL ASPECTS OF PAST HUMAN HEALTH: THE EFFECTS OF INDOOR AND OUTDOOR ENVIRONMENTS AND CLIMATE ON HEALTH. Charlotte Roberts

The assessment of the health of our ancestors is a key aspect of archaeological exploration. While many factors can predispose to poor health, there has been a concentration on the effects of changes in economy on the occurrence of disease, for example, the development of agriculture. Less common has been the palaeopathological analysis of skeletal samples in relation to their general and local living environments. This paper will review some of the palaeopathological studies which have already been undertaken and consider the potential for this field of study.

DO NOT RUN BEFORE WE CAN WALK: ISSUES IN ANALYTICAL METHODS IN PALAEOPATHOLOGY. Charlotte Roberts

Within the last ten years the application of biomolecular methods of analysis to human skeletal remains to answer questions about health and well being has increased markedly. Although problems with these methods remain, they now form the focus of much current palaeopathological research. For example, ancient DNA analysis of specific disease organisms has enabled diagnosis of disease in individuals without evident skeletal pathology, allowing diagnosis in individuals who died before bone changes could occur. Furthermore, stable isotope analysis of carbon, nitrogen and oxygen has shed light on the dietary components of past populations, and histological analysis has been used for diagnosis. This paper makes a plea to palaeopathology as a discipline that we do not forget the basic non-destructive analytical methods that reveal much important diagnostic information, and avoid damaging our skeletal collections for no increased yield.

PALEOPARASITOLOGICAL REMAINS REVEALED BY SEVEN HISTORIC CONTEXTS FROM SQUARE OF ARMS, NAMUR, BELGIUM. Gino C. Rocha, Fransoize Bouchet, Aduto Araújo, and Luiz Fernando Ferreira

Along the centuries, the Square of Arms testified several moments of its occupation. Preventive archaeological excavations were carried out between 1996 / 1997 and seven historical strata were observed, since galo-roman period up to Modern Times. Soil samples from cesspools, latrines and structures-like were studied and revealed

intestinal parasite eggs taking into account the archaeological contexts. The sediments were processed by the same techniques used for coprolites. In addition, ultrasound was employed to dissociate the eggs and sediment particles. *Ascaris lumbricoides*, *Ascaris suum*, *Trichuris trichiura*, *Trichuris suis*, *Taenia spp.*; *Fasciola hepatica*, *Diphyllobothrium sp.* and *Oxyuris equi* eggs were identified. Paleoparasitology confirms some descriptions of the archaeologists about the functions of structures used as latrines or cesspits. Galo-roman people used to eat wild boar and, probably, the presence of *Ascaris spp.* and *Trichuris spp.* eggs could be *A. suum* and *T. suis*, considering an swine carcass recovered into the cesspit. Many times, analyses could re evaluate the origin of the sediments. Medieval latrines were not only used for rejection of human excrements. The findings suggest its function as cesspits. *Taenia sp.* eggs identified into latrines samples indicate the ingestion of uncooked beef with cysticeroid larvae. *Fasciola hepatica* eggs suggest the ingestion of raw contaminated vegetables and *Diphyllobothrium sp.* eggs indicate a contaminated fresh-water fish. *Ascaris sp.* and *Trichuris sp.* eggs indicate oral contamination by human and/or animal excrements.

BOQUEIRÃO SHELLMOUND, BURIAL I, ARRAIAL DO CABO, RJ, BRAZIL: AN OSTEOBIOGRAPHIC ANALYSIS. Claudia Rodrigues-Carvalho, Andersen Líryo, Maria Cristina Tenório, and Diogo Cerqueira Pinto

The Boqueirão shellmound is located on top of the Atalaia mound, one of the highest mounds of Arraial do Cabo, with great visibility of the shore, nearby islands, and the sea. A small archaeological excavation at this site recovered the partially complete skeleton of a woman, younger than 30 years old. An osteobiographic analysis revealed fractures in her left clavicle, ribs and in her right distal ulna, intense joint damage in her appendicular and axial skeleton, and severe tooth wear. The fractures are healed and probably were result of a single event like a fall. It is suggested that some of the joint damage was fracture-related, since the muscle insertions were not highly developed. Severely worn enamel and three periapical cavities indicate contact with abrasive elements. These conditions and other osteological and paleopathological features are discussed and compared with similar shellmound biocultural contexts.

THE COST OF LIFESTYLE: SKELETAL MARKERS OF OCCUPATIONAL STRESS (MOS) IN BRAZILIAN PREHISTORIC COASTAL POPULATIONS. Claudia Rodrigues-Carvalho

Through recent systematic analysis of MOS in shellmounds skeletal series, daily physical stress is now more intensively discussed in Brazilian bioarchaeology. Those studies are revealing expected and unexpected patterns of workloads and detailing stress variability among groups. The goal of the present study is to discuss MOS and its relations with coastal prehistoric lifestyles in Brazil. An analysis of osteoarthritis and musculoskeletal stress markers was performed in four skeletal series from shellmounds of Rio de Janeiro State coast (Beirada, Moa, Zé Espinho e Ilhote do Leste). These series represents expressions of coastal lifestyles in different times from 4,520±190 (Beirada) to 1,180±170 years before present (Zé Espinho). Only the adult appendicular skeletons from both sexes were considered for study. The results indicate heavier workloads for men than for women from the same groups, but also workload variability among groups. Low occurrence of side dominance in upper limbs was observed for all series suggesting that bilateral activities were more frequent. Evidence of osteoarthritis was predominantly mild in all series but one, Ilhote do Leste, where moderate signs of osteoarthritis reach elevated frequencies. Robusticity grades were predominately slight in females and moderate in males. A few cases of stress lesions and ossifications were reported. These data suggest a vigorous but not heavily stressful activity pattern for most of these series, indicating a good adaptation by these populations to coastal lifestyles.

ANCIENT TEXTS: MODERN PROBLEMS. Maria Carlota Rosa

When reading an ancient text, one word stands out in the reader's mind: tradition. This word has a very specific meaning in the study of linguistics: the passing down of a text which may have been completed or corrected by different copyists at different times, when the concept of authorship was not the same as it is today. To discuss some of the problems an ancient text poses to its readers, this work deals with one of the first printed medical texts in Portuguese, the *Regimento proueytoso contra ha pestenença* (Lisbon: Valentim Fernandes, 1496?), and compares it to two related texts, *A moche profitable treatise against the pestilence* (London: T. Bertholet, 1534), and the *Recopilaçam das cousas que conuem guardar se no modo de preseruar à Cidade de Lixboa. E os sãos, & curar os que esteuerem enfermos de Peste* (Lisbon: Marcos Borges, 1580). The problems which arise out of the textual structure of those books illustrate how difficult it is to establish a tradition of another type, the medical tradition.

PATHOLOGICAL ANALYSIS OF PRE-COLUMBIAN SKULLS FROM HELLSHIRE, JAMAICA.

Ana Luísa Santos, Philip Allsworth-Jones, and Michael Gardner

In 1992, it was reported that “several human skeletons” had been found in a cave in the Hellshire Hills, near Old Braeton, in the vicinity of Kingston. The villager who reported the find produced two skulls and one mandible in evidence, but did not show the cave to the representative of the Jamaica National Heritage Trust who was alerted at the time. The skulls subsequently came into the possession of the Jamaica Constabulary Force, and they were handed over for safe keeping to the University of the West Indies (UWI). They are presently housed in the Archaeology Laboratory at UWI, Mona. They were examined macroscopically in 2001 and submitted to Computerized Axial Tomography in the Radiology Section (UWI). Due to taphonomy, one of the skulls is whitish in external appearance and the other is brownish; they are here referred to as Hellshire 1 and 2, respectively. Both skulls are modified and this artificial cultural practice gives a clear Pre-Columbian chronology. Hellshire 2 shows pitting in part of the sphenoids and zygomatics and in the superciliary arch and an expansion of the *lamina externa* in part of the frontal and both parietals, covering the sutures. A differential diagnosis for this pathology will be discussed. The dental condition of these two specimens will be also described. These findings will be compared with other skulls which form part of the Lee Collection. Despite the lack of information about these individuals, in particular the archaeological context, their study is a contribution to our understanding of the extinct Taino/Arawak.

VEGETATION, CLIMATE, PLANT USE, AND DIET DURING THE COASTAL OCCUPATION IN BRAZIL FROM 6000 TO 1400 YRS BP. Rita Scheel-Ybert

The Brazilian coast was colonized by a relatively complex society of moundbuilders during the Holocene. Mounds (“sambaquis”) constructed by these people were intended as landscape markers, sometimes achieving monumental sizes. There are indicators of sedentism and of territorial and social stability. Charcoal analysis of ten sites in Southeastern and Southern Brazil provided much information. Sambaqui dwellers inhabited the “restinga” ecosystem (characteristic of the Brazilian sandy coast), usually in the vicinity of mangroves and forest formations. Depending on the site location, open restinga, restinga forest, or forest formations were dominant in the landscape. Despite climatic variations recorded by mangrove elements in the Southeastern coast, the charcoal assemblage was the same during several centuries of occupation, indicating that the vegetation was not greatly affected either by climatic or by anthropogenic perturbations. Firewood was obtained essentially by random gathering of dead wood. A great number of species was used. There are indications that the wood of a Rhamnaceae species was selected, either for economic or for ceremonial reasons. However, it was demonstrated that this occasional selection does not compromise the palaeoecological record. Tuber remains (yams and others) found with the charcoal samples attest to greater consumption of plant food by these populations than previously considered. Human management of tuber-producing and tree fruit plants was suggested, on the basis of archaeobotanical and ethnobotanical data.

PATHOLOGICAL FINDINGS IN THE SKELETONS OF SMALL CETACEANS FROM RIO DE JANEIRO, BRAZIL. Salvatore Siciliano, Lucas B. Hassel, Vinicius C. Alves, Katharina Dittmar, and Sheila M.F. Mendonça de Souza

Since 1999, cetacean remains and carcasses have been collected along the eastern Brazilian coast in order to investigate diseases. Necropsies were performed in over 50 whales and dolphins found stranded or entangled by GEMM-Lagos staff. Paleopathology expertise helped to identify skeletal pathologies, especially in two specimens of tucuxi (*Sotalia fluviatilis*), one bottlenose dolphin (*Tursiops truncatus*), one long-beaked dolphin (*Delphinus capensis*) and one orca (*Orcinus orca*). Orca lesions were suggestive of bone tumor, confirmed as osteochondromatosis by histopathological and radiographic analyses. The long-beaked dolphin had diffuse idiopathic skeletal hyperostosis (DISH), evident along the lumbar vertebrae. One bottlenose dolphin had porotic lesions on the scapulae (possibly infectious) and lateral drift of the spinal processes in some vertebrae. The marine tucuxi had vertebral destructive lesions, perhaps TB. Adding these findings to the previous study of other *Sotalia* specimens, it is suggested that pathologies may be more frequent in our contemporary cetaceans than we formerly thought. An epidemiological approach may be eventually helpful to explain the frequent death of those free-ranging wild animals. Changes in the environment leading to high tissue concentrations of organochlorines and heavy metals, biotic water contamination, and even population reduction may have played important roles in causing health problems and death. The present study of cetaceans considers them as sentinels of degrading conditions in our marine and coastal environments with obvious consequence to the human health.

PALEOMICROBIOLOGICAL STUDY OF 400 NATURALLY MUMMIFIED HUMAN REMAINS FROM UPPER NUBIA: PRELIMINARY RESULTS. Mark Spigelman, Charles L Greenblatt, Kim Vernon, Susan G Sheridan, Dennis P Van Gerven, Z Shaheem, and Helen D. Donoghue

Two early Christian burial sites at Kulubnarti, in Northern Sudan, were excavated prior to Aswan flooding. One dated from 550-750 AD, the other from c.750-1500 AD. Dry climate assured natural mummification, and 400 individuals were studied. Chemical examination of hair and coprolites indicated deficiencies in vitamins B6, B12, folacin, and vitamin C, suggesting iron deficiency. This was supported by cribra orbitalia, associated with iron deficiency anaemia but also with infections. Anaemia is found in conjunction with several infectious diseases, such as tuberculosis and Leishmaniasis, and severe iron deficiency increases susceptibility to disease. Tuberculosis was widespread in ancient and Roman Egypt, and historical contact with Upper Nubia is proven. The presence of Acacia pollen in coprolites suggested the possibility of Leishmaniasis, as these trees are the habitat of the sand fly vector. The Kulubnarti study initially looked at diseases that afflict inhabitants of the area today, including TB, leishmaniasis, brucellosis, and malaria. Anticipated broadening of the search may include hepatitis and West Nile fever. Ribs from young adults were examined for *Mycobacterium tuberculosis* DNA, using nested PCR targeting a 123 bp sequence on the repetitive element IS6110. Epiphyses of the long bones were examined for Leishmania using a PCR which amplifies a 119 bp-conserved region of the minicircle kinetoplast DNA. Initial results point to tuberculosis and leishmaniasis in both populations.

TUBERCULOSIS IN 18TH-CENTURY HUNGARIAN ADULTS AND CHILDREN DETERMINED BY THE DETECTION OF *MYCOBACTERIUM TUBERCULOSIS* DNA. Mark Spigelman, Helen D. Donoghue, Ildicó Pap, Poonam Gopal, and Anjana Vishnuram

Skeletal and naturally mummified tissues were obtained from a previously archived group of 18th century Hungarian remains. These were examined for the presence of *Mycobacterium tuberculosis* complex DNA, using specific nested PCR for the IS6110 element. Overall, 156/237 (66%) individuals were positive for MTB; this varied according to age at death, ranging from 24/59 (49.0%) in children to 132/212 in adults (62.3%). Where multiple sites were sampled from the same individual it was possible to determine whether MTB DNA was highly localised or more generally distributed. Pulmonary tuberculosis was most common, but disseminated and extra-pulmonary disease could be distinguished. Gross morphological features associated with TB were observed in only 32 MTB-positive individuals. These included abnormalities revealed by radiography (11); signs of wasting or impaired growth (6); and abnormal or collapsed vertebrae (5). However, rib lesions were rare (2) as was osteitis (3), although 53% of ribs were MTB-positive. Tissue samples from the chest cavity were more likely to be MTB-positive (62.5%) than was abdominal tissue (41.1%). To distinguish *M. tuberculosis* from *Mycobacterium bovis*, well-preserved positive samples were examined for the TbD1 deletion, present in modern strains of *M. tuberculosis*, and spoligotyped. Other loci were also examined to enable molecular fingerprinting of the infecting organism. This demonstrated that the MTB strains in this population were of *M. tuberculosis* and not *M. bovis*. In comparison with present day clinical MTB isolates, the 18th century MTB strains show few chromosomal deletions

MULTIPLE MYELOMA IN A MUMMY FROM THE HELLENISTIC PERIOD STUDIED WITH PLAIN X-RAYS AND COMPUTED TOMOGRAPHY. Eduardo Gonzalez Toledo, Susana Salceda, and Horacio Calandra

An Egyptian mummy in a black coffin, very common in the New Empire, was first radiographed and then scanned with a computed tomography unit (Ohio Nuclear- Delta Scan 50- Fast). This mummy is part of a collection from Upper Egypt, donated at the beginning of the XIX century by the founder of the Museo de La Plata, Dr. Dardo Rocha. The mummy is currently curated by the Division of Anthropology at this Museo. Analysis of the superimposed 13 mm transverse sections indicates that the sex (male) of the mummy coincides with features (i.e., the beard) of the anthropomorphic coffin. Resin and linen folds inserted into the skull through the cribiform plate and sphenoid sinus are clearly depicted as well as bandages around the thighs and testicles. Multiple osteolytic lesions in the skull, limited to the inner table, and a collapsed L3 vertebral body are findings mostly consistent with multiple myeloma. This pathology is compared with similar digital radiographs of the skull of a clinical patient with the same pathology. The embalming techniques as well as the bone disease were uniquely depicted by X-Rays and computed tomography, preserving the valuable material and complying with the ethics of studying human remains.

INFECTIONS IN THE SUBADULTS SKELETONS OF SAN PEDRO DE ATACAMA: A CASE OF THE OSTEOLOGICAL PARADOX? Pedro José Tótoro da Glória, Maria Antonietta Costa, and Walter Alves Neves

The Atacama Desert, Northern Chile, presents excellent conditions for the preservation of archaeological material. The high number of well-preserved human skeletons uncovered in the region has allowed for a rich exchange of ideas between biological anthropologists and archaeologists. The present study concentrates in the sub-adult human skeletons of San Pedro de Atacama derived from four distinct periods of the local prehistory: before, peak, final and after Tiwanaku influence. The sample is composed by 88 specimens uncovered from three cemeteries: Solcor-3, Coyo-3 and Quito-6. The dates of these cemeteries vary between 250 to 1240 AD. The specific hypothesis tested in this study is that there was a significant improvement in the quality of biological life in the region during the influence of Tiwanaku. This hypothesis is based on the analysis of the adult skeletons, and on archaeological evidence pointing to a clear local economic improvement during this period in San Pedro de Atacama. Two osteological markers were analyzed: periostitis and osteomyelitis. The results indicated an inverse picture when compared to the original expectations. The period corresponding to the peak of Tiwanaku influence was the one with the highest incidence of infected anatomical regions and also the one presenting the most severe lesions (osteomyelitis) detected. The “osteological paradox” is suggested as a possible explanation for the results obtained for the subadults.

SCHMORL'S NODES: INDICATORS OF STRESS? Handan Üstündag-Aydin

Schmorl's nodes are displacements of intervertebral disc tissue into the vertebral body. These nodes can be produced by acute trauma or gradually as the result of metabolic and neoplastic disorders, congenital factors, and degenerative disc disease associated with ordinary stress. In studies related to stress, skeletal indicators, such as enamel hypoplasia, cribra orbitalia and Harris lines were generally recorded as “typical stress markers”. However other features, such as adult stature, non-specific infection, trauma and Schmorl's nodes were considered as non-specific markers of stress, hence they may be influenced by numerous factors. The aim of this study was to discuss whether Schmorl's nodes are a reliable indicator of stress. In this comparative study the occurrence of Schmorl's nodes was examined in 6084 vertebrae of 548 adults from two different skeletal populations: a 16th-18th century cemetery in Klostermarienberg (Austria) and a mediaeval cemetery in Ephesos (Turkey). The distribution of Schmorl's nodes was similar in both samples. Schmorl's nodes were mainly localized in the lower thoracic region in both samples. The predominance of these nodes in this region suggests that these vertebrae are particularly susceptible to stress. There is no significant relationship found between Schmorl's nodes and aging. They were observed more frequently in males rather than females. The frequency of Schmorl's nodes was 7% in Klostermarienberg sample and 19% at Ephesos. Schmorl's nodes show a dissimilar pattern to both vertebral osteophytosis and apophyseal osteoarthritis; therefore it is suggested that they may have different etiologies.

MEDICOLEGAL IDENTIFICATION OF SKELETAL REMAINS THROUGH ANTEMORTEM BONE CHANGES - THE EXPERIENCE OF THE MEDICAL EXAMINER'S OFFICE IN PORTO ALEGRE, BRAZIL. Márcia Vaz

The role of forensic anthropology is to determine not only identity, but also cause of death and time elapsed since death. The Forensic Anthropology Service of the Porto Alegre Examiner's Office was established seven years ago to perform medicolegal examinations conducted in this institution. Since then, a growing number of skeletal remains and bodies in advanced states of decomposition have been sent to this Service. In the last five years (2000 to 2004), 198 skeletal remains were examined (mean = 40 examinations/year), and identity was determined in 42 cases (21%), 76% by DNA testing and 24% by dental records and bone changes, in particular those resulting from fracture. The purpose of this study is to demonstrate that antemortem bone changes, particularly those resulting from fractures, are highly efficient in determining identity of skeletal remains. However, medical, hospital and dental records are difficult to obtain in our community, which explains the predominance of genetic testing over more economical and rapid methods. Three cases of medicolegal identification by examination of bone fractures are reported.

HUMAN SACRIFICE IN PREHISPANIC PERU: NEW DISCOVERIES, NEW PATTERNS. John W. Verano

Over the past ten years, archaeological investigations in Peru have revealed important new evidence of human sacrifice. Collaboration between archaeologists, physical anthropologists, and other specialists has been important

in documenting the evidence and in revealing new details about the variability in sacrificial practices across space and time, and the possible motives for such behavior. In this presentation we provide an overview of recent discoveries of sacrificial sites in Peru, with a specific focus on new evidence of prisoner sacrifice among prehispanic Moche, Lambayeque, and Chimú cultures of the north coast. Bioanthropological analysis of the skeletal remains recovered from these sites has played an important role in the reconstruction of these practices.

ORIGIN OF HTLV-1 INFECTION IN SOUTH AMERICA: PALEOPARASITOLOGICAL AND THEORETICAL ANALYSIS. Ana Carolian P. Vicente, Alena Mayo Iniguez, Koko Otsuki, L.D. de Souza, and Aduino Araújo

The human T-cell leukemia/lymphotropic virus (HTLV) is an oncogenic retrovirus considered to have evolved partly in concert with human migrations. These human viruses are the consequence of STLV (Simian T-cell lymphotropic viruses) interspecies transmission in Africa and/or Asia. The PTLV-1 spread (HTLV-1 and STLV-1) in Africa occurred 28,000 +/- 8,000 years ago. HTLV-2 is endemic among New World Amerindian tribes, and is sometimes called a Paleo-Indian virus. This prevalence indicates that HTLV-2 was probably brought from Asia to Americas by Mongoloid migrations over the Bering land bridge some 10,000-40,000 years ago. The introduction of HTLV-1 into Latin America, where it is endemic and highly prevalent among some populations, may have occurred by several possible routes: (1) as HTLV-2, together with the ancient migration of Mongoloids; (2) by the African slave trade after the discovery of the Americas, and (3) through recent Japanese immigration. Controversial studies in Chilean Andean mummies showed the presence of HTLV-1 provirus DNA, similar to current Japanese viral sequences, in 1 of 104 specimens analyzed. Recently our group recovered HTLV proviral DNA from 3 Indian individuals from a Tukano community in the Amazon Basin. Considering this evidences, we carried out a study for retrieving HTLV DNA from naturally mummified Andean mummies from Atacama, Chile). Analysis of ancient HTLV DNA could be a valuable tool for understanding the past history of human retroviral infection and also of ancient human migrations.

SAMBAQUI INHABITANTS: COULD HARMFUL ALGAE BLOOMS (HAB) SIGNIFY STRESS TO THEM? Agueda Maria Vieira Alves

The shellmound inhabitants had many advantages in their prehistoric lifestyle along the Brazilian coast, as the archaeological scientific researchers testify. Here we intend to raise a question about the possible disadvantages and biological costs due to the constant and intense exposition to the coastal environment. The basis for this hypothesis rests on the intoxication injuries and pathologies caused by toxic algae blooms that occur to the modern coastal populations around the world. This discussion attempts to correlate health-environment parameters that were probably experienced by the people living in the shoreline shellmounds with pathological consequences described today in similar situations by public health workers. References to the possible paleoenvironmental conditions during the geological period when the shellmounds were occupied will be considered, especially the fact that some of the toxic aquatic microorganisms that are known today already existed in prehistoric times.

A PALEOPATHOLOGICAL PERSPECTIVE ON THE EVOLUTION OF COASTAL ADAPTATIONS IN THE WESTERN HEMISPHERE. Phillip L. Walker

The amenities of coastal environments are well known to modern tourists who flock to the world's beaches in enormous numbers. Archaeological data show that the coastal environments of the Western Hemisphere were among the first places Paleoindians colonized. Although coastal environments are ecologically diverse and offer many resources to hunter-gatherers, they also present significant adaptive challenges that can have unhealthy consequences. Although marine resources are rich in protein, they are practically devoid of carbohydrates. Obtaining an adequate energy supply is a limiting factor for coastal populations. Coastal environments are also topographically diverse with rugged cliffs and long stretches of flat beaches. Such environments place heavy demands on the musculo-skeletal system and can result in traumatic injuries and osteoarthritis. Coastal environments also harbor many pathogens that can have very harmful consequences for people who come in contact with them. These health challenges of coastal environments are illustrated by differences in the frequency of pathological lesions in the large series of skeletal collections studied as part of the History of Health in the Western Hemisphere Project.

THE IMPORTANCE OF NUMBERS: WHAT LARGE SKELETAL SAMPLES CAN REVEAL ABOUT THE HEALTH STATUS OF EARLIER HUMAN POPULATIONS. Phillip L. Walker

The inferences we can make about the health status of our ancestors is limited in many respects by the size of the skeletal samples that we have available for analysis. Not only are archaeological skeletal samples typically small (usually less than 50-100 individuals), but they are subject to age, sex, sex status dependent biases that make population-level health status extrapolations hazardous. Paleopathologists have traditionally avoided these issues by taking the case-specific “doctor to the dead” approach that emphasizes identifying modern pathological conditions in ancient human remains. Although valuable, such work has significant limitations; it provides no basis for determining the prevalence of specific diseases in ancient human populations, nor does it easily accommodate the fact that pathogens and their human hosts participate in complicated co-evolutionary processes in which they adapt to each other. This means that ancient pathogens may produce skeletal lesions that differ significantly from those produced by their modern descendants. An alternative approach is to attempt to learn more about the health status and quality of earlier populations through surveying large number of skeletons for frequently occurring health-related skeletal conditions. The strengths and weaknesses of this approach are illustrated by the results of the History of Health in the Western Hemisphere project in which over 12,000 skeletons were analyzed using standardized techniques through the collaboration of a large number of different researchers.

CARIES PREVALENCE IN SKELETAL SERIES: IT IS POSSIBLE TO COMPARE? Verônica Wesolowski

Because of the potential link with subsistence, dental caries is a continuous and frequent issue in paleopathological research, and diet is the most popular explanation for cavities prevalence. The aim of this paper is to verify if it is possible to compare caries prevalence reported for different archaeological skeletal series, and also to verify if other factors besides diet are implicated in explanations of dental cavity prevalence. To appropriately compare prevalence, diagnostic methods, definitions of carious lesions, the prevalence of dental calculus, sex and age composition of samples, and location of lesions in different skeletal series should be similar. Twenty six papers about dental health with caries prevalence mentioned, published from 1999 thru 2004, were analyzed for completeness of information in carious lesion diagnosis, age, sex, and size of the samples, and dental calculus prevalence. More than half of the analyzed papers do not give adequate information about the characteristics of samples and lesions: descriptions of diagnostic method, definitions of location and morphology of lesions, and age and sex characterization of samples were incomplete or absent. Only 3 papers do not attempt to explain the observed prevalence, while all of the others used diet to explain caries lesions development and verified prevalence. Only nine implicated other factors as contributors to caries lesions development.

VEGETAL MICRO-RESIDUES ON HUMAN ANCIENT DENTAL CALCULUS: A WAY TO BETTER UNDERSTANDING DIET AND DENTAL DISEASE. Veronica Wesolowski and Karl J. Reinhard

During the 1990s, research methods for studying vegetal micro-residues in archaeological contexts improved. Several works with vegetal micro-residues from soil, artifacts, and coproliths were published, but there were few reports on vegetal micro-fossils from dental pathologies or skeletal remains. Preliminary studies show that it is possible to recover from dental calculus a varied assortment of vegetal micro-residues. Apparently, dental calculus can promote the retention and conservation of multiple kind of vegetal material like phytoliths, fibers, and starch grains. This retention and conservation capability should be explored, as it provides another window opened on human quotidian habits in the past. This presentation describes the processing of human dental calculus to recover vegetal micro-residues and their analysis aimed at better understanding of diet and dental disease, in particular dental wear and caries.

BONY EVIDENCE OF BEHEADING. Karin Wiltshcke-Schrotta

The cause of an individual’s death is frequently in question when we deal with human skeletal remains. Unfortunately, in most cases the cause of death is impossible to determine. However, while investigating an Early Medieval series from Austria (630-800 A.D.) with 554 burials, three individuals with sharp cut marks at the cervical vertebrae were unearthed. The investigation of the possibility that these individuals were beheaded includes a description of the cut marks and their implications. Furthermore, different motivations for beheading are discussed. Typical cut mark patterns of beheading as a result of an armed confrontation, a sacrifice, slaughtering, punishment, or ritual are presented with examples from my own investigations and from literature. An overview elucidates which motivation is the most probable for the beheading of these individuals. Two of the medieval finds are likely to be a result of decapitation punishment. One individual may have been stabbed with a

knife, possibly in an armed confrontation. Beheading seems to be a rare method of capital punishment in Early Medieval Europe. The rarity of beheaded finds is perhaps due to poor preservation or to the difficulty of identifying cut marks on the cervical vertebrae.

MOLECULAR IDENTIFICATION OF *LEISHMANIA* DNA IN MUMMIES FROM ANCIENT EGYPT.

Albert R. Zink, Bettina Schraut, and Andreas G. Nerlich

Bone tissue samples from 91 ancient Egyptian mummies and skeletons from the Pre- to Early Dynastic site of Abydos (n=7; 3500-2800 BC), a Middle Kingdom tomb in Thebes West (42; 2050-1650), and different tomb complexes in Thebes West, from the Middle, New Kingdom, and Late Period (42; c. 2050BC – 500BC) were studied. Samples were tested for the presence of *Leishmania* spp. DNA and further characterization by direct sequencing. PCR was performed with primers targeting a 120 bp fragment region of the minicircle molecule of kinetoplastid mitochondrial parasite DNA (kDNA). Eight of the 91 samples had the 120bp fragment of the kDNA amplified, five samples from the Middle Kingdom and four from the New Kingdom/ Late Period tombs. No ancient *Leishmania* DNA was found in the Pre- to Early Dynastic specimens. Direct sequencing of the first PCR products was carried out and the results were aligned with other *Leishmania* sequences from the NCBI Genbank database. Two Middle Kingdom cases were associated with kDNA of *Leishmania donovani* which causes visceral leishmaniasis (kalaazar), a serious modern health problem in the Near East and North and East African countries. We here provide the first evidence for visceral leishmaniasis in ancient Egypt dating back about 4000 years ago. The molecular identification of *Leishmania* DNA offers a unique opportunity to study the occurrence, frequency and evolution of this infectious disease, both in the Old and New Worlds.

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