

## ABSTRACTS OF PAPERS ARRANGED ALPHABETICALLY BY AUTHOR

### SANTA ROSA ISLAND, CA: A CASE FOR MAMMOTH EXTINCTION AND THE FIRST HUMAN PRESENCE AS SYNCHRONOUS EVENTS

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#### *Abstract*

Recent investigations of the distribution and chronology of mammoth and human histories on Santa Rosa Island, provide evidence of contemporary late Pleistocene presence. The northern Channel Islands of California, San Miguel, Santa Rosa and Santa Cruz, have mammoth remains. Santa Rosa Island has the earliest absolute date for human presence. A pygmy mammoth bone has provided an absolute date, supported by charcoal dating, of mammoth presence at the time of first humans arrived on the island.

### SCIENCE IN EVIDENCE: WHAT KENNEWICK MAN CAN TEACH US ABOUT LEGAL PROOF

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#### *Abstract*

Some controversies spark legal as well as scientific debate. Those that are headed for a judicial resolution (such as, for example, competing claims about the applicability of the Native American Graves Protection and Repatriation Act) present special challenges because the Federal Rules of Evidence govern the admissibility of scientific evidence. The present-day evidentiary rules grew out of controversies such as the reliability of early versions of the polygraph, or the causes for certain birth defects but are applicable to all scientific or expert evidence. This paper and presentation will discuss the origins and requirements of the rule, its importance in judicial controversies, and how courts are instructed to measure the reliability of scientific evidence.

### ENVIRONMENTS OF THE NORTHWEST ENTRADA

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*Abstract*

Two routes existed for migration into North America from the northwest: the ‘coastal route’ along the western side and the ‘ice-free corridor’ through the interior between the ice sheets. This paper will consider the geographic and climatic factors that affect the relative timing and *feasibility* of the two routes using the Archaeoclimatology Macrophysical Climate Model in connection with geographic conditions and obstacles. Whether one or the other was actually used in the immigration process must, logically, be a function of time, but the final evidence must come from archaeological fieldwork. Our comparison of the conditions of the two routes suggests that the coastal route was, by far, the best option and should be the focus of further archaeological investigation.

## RELIGION AND SCIENCE IN AMERICA – A CLASH OF WORLDVIEWS

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*Abstract*

The conflict between religion and science can be described as a clash of worldviews – assertions about the nature of experiential reality, and how we can best apprehend it. I argue that it is difficult, if not impossible, to reconcile the worldviews of religion and science, that – for historical reasons – religion plays a more important role in the formation of public policy in the United States than it does in many other secular nations, and that these confrontations can ultimately be traced to classical antiquity and the contrast between materialism and dualism. Americans are fascinated by science, but do not understand what it is or does. Areas of conflict familiar to everyone include the ongoing struggle between evolutionary biology and scientific creationism, and the tensions arising from Native American worldviews and those of archaeologists. I review the history of these conflicts, and make a case for western science as the most powerful

conceptual framework ever devised to account for the origins and diversity of life on earth.

## THINKING SMALL AND FALLING SHORT: A CRITIQUE OF MYOPIA IN ARCHAEOLOGICAL INQUIRY

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### *Abstract*

Peopling the Western Hemisphere as the last major phase in Human Adaptive Radiation is of global significance, yet many of those who claim to be investigating the phenomenon fail to consider its full scope. First, this was a process, not an event. Comprehensive understanding this process involves the full suite of cultural and natural conditions of the Northern Hemisphere and the evolutionary status of *Homo sapiens* for at least the past 25,000 years. Humans were far more cosmopolitan, mobile, and capable than we tend to assume. General and specific examples of myopia and its consequences in investigating the peopling of the Americas illustrate the problem.

## 'HOW MUCH FAITH CAN WE PUT IN ANCIENT GENETIC DATA?'

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### *Abstract:*

Discoveries linked to ancient DNA (aDNA) studies repeatedly hit the headlines of both the popular and scientific press. As such, aDNA can often appear to the to non-specialist as a miracle tool that provides a means to answer otherwise unapproachable questions. However, aDNA studies are not without their flaws – indeed critics have argued that they suffer more problems than many comparable fields of research. As such, exactly how much information aDNA studies can add to scientific debate remains uncertain.

Here I discuss some of the problems that affect the field, with the aim of highlighting exactly how much faith we can put in published data. Furthermore, I discuss potential solutions to some of the problems and future work that needs to be undertaken in order

that aDNA studies develop a sounder theoretical basis.

## GENESIS, GENES, AND GERMS: THE IMPLICATIONS OF GENETICS AND EPIDEMIOLOGY FOR INITIAL AND LATER OLD WORLD ENTRIES INTO THE AMERICAS

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**Abstract.** Earliest identifiable New World human skeletons show Ainu-Australoid craniofacial affiliations and mitochondrial-DNA haplogroups B, C, and D, especially the last two, and their forebears may have entered from eastern Asia from the Sea of Okhotsk region via coastal cruising in bundle raft-boats some 25,000–15,000 B.P. plus, possibly, by island-hopping across the South Pacific; they had been preceded by as-yet unidentified peoples following unspecified routes. Around 18,000–16,000 B.P. Upper Paleolithic people likely crossed along the Atlantic ice-edge to eastern North America, carrying mtDNA haplogroup X. Mongoloid, probably overland-traveling Beringian entrants of about 14,000–10,000 B.P., principal progenitors of living Native Americans, ultimately genetically overwhelmed the earlier populations, to different degrees in different regions. In terms of DNA, these Mongoloid Americans as a whole relate genetically most closely to populations in or formerly in Siberia's Baikal/Altai region, but Siberia's genetic geography may have changed substantially since. They probably carried largely mtDNA haplogroups C and D. River-oriented, canoe-traveling Na-Denéan-speakers, of similar genetic background to the immediately previous entrants, came into subarctic Alaska from Siberia's Yenesei delta around 5000 B.P.; mtDNA haplogroup A predominated. At about the same time, ancestral Eskimo/Inuit moved into the North American Arctic. Between 5000 and 2500 B.P., sea-borne inputs came from Indonesia to Colombia and from Southeast China and to Central America. Ancestors of California's Penutians arrived by canoe from the Ob River delta around 2500 B.P. American Indians display considerable genetic diversity, and in addition to the above scenarios, geographical distributions of some marker genes imply later-Holocene, sea-borne increments from Afro-Asiatic, southern Asian, East Asian, and probably European and Subsaharan African lands.

Several species of tropical human intestinal parasitic worms are pre-Columbian in the Americas but cannot have been introduced via the Arctic. They must have entered with human ocean-crossers or via very rapid coastwise migration by boat. Three species are dated to quite early, from 8620 to 4250 B.P.

The lack of endemism in the New World of most Old World infectious diseases (other than tuberculosis, typhus, and treponematosi, and perhaps yellow fever) probably reflects 1) the historically late emergence of some diseases, 2) childhood-acquired immunity on the part of ocean-crossers, 3) voyages whose temporal lengths exceeded the

diseases' incubation and infectious periods; and 4) New World populations too small to support endemism. Tuberculosis, typhus, and some forms of treponematosi s could have survived Beringian climate, but yellow fever could not and would have to be watercraft-borne.

## ANTHROPOGENIC EXTINCTION: TRUTH, LIES, AND CONSEQUENCE

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(Paper not presented)

### *Abstract*

There is no “theory of extinction” comparable to the “theory of evolution”, yet extinction is just as much a part of the story of life on this planet as evolution is. Lack of testable theory is apparent in the continuing controversy over late Quaternary extinctions. Anthropogenic extinctions, or losses directly caused by humans, are thought by many to have been the dominant process of species collapse since the late Pleistocene. Hard evidence for this position has proven extremely elusive, suggesting that it is probably far from an adequate description of how extinctions occur in most ecosystems. Tests are offered to show that the anthropogenic argument in its most extreme form—Blitzkrieg—can be rejected on its own terms.

## MODELING PLEISTOCENE LOCAL CLIMATIC PARAMETERS AND THE PALEOECOLOGY OF PLEISTOCENE MEGAFUNA: A NEW APPROACH TO UNDERSTANDING PLEISTOCENE EXTINCTIONS

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(Paper not included present volume.)

### *Abstract*

The question of the ultimate causes of extinction of the megafauna at the end of the Pleistocene is one of timing.† Can it be demonstrated that the disappearance of a species

coincided with or occurred shortly after the first appearance of humans in a region or alternatively can it be demonstrated that the disappearance of a species coincided with or occurred shortly after an environmental or climatic change.† It is also critical to demonstrate whether such a climatic change was widespread and synchronous over the entire range of the species or diachronic resulting in the more gradual disappearance of the species through time and space.† At the moment we have limited knowledge of physical parameters such as seasonal variations in temperature and rainfall related to the ecology of an extinct species.

The Macrophysical Climate Modeling (MCM) is predicated on orbital forcing, variations in atmospheric transparency, and the principles of synoptic climatology. The model has previously been applied to archeological sites and has been referred to as archaeoclimatology. We have extended the use of the model into the late Pleistocene to examine the relationships of the paleoecology and distribution of the North American fauna to various climatic parameters, such as monthly temperature and precipitation patterns, although other climatic patterns can be determined from the model as well. Site specificity is the key component to the model as it lets us examine climatic parameters at individual sites with extinct fauna and compare multiple sites to look at shared climatic parameters. Calculations from the model are done for 200 year averages (now moving to 100 year) and allow us to utilize AMS radiocarbon dates for individual extinct species and determine climatic parameters for narrow slices of time. Consequently the model allows us to examine specific climatic parameters that may be related to an extinct species' paleoecology and critically examine climatic events that may be related to the extinction of species at the end of the Pleistocene. We present examples of paleoclimatic parameters for different extinct species of megafauna related to their paleoecology and how this may be related to explanations for their subsequent extinction.

## THE FINAL FRONTIER? RECENT DEVELOPMENTS IN RADIOCARBON DATING: EXPLORING WHAT CAN AND CANNOT BE DONE USING SELECT EXAMPLES FROM PALAEOLITHIC ARCHAEOLOGY.

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### *Abstract*

Radiocarbon dating can be said to be in a 'frontiers' phase, in which the applications of the technique are being pushed through new chemical and physical developments that have broadened both the reliability and applicability of the technique, In recent years such developments have allowed the measurement of remarkably small samples in the

microgram range, and have improved the ability of radiocarbon laboratories to remove contaminating substances, which have improved the accuracy in particular of early prehistoric samples. The refinement of statistical analyses and use of large 14C datasets as proxy demographic information has been revealing large-scale prehistoric population fluctuations that can be correlated to environmental change, and slow improvements in archaeologists' appreciation of the needs of 'chronometric hygiene' are beginning to have a cleansing effect on a large and old database. But frontiers are also about limits and barriers, and a number of pitfalls still exist. Archaeologists in particular still ignore some of the most basic problems that were identified in the 'pioneer' phase of radiocarbon development: the relevance of measurements to archaeological events, the effect of radiocarbon plateaux on accuracy, and the most ignored problem of all – the assumptions one must make about precision. Here, advances and limitations are explored using examples from prehistory, such as Neanderthal extinction and modern human expansion, the dating of cave art, and European Late Pleistocene human demography.

## RELIABLE AND UNRELIABLE DATING IN THE ABSENCE OF RADIOCARBON

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### *Abstract*

Essentially I will cover current controversies in dating for alternative methods to 14C dating (e.g. ESR, U-series, OSL). To some extent I will draw upon dating examples from the Americas, but I will also talk about dating debates about the first human colonization of Australia (where much of the dating evidence has been challenged) and European examples.

## KENNEWICK MAN: THE SCIENCE BEHIND THE COURT DECISION

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### *Abstract*

The Kennewick Man illustrates the evidentiary complexities and difficulties created by repatriation claims involving ancient skeletal remains. The Secretary of the Interior determined that the Kennewick Man skeleton was Native American because of its age (more than 9000 years), and that it was culturally affiliated to a coalition of local tribes. The courts rejected his conclusions. They held that he failed to demonstrate that the

skeleton had a special and significant genetic or cultural relationship to the tribal claimants or any other living American Indians. Finding proof of such a relationship with current scientific technologies may be impossible for skeletons as old as Kennewick Man.

## MEGAFUNA, MAN AND PATHOGENS: INTERNATIONAL TRAVEL IN THE PLEISTOCENE

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### *Abstract:*

The migration of animals during the Pleistocene is clearly represented in the fossil record. Travel by humans is similarly recorded through their skeletal remains and in the archaeological record of material culture change. While aDNA studies identify mammalian populations, genetic mutations aid in establishing the number of generations that separate species from their parent populations. Craniometrics in human groups, and stable isotope  $^{15}\text{N}/^{13}\text{C}$  ratios in all populations, further define life ways and paleoenvironments. What is not well understood are such issues as actual migration routes and species-specific extinction events. We know that numerous species migrated into and out of North America, but not the means by which this was accomplished in non-Arctic adapted mammals and during periods in which the Panamanian Land Bridge was not accessible. We also know that in much of the world, ancient humans disappeared from the skeletal record shortly after the megafaunal extinctions occurred. Was there a pathogenic link between these mammalian groups? What role did hyperdisease take in these extinction events? This paper explores these issues, as well as possible methods for testing both newer hypotheses and those that have been more widely circulated.

## 'NEW RADIOCARBON DATES FOR CLOVIS—IMPLICATIONS FOR THE PEOPLING OF THE AMERICAS'

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(Paper not included present volume.)

### *Abstract*

Clovis has long been considered to be the oldest unequivocal evidence of humans in the Americas, dating between 11,500 and 10,900  $^{14}\text{C}$  yr B.P.† New radiocarbon dates and a

reevaluation of the existing Clovis date record, revise the Clovis time range to 11,050-10,800 14C yr B.P.† In as little as 200 calendar years, Clovis technology originated and spread throughout North America.† The revised age range for Clovis has implications to our understanding of the Clovis complex and the peopling of the Americas.†

## 'ANCIENT DNA FROM ICE, SEDIMENTS, AND COPROLITES'

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(Paper not included present volume.)

### *Abstract*

Ancient DNA from animals and plants can be obtained directly from basal glacial ice, sediments, and coprolites. This enables us to study environments prior to glaciations, extinction events of megafauna, and past migration routes of humans and animals. In this talk a number of case studies will be presented on how ancient DNA from ice, sediments and coprolites can be used to address specific scientific questions along with a discussion of possible pitfalls connected to this type of research.