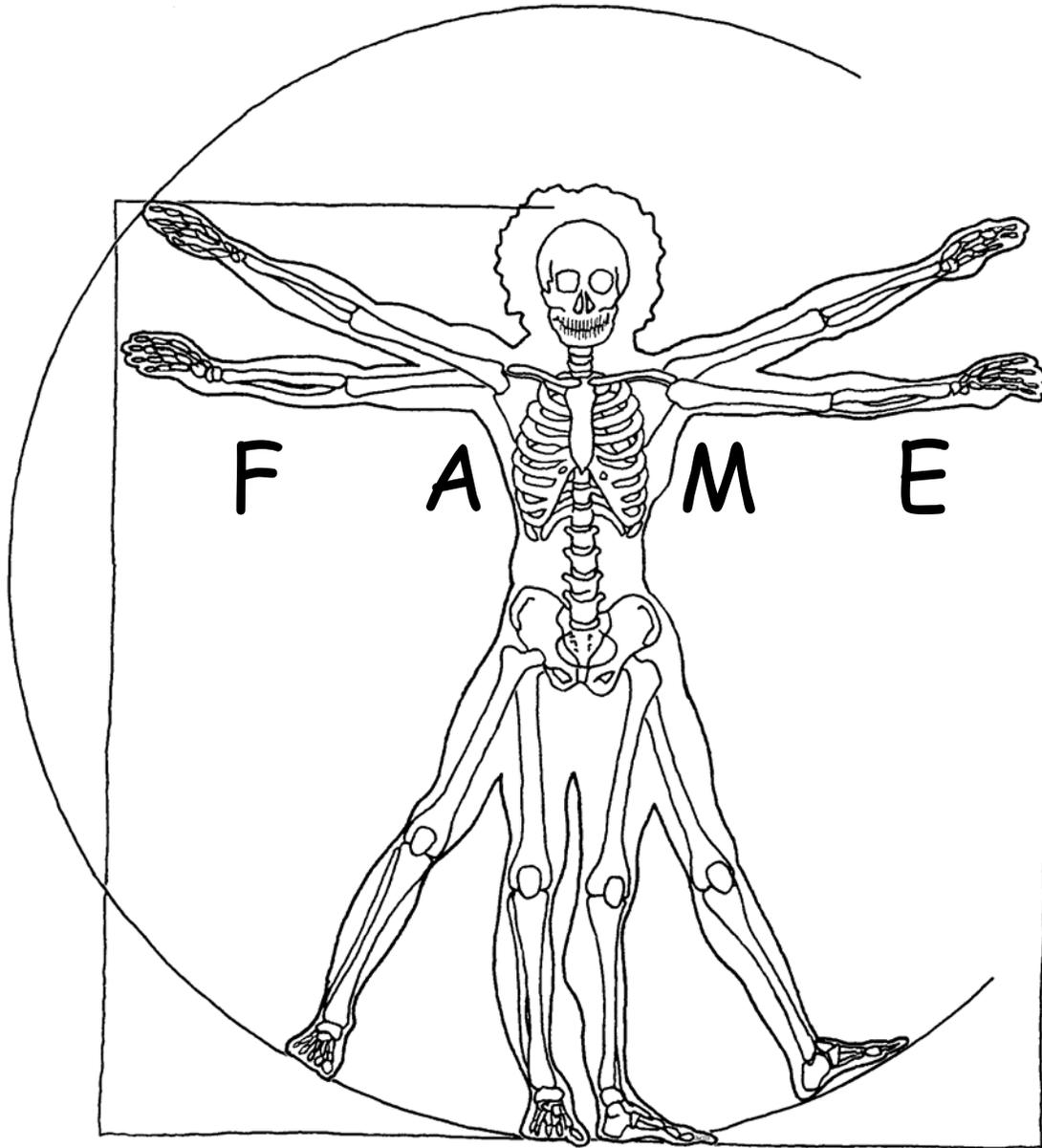


Fysisch-Anthropologische Mededelingen



Newsletter of the Dutch Association of Physical Anthropologists

No. 13, February 2005

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From the editors

In the past year, we received the sad news that one of the three founding fathers of the NVFA, Dr D.P. Bosscha Erdbrink, died. We therefore begin this newsletter with an obituary of him written by George Maat.

This is followed by abstracts of the talks given at the symposium held in November 2004, and the usual, very welcome, contributions of abstracts and poster presentations by our members.

We have also included an interesting, polemic article on the relationship between Late Pleistocene and Holocene populations in America and Europe by one of our members. After more than a year of trial and error, we have at last succeeded in getting our own website 'on air': www.nvfa.nl.

We would, of course, be very interested to hear your comments, and are open to any suggestions for improvements and/or additional information.

In Memoriam Dr D.P. Bosscha Erdbrink

"Dr D.P. Bosscha Erdbrink, een man uit één stuk". Korter en duidelijker kan het niet.

Iemand die ik mij altijd zal herinneren als:

In de eerste plaats een zeer vriendelijke, trouwe, bescheiden en zeer integere man.

Een groot voorvechter, ook toen alles tegen zat, van de oprichting van een algemene vereniging voor geïnteresseerden in de fysisch antropologie. En zo is de Nederlandse Vereniging voor Fysische Antropologie er ook gekomen. In deze was er bij hem geen plaats voor twijfel.

Iemand die snel het handelen van anderen doorzag, daar rekening mee hield en je waarschuwde.

Een persoon die alles wat hij deed tot in de puntjes voorbereidde. Een voorbeeld: eens in de zoveel tijd kreeg je alle nieuwe overdrukjes van zijn vele publicaties over de 'River Valley People'. Je kreeg ze 'terloops', in perfecte staat, zonder 'uitvallers' en in de juiste volgorde.

Een man die, als je hem met "je" of zijn voornaam aansprak, net deed alsof hij het niet hoorde.

George Maat

Symposium abstracts

Don't fence me in

Hylke de Jong

Faculty of Archaeology, Leiden University

The aim of this research was to test a social hypothesis through the use of $^{87}\text{Sr}/^{86}\text{Sr}$ provenancing techniques. Presence, occupations, and most importantly change of or in Caribbean archaeology are usually the outcome of, and function of indigenous mobility. By using $^{87}\text{Sr}/^{86}\text{Sr}$ values from human tissues, it is possible to place a location of origin and habitation on those remains. The hypothesis adopted would place the emphasis on the differences in signal rather than on the actual signal itself. This hypothesis was the assumption of matrilocality; a pattern of matrimonial-mobility, in which couples tended to move to the settlement of the bride's parents to take up residence. This social view of the Caribbean Amerindians was put forward on observations gleaned from the contact Hispanic sources, and analogies drawn from ethnographic fieldwork carried out in the linguistically related Orinoco and Amazon valleys and deltas. In a matriloal mobile scenario, the $^{87}\text{Sr}/^{86}\text{Sr}$ expectations would be that the females would give local provenances, while the males would give non-local provenances.

Fourteen individuals, seven female and seven male, were taken from the recovered Pre-Columbian population of Anse à la Gourde, Guadeloupe (AD 500-1350, the population stemming from the later period of the site; AD1200-1350). This excavation took place under the auspices of the DRAC (Direction Régionale des Affaires Culturelles) and Leiden University between 1995-2000. In addition, four rice rat (*Oryzomys* sp.) individuals recovered during the excavation were taken for sampling to serve as proxy for the local $^{87}\text{Sr}/^{86}\text{Sr}$ signal.

Not all burials in the Pre-Columbian Caribbean are complete, as reburial and worship of ancestral tokens was prevalent. For each individual two samples were necessary; one from the enamel of the tooth, and one from the mid-shaft compact bone of the long bone, and the criteria for the selection of the individuals was made on the basis of this availability. The tooth enamel is formed in early childhood, and the signal derived from it would indicate pre-marital location. The long bone, subject to remodeling during life is thought to be representative of the last ten years before death. The rice

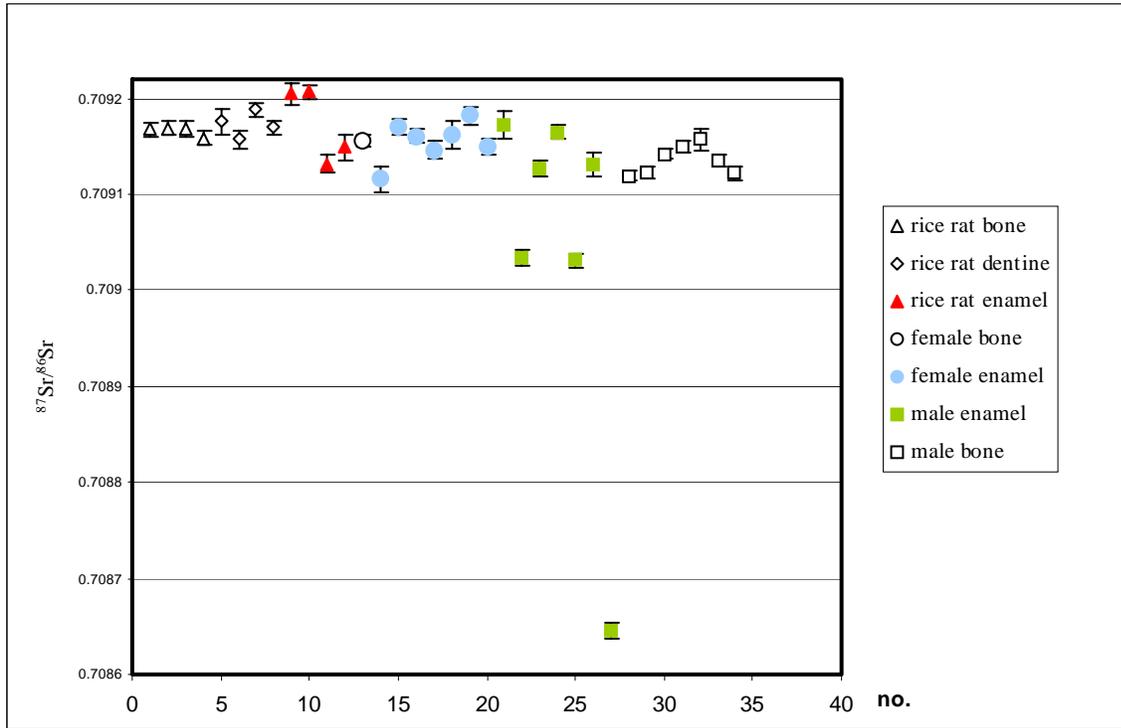
rat samples consisted of four left jaws (mandibles), and were samples taken from the enamel, the dentine, and the mandibular bone. All samples were about 1 mg in weight. The samples were treated according to the standard procedure for strontium at the Geochemistry Laboratory of the Free University, Amsterdam. This involved an initial dissolution in 5N HAC, and a cycle of evaporation and nitration, ending with the Strontium fraction being caught on a resin bed.

Samples were measured dynamically in 10 data blocks, 10 scans per block, in a MatFinnigan 262. All analyses were corrected for mass fractionation using an exponential law, with a y-intersect (= 1) being the $^{86}\text{Sr}/^{88}\text{Sr} = 0.1194$. NBS 987 standards ($n = 7$) gave 0.710245 ± 0.000008 , which is within range of the long-term average of 0.710250 ± 0.000012 ($n > 200$).

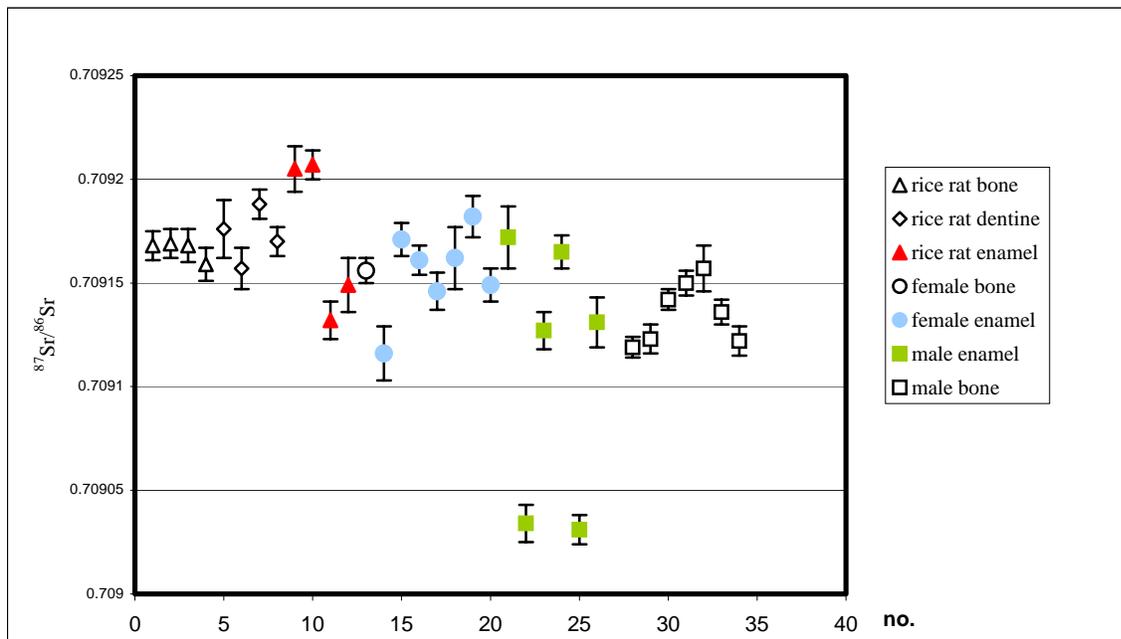
The rice rat enamel signal ranged between 0.709207 ± 0.00007 and 0.709132 ± 0.000009 . The two extremes are given by the rice rat enamel, presumably reflecting the variation in this locality. All the enamel samples for the female individuals fell within the rice rat range spanning 91 ppm, and were strongly homogenous. Three of the seven males fell outside this range. All the long bone samples fell within the rice rat range.

The data show a variation between the sexes, and as groups they differ much. This is more or less caused by one male individual, whose enamel $^{87}\text{Sr}/^{86}\text{Sr}$ falls outside the rice rat range by 561 ppm, though two other male individuals also fall outside the rice rat range. This characterizes the male group as heterogenous. Given the marine setting of the Caribbean, it is surprising that there is any variation at all. The influence of the sea, and in this particular case, the geology of Grand-Terre Guadeloupe being a marine limestone of Pliocene-Quaternary origin, makes it all the more exceptional that one individual should stand out so.

Therefore there seems to be a strong indication for matrilocality, as presented by this pilot study. It lends support to the anthropological analogies drawn to the archaeological past. However, a sample of 14 out of a recovered 83 individuals cannot be considered representative. The long bone samples were disregarded, as having been heavily diageneticised, due to great permeability of the bone structure, in favour of the more impermeable enamel. There also seems to be enough variation to lend support for future attempts to trace individuals to specific locations in the Caribbean.



Total samples Anse à la Gourde, Guadeloupe



Blow up of the above, showing the error bars

*

Changes in age at weaning?**Enamel hypoplasia and health during childhood in early medieval Maastricht and 18th and 19th century Zwolle (the Netherlands)**

M.L.M. Merckx and R.G.A.M. Panhuysen

Two series of skeletal remains from the Netherlands were examined in order to determine the impact of known differences in life conditions on health in the skeleton. In this presentation the results concerning the prevalence and the age of formation of enamel hypoplasia will be discussed.

The first sample consists of 60 individuals from the “Pandhof” cemetery in Maastricht, dated between 350 and 950 AD. These individuals were of intermediate to high social status. The second sample was excavated in the “Broerenkerk” in Zwolle and consists of 54 individuals of low to intermediate social status who died between 1819 and 1828 AD. The presence of enamel hypoplasia was recorded according to the 'standards' (Buikstra and Ubelaker 1994). The age of formation of enamel hypoplasia was calculated as described by Goodman and Rose (1990). In both samples almost the same percentage of individuals had enamel hypoplasia in one or more teeth. A significant difference was found between the samples regarding the age of formation of the enamel hypoplasia. In the Pandhof sample most enamel hypoplasias had formed between 2 and 4 years, whereas in the Broerenkerk sample the hypoplasias occurred earlier in life, namely between 1 and 3 years. It is tempting to suggest this difference in the age of formation was associated with differences in the nutrition of young children. More specifically the difference may be a consequence of diachronic changes concerning the age at weaning.

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The oldest hospice of Delft, a short impression

Jan-Michael Groen

Four archaeological campaigns were carried out in the grounds of the former 'Oude and Nieuwe Gasthuis' (Old and New Hospice) in Delft. This hospice was founded in, or just before, AD 1252 and can justifiably be regarded as the oldest still functioning

hospital in the Netherlands. The archaeological investigations yielded the foundations of a ward (infirmary), a number of annexes, and a number of cesspits and wells. Also found were the foundations of (minimally) two chapels and an ossuary, as well as part of a former burial ground. The ossuary yielded skeletal elements of a minimum of 35 individuals. In the burial ground 400 small primary grave locations were discovered. In 2001 a start was made on the examination of the human skeletal remains found in the burial ground and ossuary. This research was based on models current in physical anthropology but also on traditional historical sources and spatial analyses executed with the help of GIS. A primary point of departure was the aim of a multi-disciplinary approach in which the goal was the integration of knowledge elements from historical, archaeological and physical anthropological disciplines. The focus of the research centred on the following six questions:

1. Which socio-economical strata and/or religious groups were interred in the burial ground?
2. What was the demographic composition of these populations?
3. What was the state of health of these populations?
4. Are any traces observable of biological relationships in these populations?
5. Which burial methods and rituals were used in the burial ground?
6. What is the value of the current physical anthropological models in an archaeological context?

During the lecture the applied multi-disciplinary approach will be considered more fully and every research question will be illustrated with an example.



Living by the sword?

Sharp bladed trauma in early medieval Maastricht.

Raphaël Panhuysen

Saint Servatius Project, Amsterdam Archaeological Centre, University of Amsterdam, the Netherlands

Apart from fractures, injuries caused by sharp-bladed objects were the most frequent type of trauma in skeletal remains from early medieval Maastricht (480-950 AD). These traumas were studied to discover more about the historical context of this type of trauma. Examined were skeletal remains from four early medieval cemeteries from

Maastricht and surroundings. Evident blunt-force trauma was not found in the sample and trauma due to the impact of pointed objects was generally superficial and ambiguous. Sharp-bladed trauma were found in eight adult male individuals. The characteristics of the wounds suggest that all of these trauma were inflicted by swords. In one case the tibia was involved, in all other cases the skull was affected. In four individuals the trauma displayed signs of healing, while the other cases lacked any sign of healing. Analysis of individuals with sharp-bladed trauma within the archaeological context suggests that generally these trauma were found among males of high social status. The preliminary results of samples of lower social status indicate that the prevalence of sharp-bladed trauma was considerably lower in these groups. The circumstances under which these wounds were inflicted will be discussed.



The relationship between dogs and humans since prehistoric times

Paul Storm

The evolution of dogs and humans shows an interesting parallel. There are moreover scientists who think that dogs and humans have influenced each other during their development.

It is clear that in both dogs and humans neoteny plays an important role in their history of development. Neoteny means that youthful characteristics persist in adult individuals; they therefore do not disappear as is normally the case. Hence the young of mammals, such as wolves and chimpanzees, have a much shorter snout than their parents. A large number of dog species and humans retain this youthful characteristic throughout their lives. Humans are extreme in this respect, they have a noticeable flat face, but also dog species such as bulldogs and boxers have a very short snout. It can be argued that dogs have an infantile wolf head and humans an infantile ape head. It is interesting to note that neoteny in these two species is not limited to the anatomy. Adult dogs and humans show youthful behaviour in that they remain eager to learn throughout their lives.

Scientists who are of the opinion that there has been co-evolution between dogs and humans think that not only does the dog owe its success to humans, but that conversely humans owe their success to dogs. We are accustomed to the idea that humans are in control of 'everything' and decide their own way. Revolutionary is

therefore the idea that not humans selected the wolf, but the other way around, wolves selected humans to live together with. This successful symbiosis between wolves and humans, which would have started c. 100,000 years ago, is responsible for the evolutionary success of both species. For instance, modern humans, *Homo sapiens*, would have had an advantage over the Neanderthals, *Homo neanderthalensis*, because the former was accompanied by man's best friend. According to some this would explain why the Neanderthals went extinct and modern humans did not.



Abstracts

PHYSICAL ANTHROPOLOGICAL RESEARCH OF HUMAN SKELETAL REMAINS BURIED AROUND THE ST. MAARTENSKERK IN ELST, GELDERLAND

S. Baetsen

(Soon to appear as material report in the series Zuid Nederlandse Rapporten of the Archeologisch Centrum van de Vrije Universiteit Amsterdam/Hendrik Brunsting Stichting)

Between July and September 2002, human graves were found during archaeological investigations into Roman temple remains by the Archeologisch Centrum van de Vrije Universiteit (ACVU - Archaeological Centre of the Free University)/Hendrik Brunsting Stichting (HBS - Hendrik Brunsting Foundation), around the Grote Kerk in Elst (Gelderland).

The recovered individuals date between 699 AD and 1850 AD. With the aid of the dating of coins and pottery fragments found in the graves and C-14 dates, an attempt was made to apply a phasing in the chronology of the graves in the form of a Harris matrix. The most reliable reconstruction yielded three phases. These periods can be distinguished as follows: an early and full medieval period (< 1135 AD), a late medieval period (1135 - 1525 AD), and a post-medieval period (> 1525 AD). During the fieldwork the human bone remains were in situ investigated regarding the most basic physical anthropological characteristics. Thus was prevented that information went missing during the recovery of the inhumations.

The objective of the investigation of the inhumations was to determine the physical condition of the recovered individuals (sex, age, dental status, stature and possible pathology), and to explain the meaning of this in relation to other populations. Physical anthropological investigations of late medieval British town and village populations have shown that the variation in the physical condition between populations is useful

in the research into for instance the different living conditions between urban and rural populations (Brothwell 1994: 129).

A total of 195 graves have been dated, and can be attributed to one individual each.

Eleven of these belong to the phase before 1135 AD, 30 individuals were interred between 1135 and 1525 AD, and 154 after 1525. As the number of investigated individuals for the first two phases is rather small to be validated as reliable or representative of a large population group, the emphasis of this research will be on the post-medieval phase. 154 individuals are dated to this phase. It concerns 121 adults and 33 non-adults. The group of adults can be divided into 51 males and 47 females. The mean skeletal age of the male individuals (n= 48) is 47 years, and of the females (n= 31) 38 years. The mean stature for males (n= 49) is 173 cm, and for females (n= 36) 162 cm. Among pathological bone changes were observed a.o. fractures, rachitis (rickets), osteoporosis, hip dislocation, degeneration of discs and arthritis.

The primary aim of physical anthropological research of skeletal remains consists of a description of the physical characteristics of the population examined. This description is based on analyses executed on a selection of individuals who were once part of that population. A whole population, however, consists of all those who died at a certain place over a certain period; it is a different question to what extent this population is a reflection of the corresponding living population. Moreover, in the consideration of the representativeness of the selection, it will be necessary to take four factors into account (Waldron 1994: 12-16):

- As a whole, the population consists of the total number of deceased individuals that is interred at the examined location over a certain period. There is no certainty at all that every deceased individual of this population was interred at this location. A concentration of burials should in fact be seen as a socio-cultural reflection and not as a biological one.
- Subsequently, buried individuals disappear from this context, due to disturbances and poor conditions of preservation.
- Important is also the number of buried individuals that is discovered during for instance an excavation. A number of the remaining burials will not or cannot be discovered.
- The number of excavated individuals also plays a role. Not all discovered buried individuals will be completely excavated or recovered. An extra factor that can be noted here is that not every recovered individual has been examined. This factor should however yield the least loss of information and can at any rate be quantified.

Taking the above into account, the individuals from Elst, who derive from a more rural environment, can be compared with contemporaneous individuals from a more urban environment. According to Brothwell, three kinds of variables can be used for

this (Brothwell 1994). Variation in physical characteristics, variation in the demographic composition, and variation in the occurrence of diseases.

With the exception of the mean skeletal age of female individuals, all variables in the Elst individuals score 'better'. Noticeable, for instance, is the absence of periostitis, osteomyelitis, and DISH. Degenerative bone disease in the spine and the peripheral joints occurs less often in Elst and the average stature is greater. On the basis of these data, it can be concluded that the living conditions of the examined selection of post-medieval individuals from the rural environment of Elst seem to be healthier than those in a post-medieval urban environment.

Literature

Brothwell, D.R., 1994. On the possibility of urban-rural contrasts in human population palaeobiology. In: A.R. and H.K. Kenward (eds), *Urban-rural connexions: perspectives from environmental archaeology*. Symposia of the Association for Environmental Archaeology no. 12. Oxbow Monograph 47, 129-136.

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HANDS-ON PREPARATION OF GROUND SECTIONS FOR THE MICROSCOPY OF NATURAL BONE TISSUE

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Proceedings of the 8th Cross Channel Conference, Brugge, Belgium, p.15, 2004

Light microscopy should be a routine complementary diagnostic tool for osteoarchaeologists, paleopathologists and forensic anthropologists. But this well-established and long existing technique is not widely utilized. It is a popular belief that the preparation of the required sections of bone tissue demands a lot of time, expensive instruments, and knowledge of plastics. To show that this is entirely not the case, a long existing technique for the manual preparation of ground sections was brushed up and tested. Its application is simple, extremely cheap, rapid and reliable. Its final product is a beautiful and intact ca. 10-15 micron or even less thin section. A few modifications are proposed which further improve the feasibility of the technique and which also make it very suitable for less well-preserved inhumed and even cremated osteoarchaeological and forensic remains. As in the original method, the modifications need only a few extra but still very basic and cheap products. A step-by-step description of the procedure is presented. The advantages are discussed.



TWO MILLENNIA OF MALE STATURE DEVELOPMENT IN THE LOW COUNTRIES

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Abstracts of the XV European Meeting of the Paleo Pathology Association, Durham,
Great Britain, p. 61, 2004

This paper offers a review of shifts in average male stature and their relationship with health and wealth in the Low Countries from 50 to 1997 AD. Twenty-one population samples were studied to cover the full time span. To make data compatible, so-called 'virtual statures' were used, i.e. the statures which adult males were supposed to have had at the end of their growth period before they started shrinking by aging. Original data were extracted from 'in situ (in the grave) measured statures', 'calculated statures' and 'corrected cadaveric statures'. If possible, maximum femoral lengths were also collected from the same population samples to check if trends in stature development were in agreement with raw skeletal data. A long phase of stature decrease from ca. 176 cm to 166 cm, a so-called 'negative secular trend', was noticed from the Roman Period up to and including the first half of the 19th century. This was followed by a sharp and still ongoing increase in stature to 184 cm, a typical 'positive secular trend', from the second half of the 19th century to the present time. General shifts in stature and 'outliers' illustrative for the process are viewed in the context of socio-economic, demographic, health and nutritional factors.

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AN ANATOMICAL AID FOR THE EVALUATION OF COMPUTED TOMOGRAPHY SCANS

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Proceedings of the AEIMS Congress 2003. Museum 'Naturalis', Leiden, the Netherlands, p. 8, 2003

To evaluate computerized assisted tomography scans through the human head and neck region for clinical purposes, a series of corresponding anatomical and scanning sections was prepared from a cadaveric specimen in 1979.

The head was of average proportions (mesocephalic, orthocephalic, metriocephalic). Routine scanning sections were made of the unfixed human material by an E.M.I.-scanner CT 1010 in a plane 15° to the Frankfurter Plane. This plane is the universally utilized orbito-meatal plane for obtaining scans of the head. Unfixed material was employed to prevent shrinkage, especially of the central nervous system. After freezing, enclosure of a reference bar, embedding in water and X-ray control, parallel

sections with an ultimate thickness of 7.2 mm were made with a band saw at 8 mm intervals. Sections were photographed on both sides. Prints of anatomical and scanning images for a cross-section atlas were superbly labeled for anatomical details by the late medical illustrator and artist Jan Tinkelenberg. Subsequently, the 28 sections were fixed in Kaiserling's fixative to preserve natural colours. For future use the sections were embedded in a polyester resin. In order to obtain accurate topographical orientation, three-dimensional reconstructions were made of the cerebral cortex, the ventricular system and the subarachnoid cisterns. A given reference framework enabled precise reconstruction of anatomical structures.

Although at the present time the imaging potential of advanced scanners excels the contrast and spatial resolution of the formerly used second generation scanner, even today it is hard to exceed the quality of the presented anatomical sections. This, together with the given orientation framework, still makes the atlas after more than thirty years a powerful tool to cover missing anatomical details of computed images.

Reference:

Maat, G.J.R., G.J. Vielvoye and J. Tinkelenberg, 1981. *An Anatomical Aid for the Evaluation of Computed Tomography Scans. A Photographic Cross-Section Atlas of the Head and Neck with CT Images and Graphic Reconstructions.* (127 pp and 98 illustrations). Beetsterzwaag, Mefar BV, (ISBN 90-70562-01-4).



EXPLORATORY STUDY ON CLASSIFICATION AND INDIVIDUALISATION OF EARPRINTS

L. Meijerman, S. Sholl, F. De Conti, M. Giacon, C. Van der Lugt, A. Drusini, P. Vanezis, and G. Maat

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Forensic Science International 140 (2004), 91-99

The FearID research project is aimed at the individualisation of earprints for the purpose of forensic research. The study presented here was carried out within the framework of this project. It intends to combine a review of what is known from

literature on the classification and individualisation of earprints with results from a preliminary study of earprints. Possibilities for, and limitations to, the use of earprints in forensic investigation are addressed. Differences between eliminating a suspect, placing a suspect at a crime scene, and linking crimes by prints left at different scenes are considered.



INDIVIDUALISATION OF EARPRINTS

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Proceedings of the 8th Cross Channel Conference, Brugge, Belgium, 2004

Latent earprints, recovered at or near crime scenes, have potential for identification in forensic research. The FearID research project is aimed at the individualisation of earprints to a person. To justify the claim that we can match an earprint uniquely to an ear, we must establish that the print resembles other prints from the same ear more than it resembles prints from another ear. We therefore analyse multiple prints from a large sample of ears, comparing variation between several prints made by a single ear (intra-individual variation) with variation that occurs between prints that each have been made by a different ear (inter-individual variation), over a suitable set of measurable features. The outcome of this analysis will be probabilistic. This means we may estimate the probability of encountering seemingly indistinguishable prints from different ears.

Knowing the extent of realistic intra-individual variation in earprints – and research into the various sources of intra-individual variation – is of paramount importance. Several factors may influence the appearance of an earprint, causing dissimilarities between various prints by a single ear. Various research questions relating to sources for this variation have therefore been addressed in the framework of the FearID project.

One study concerned the use of different media to lift and secure earprints. The quality of prints secured on black gel lifters and acetate sheets, and prints created using the Inkless Impression Kit, were compared. It appeared that the first medium yielded the

best results, as it did not only preserve detail well, but also allowed for the collection of earprints under natural 'listening' conditions.

A second study concerned an effect by the time that was spend listening, i.e. the time the ear was in contact with the surface on which the print is left. It appeared that, within the range to be expected under natural conditions, distortion of prints by movement of the ear hardly occurred.

A difference in the amount of force that is applied by the ear during listening is another factor that may cause variation in different prints by a single ear. We therefore also set out to study various factors that may influence the amount of applied force during listening, such as for instance the presence or absence of a target sound, or the level of ambient noise.

Finally, changes in the morphology of the ear during life may be another cause of variation in different prints by a single ear. We therefore also undertook a (cross-sectional and longitudinal) study into age-related changes of the ear.

The results from the various studies facilitated decision-making regarding a procedure for the collection of earprints. For this procedure we needed to maximize the chance of obtaining intra-individual variation in prints, without introducing unrealistic variation that could impede the search for diagnostic characters. Finally, observed variation will aid the selection of diagnostic cues with sufficient discriminating power to select a single print, or a small selection of earprints, from a database.

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CROSS-SECTIONAL ANTHROPOMETRIC STUDY OF THE EXTERNAL EAR

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(submitted)

The study was aimed at determining growth of the external ear during adult life in order to evaluate the extent to which anatomical features appearing in earprints may vary with time. A review of literature was provided. Data extracted from photographed ears of 1353 subjects were analysed. The effect of age on pinna length, earlobe length and pinna width was explored using univariate analyses of variance. The regression coefficients of age on these dimensions were respectively 0.178, 0.115

and 0.073 mm/yr for males, and 0.162, 0.100 and 0.073 mm/yr for females ($p= 0.000$). Regression coefficients of age corrected for stature were calculated as well but assumed to be less accurate. Differences between the sexes in the effect of age during various stages of life appeared significant for pinna length and width. Helix width at two positions and anthelix prominence were further analysed using data of 175 subjects. A univariate analysis of variance yielded no significant effect of age on helix width. Spearman correlations indicated no reduction of anthelix prominence with age.

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INTER- AND INTRA-INDIVIDUAL VARIATION IN APPLIED FORCE WHEN LISTENING AT A SURFACE, AND RESULTING VARIATION IN EARPRINTS

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(submitted)

A prerequisite to using earprints for legal purposes is an estimation of the probability of encountering seemingly indistinguishable prints from different ears. This estimation of false positive probability requires knowledge on the variability in various prints of a single ear. A potentially important source for intra-individual variation in earprints is variation in applied force by the ear to the surface during listening. With this study, we aimed to explore the level of inter- and intra-individual variation in applied perpendicular force when listening at a surface, and assess the resulting variation in earprints. We further aimed to identify possible sources for this variation.

For this purpose, forty subjects each listened twenty-four times at a surface while applied force was recorded. In between efforts the level of target sound, frequency of target sound, and level of ambient noise were varied. Applied force was recorded, and force recordings of each effort were then characterized by two values: the average of a relatively stable interval (when the subject was listening), and the highest recorded force during the effort (often recorded shortly after the ear had touched the surface). Both values were analysed separately. A mixed model analysis of variance revealed that the effect of repetition during multiple efforts of listening caused significant variation in both values for applied force. Variation in the level of the target sound

appeared also to have a significant effect. Variation in the frequency of the target sound appeared only to have affected the peak value, and this effect may have been exaggerated in our analysis due to confounding effects. The level of ambient noise appeared not to have significantly affected applied force.

In order to explore the correlation between the values for applied force of the various efforts by the same ear, the intra-class correlation coefficient was calculated using variance components provided by a univariate analysis of variance. After adjusting for factors such as the level of target sound and the effect of repetition (to avoid these factors contributing to the error variance), the intra-class correlation coefficient was 0.80 for functional force and 0.79 for the peak value. In order to study intra-individual variation in earprints, five prints from each ear of every subject were lifted and studied. Variation in prints is discussed.

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Poster presentations

PUZZLES FROM THE LATE IRON AGE: THREE INHUMATIONS FROM
TIEL-PASSEWAAIJ

S. Baetsen

Posterpresentation Reuvensdagen Alkmaar 18th and 19th November 2004/Lecture
Metaaltijdendag Brussel January 2005

The Archaeological Centre of the Free University/Hendrik Brunstig Foundation has for some years been carrying out research at the location of Tiel-Passewaaij, where remains of a native Roman settlement with burial ground have been found. In 2003 and 2004 some graves from a Late Iron Age context were also discovered. Three of these graves were completely excavated. Remarkable is that the bone remains found were not burnt, as it was customary in this period to cremate the deceased. Moreover, various unburnt bone remains were no longer articulated. The causes for these discrepancies can only partly be found in post-depositional processes. It would therefore be reasonable to assume an unusual method of treating the dead. One of these different methods could have been defleshing (excarnation) of the bone remains. In order to show that the inhumations of Tiel-Passewaaij could indeed have been thus treated, they were tested against the following criteria which have been used for inhumations of the British Iron Age (Carr and Knüsel 1997):

- the occurrence of incomplete skeletons
- the occurrence of non-articulated skeletons
- the occurrence of isolated or scattered splintered, eroded bones or bone fragments
- the occurrence of gnaw-, cut- or slash-marks on the bone remains.

In the first grave were found the skeletal remains of a 6 to 9 month-old baby. The skeletal remains in the second grave belong to a baby of c. 6 months. In the third grave were found different burnt and unburnt, isolated bone remains of an adult individual. The unburnt skeletal parts consist of 11 vertebrae, a fragment of the right heel bone, a fragment of the right pelvic bone including the socket for the joint, and a rib fragment. The parts of the spinal column consist of two parts: the fourth lumbar vertebra to the twelfth thoracic vertebra, and the eleventh to eighth thoracic vertebrae. The separate parts are articulated.

Bones are missing in all three graves and in two out of three graves skeletal components were found which were partly articulated and partly not. None of the examined bone remains show cut-, slash- or gnaw-marks. The bone remains of the first grave do not give clear indications of deviant methods of treatment. A number of bones are indeed missing, but as the rest is articulated, this lack will have a post-depositional cause.

Remarkable in the second grave is that the distal parts of both femura are in their original position, whereas the linking proximal parts of the tibia and fibula were displaced. In disturbance due to bioturbation or (sub)recent disturbances also the distal parts of the femura would have been displaced. In view of the absence of slash-, gnaw- or cut-marks, the possibilities of mutilation or disturbance by scavengers can be discounted. It is clear that no excarnation had taken place, as even the smallest bones were still present. The reason for the non-articulation of nearly all skeletal components of this individual is more likely to lie in the manner of burying. Here we can think of an only partly covered burial pit or the presence of perishable grave goods. With the latter, decomposition of these gifts could create space within the grave in which the bones could move. Also within the body mass itself, bones can alter position after decomposition.

The isolated, articulated parts of the spine in the third grave could point to a form of excarnation. This can take place in several ways. It is possible that the individual was first partially excarnated, whereupon the isolated parts were burned, except for the spinal column, a heel bone and part of the pelvis. This occurred when the spinal column was still held together by soft tissue. Another possibility is that parts of the individual fell apart on the pyre whereby a.o. the spinal column ended up outside the fire. This would also explain the soot marks on the pelvic fragment. The absence of gnaw-, cut- or slash-marks would indicate that the body was not mutilated, and that, if it was defleshed, this took place in a shielded manner as a protection against scavengers.

Of the three Late Iron Age burials from Tiel-Passewaaij, two show different methods of treatment. It cannot be excluded that the body was partly stripped of its soft tissue before it was interred. It is however beyond question that body components were displaced while the body was not entirely decomposed.

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ANALYSING HUMAN CREMATIONS FROM THE MEROVINGIAN CEMETERY AT BROECHEM (BELGIUM, PROV. OF ANTWERP)

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Poster presentation 55th Saxons symposium, Newnham College, University of Cambridge, September 2004

The Merovingian cemetery at Broechem was excavated during 2000-2003. 263 graves from the 6th and 7th century were recorded. Both inhumations (223) and cremations (40) were present, the latter being best preserved. Since an extensive study of the human remains has not yet started, this presentation is the result of the examination of just one cremation grave (BR03-Sp447).

After removing the entire soil cover, the cremations were wet sieved using 0.5mm fraction sieves to make recovery possible of even the smallest human bones. The better the skeletal recovery, the more information will be obtained. Some bones were single, others occurred in pairs. Any duplication of skeletal elements indicates the presence of more than one person.

After sieving, the bone fragments were picked out by hand. Artefacts belonging to pyre- or grave goods such as ceramics, metals, beads, melted or not, were separated. Any colour-staining, mostly from copper alloy, was marked and put aside. Burnt animal bones were commonly found, representing food offerings, sacrifices or personal objects.

In an osteological inventory, the bones were divided into the categories skull vault, facial part of the skull, axial skeleton, hand and foot bones, diaphyses (shaft fragments), and epiphyses (joint-ends) of upper and lower limbs. The residue consisted of all non-identifiable fragments <10 mm. Of every category the mean weight, fragment size, fracture patterns, shrinking effects, maximum bone length and thickness, and combustion colour was described. This makes a technical description possible of the ancient cremation process.

When the correct skeletal element has been preserved, the age at death and sex can be estimated using the same methods as for unburnt skeletons. Sometimes skeletal anomalies and pathologies can be recognized. Of some parts measures could still be taken to calculate stature or to detect gender. With an impression of the general robustness and muscularity, the biological description of the cremated individual is

formed.

Bone samples were taken for histological analysis, radiocarbon dating and for building up a reference collection.

The proportion of material which can be identified largely depends on fragment size. However, other factors also play a role. Some elements, such as teeth, are easier to identify than others.

Pathological lesions can be diagnosed depending on the condition of the bones and on the prevalence of the disease. Most frequent were signs of joint degeneration, such as lipping of the vertebral margins.

Conclusion:

The study of incinerated human bones is very time consuming and not always fruitful. Is it valuable? Yes, because cremated bone is more resistant to destruction in the soil than unburnt bone, and because the number of ancient cremations is very large in Belgium.

By putting the technical information (total weight, fragment size, colour, shrinkage and warping effects) together with the biological description (osteological inventory, age

at death, sex, non-metric variants and pathological features), the opportunity is provided to learn more about ancient pyre construction and combustion temperatures, burial customs, and relationships between cremation and inhumation funerary practices within the same cemetery, such as Broechem.



PHYSICAL ANTHROPOLOGICAL RESEARCH IN FLANDERS

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New:

The Vlaams Instituut voor het Onroerend Goed (VIOE - Flemish Heritage Institute) is a new research centre of the Flemish government. It was founded on 5th March 2004. The new co-operation in archaeology, monuments and landscapes in the VIOE offers new opportunities for research into and opening up of the heritage complimentary to the policies pursued. The VIOE is involved in making inventories, archaeological excavations, model renovation, conservation, scientific heritage research (among which archaeology and maritime archaeology, studies of cultural and ecological find

material, history of architecture, landscapes, historical parks and gardens, trees, interiors of monuments, and industrial heritage), the development of standards for heritage management, knowledge and documentation management, communication and exposure.

Research into human bones is part of the cell of Natural Science, where ecological find material from archaeological excavations is studied.

For further information, see website: <http://www.monument.vlaanderen.be/vioe>

Recent exhibitions: assistance rendered to:

- Dendermonde – Graven onder de Markt, Zwijvekesmuseum (26.03-31.08.2004).
- Tongeren – Neanderthalers in Europa, Gallo-Romeins Museum (27.10.2003-31.01.05).
- Broechem – Merovingisch Grafveld te Broechem, Gemeentehuis Emblem (12.09-15.11.04).

Research carried out: skeleton reports are obtainable at the VIOE, publications will follow

- Galmaarden: St.Pauluskapel. Article in Archeologie in Vlaanderen IX (2002)
- Veurne: St.Denijskerk. Monograph. (2002)
- Ninove: Norbertijnenabdij. Monograph.(2002)
- Antwerpen: St Augustinusabdij. (2002).
- Brussel: Koninklijk Instituut voor het Kunstpatrimonium, Reliekschrijven, sporadisch botonderzoek van belangrijk schrijven en kerkreliken verspreid over Vlaanderen. Monograph. (2002-05)
- Ename: De Sint-Laurentiuskerk. Monograph. (2003)
- Ieper: Slachtoffers WOI, Pilkem Ridge (2003)
- Tervuren: Koninklijk Museum voor Midden-Afrika, botanalyse en 3D-scan van Twee Afrikaanse mummies. Internal report. (2003)
- Dendermonde: De Grote Markt. Exhibition with catalogue. (2003-04)
- Diest: De Minderbroedersabdij. Exhibition with catalogue. (2004-05)

Current Research:

- Het grafveld van Neerharen-Rekem. Crematieresten onderzoek, VUBrussel, Doctoraat B.Temmerman.
- Het grafveld Grijpenveld te Tienen. Crematieresten onderzoek, Monografie VIOE & Museum Toreken en stad Tienen o.l.v. M. Martens.

Publications:

Physical anthropological research:

- De Meyer, M., P. Pijpe, and M. Vandenbrouaene, 2003. *Scars of the Great War: New Applications of Battlefield Archaeology in the Ypres Salient. The A-19 Project (West-Vlaanderen, Belgium)*, Lecture and poster, The Battlefield Archaeology Symposium, Imperial War Museum, London (26.07.2003).
- De Grootte, K., J. Bastiaens, W. De Clercq, K. Deforce, and M. Vandenbrouaene, 2003. Gallo-Romeinse graven te Huise 't Peerdeken (Zingem, prov. Oost.-Vlaanderen). Een multidisciplinaire analyse, *Archeologie in Vlaanderen VII*, 31-64.
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Forensic anthropological research¹:

- Vandenbrouaene, M. 2002. *Syllabus "Forensisch Antropologisch onderzoek met*

1 Het forensisch onderzoek gebeurt als "Gerechtig Deskundige" aangesteld door de Rechtbank of het Parket in kwestie. Zo zijn op een paar jaren tijd belangrijke bijdragen geleverd aan zo'n 50 tal dossiers en zo'n 4 tal assisenzaken.

Sinds 2001 wordt een "Inleiding in de forensische antropologie" gedoceerd in twee postcademische vormingsprogramma's aan de Katholieke Universiteit Leuven, zie <http://www.kuleuven.ac.be/>

practicum”, KUL Universiteit Leuven, Postacademische opleiding, 1^ojaar GGS Orale Gezondheidszorg, Forensische Tandheelkunde, vervangend docent bij Prof. Dr G. Willems.

Vandenbrouaene, M. 2003. Hoofdstuk 4. Lijkvondst: identificatie – onderzoek van onbekend lijk. Forensische antropologie. In: W. Van De Voorde, J. Goethals and M. Nieuwdorp (eds), *Multidisciplinair forensisch onderzoek, juridische en wetenschappelijke aspecten*, deel I, 251-263, Brussel: Politeia, docent in post-academisch vormingsprogramma.

Vandenbrouaene, M. and C. Verbiest, 2004. *Positive Identification of a skeletonized body found in the woods, Limburg Belgium*. Programme Cross Channel Conference of Forensic Sciences (CCC-Bruges 23.04.2004), 56-57.

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Articles

REPLY TO JANTZ AND OWSLEY: KENNEWICK, LUZIA AND LATER HUMAN EVOLUTION

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Summary

The present reply is the fourth successive publication of a debate with Jantz and Owsley on the relationship between Late Pleistocene and Holocene populations in America and Europe. We suggest (contra Jantz and Owsley) that cranial morphological affinity may be a poor indicator for the determination of ancestor-descendant relationship between Late Pleistocene and Early Holocene populations on the one hand, and Late Holocene and recent populations on the other. We provide new evidence for this suggestion.

In a recent *American Journal of Physical Anthropology* paper Jantz and Owsley (2001) maintain that from the 11 early- to mid-Holocene American crania they investigated, only one shows any particular affinity to recent Native Americans. They conclude

that these results are inconsistent with hypotheses of an ancestor-descendant relationship between Early and Late Holocene American populations. We noted that a parallel situation can be observed in Upper Pleistocene Europe (van Vark *et al.* 2003). We examined a sample of 35 European Upper Palaeolithic crania (EUP) using multivariate statistical methods and found 19 of these specimens display a closer affinity to a sample of non-European recent skulls (out of seven samples from all over the world, including Europe, ten were closest to the Australian sample, three to Mokapu (Hawaii), two to San, two to Zulu, and two to the sample from Japan). Genetic studies carried out by several workers (e.g. Richards *et al.* 1998, 2000; Sykes 1999; Semino *et al.* 2000) demonstrated in contrast that modern Europeans can trace

their roots mainly to Upper Palaeolithic immigrants. These findings combined suggested to us that cranial morphological affinity may be a poor indicator for the determination of ancestor-descendant relationships between Late Pleistocene and Early Holocene populations on the one hand, and Late Holocene populations on the other. Jantz and Owsley (2003) disagree with this statement for several reasons. They remark that the genetic evidence we refer to derives from contemporary populations. They state that since some EUP lineages did not survive, the genetic evidence is not representative for EUP peoples as a whole. Therefore, the (statistical) populations from which the genetic and morphological data are drawn are partly different. However,

this is only a problem if the association between the morphological and genetic structures in the surviving lines is substantially different from that in the non-surviving lines. So far, there are no indications for this to be true. Below we argue that even in this case, the problem concerned is actually nonexistent.

Jantz and Owsley (2003) further criticize the relatively small number of measurements we could obtain from several EUP crania. They point to the fact that the EUP crania that display the closest affinity to modern non-European skulls are on average relatively incomplete such that only a small number of measurements could be taken from many of these specimens. They state that using a relatively large number of measurements yields better estimates of morphometric affinity. Although it is true that a larger number of measurements will theoretically contain more biological information, a larger number of measurements also leads to larger statistical uncertainties and systematic errors. A smaller number of highly diagnostic variables tends to provide the most robust results (see e.g. van Vark 1984; van Vark and Schaafsma 1992).

Sample size plays a critical role both in Jantz and Owsley's (2003) and in our own calculations. This is particularly true for the results presented in Table 1 of Jantz and Owsley (2003). These authors found that in a sample of eight EUP cranial specimens, six displayed closest affinity to modern European crania. However, given the small sample size, their results should be considered with great reservation. Our EUP sample, consisting of 35 crania, is much larger. The fact that slightly more than 50 percent of the crania display their closest affinity to modern non-European specimens does not mean that this also holds true for the (statistical) population from which they are drawn. It may instead be the case that a smaller, or larger, percentage of the population exhibits this trend.

Jantz and Owsley (2003) disclaim our view that the EUP situation can be regarded as

parallel to the Native American one. There are indeed important differences in the two samples, such as the fact that the EUP crania demonstrate a higher degree of affinity with the supposed descendant modern population ($16/35 = 46\%$) than was found in the American situation ($1/11 = 9\%$). Additionally our EUP sample spans 28,000 years (from about 37,000 BP to about 9,000 BP) compared to their North American sample of only 2,400 years (from about 9,400 BP to about 7,000 BP). Including Kennewick and Luzia, as we did, would extend the American time span to 6,900 years.

Although these temporal ranges are incongruent, they may in fact be irrelevant for the present discussion. This supposition is based primarily on additional results that were obtained by van Vark (1999) from a large number of Mahalanobis distances derived from *H. sapiens* and *H. erectus* crania. He found that in later human evolution, changes in cranial morphology occurred which were so profound that they largely obscured ancestral-descendant relationships. He saw these changes as part of a larger process which can best be termed 'hominization', in the sense of becoming more modern human-like and less ape-like. This process will have bearing on the differences observed between Late Pleistocene to Early Holocene Americans and more recent Native American populations.

Discrepancies between morphological and genetic research are not uncommon in the literature. For example, Curnoe and Thorne (2003) state that "the contrast between morphological and genetic taxonomies is stark among some organisms and has led to the observation by geneticists that macromolecules and morphological features can evolve at independent rates (e.g. King and Wilson 1975). The importance of this general observation has been recognized and discussed by geneticists and zoologists for several decades (Nei 1978; Bruce and Ayala 1979; Fitch 1982; Collier and O'Brien 1985; Gould 1985; Ridley 1996), but has been almost completely ignored by palaeoanthropologists (but see Eckhardt 1976, 2000; Gallup *et al.* 1977)". Apparently, there are factors that, at least in some instances, predominate over genetic influences. Our study provides another example of this (see also e.g. Cho 2004).

Lastly, we disagree with Jantz and Owsley's (2003) comment suggesting that if we question whether morphological affinity is a poor indicator for the determination of ancestral-descendant relationships in the Americas, it calls into question all aspects of hominid evolutionary history which rest on changes in cranial morphology. On the contrary, we are merely suggesting that the relationship is not always as direct as researchers have assumed. In our view, both morphological and genetic analyses in human evolution are important sources of evidence that at every turn need to be closely examined, particularly when they appear to conflict with one another.

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Forthcoming events

April 15, 2005 (3 p.m.)

27th Kroon-voordracht by Dr Maarten J. Raven on
'Architectural principles in theory and practice: the New Kingdom Necropolis at
Saqqara (Egypt)'.
KNAW, Kloveniersburgwal 29, Amsterdam

April 4-8, 2005 - Havana, Cuba

V Congreso Primates comp Patrimonio Nacional
e-mail: montane05@fbio.uh.cu

May 25-27, 2005 - Toulouse, France

Colloque du GALF (Groupement d'Anthropologues de Langue Française) on
'Anthropologie, evolution et histoire des peuplements'
e-mail: galf2005@yahoo.fr

August 7-19, 2005 - Bradford, United Kingdom

7th European Palaeopathology Short Course, University of Bradford, United
Kingdom
e-mail: c.knusel@bradford.ac.uk

September 19-22, 2005 - Murcia, Spain

14 Congreso de la Sociedad Espanola de Antropologia Fisica (SEAF),
'Diversidad Biologica y Salud Humana'
e-mail: congresoseaf@pdi.ucam.edu

September 1-4, 2006 - Budapest, Hungary

15th Congress of the European Anthropological Association,
'Trends and Challenges in Anthropology'
e-mail: bodzsar@ludens.elte.hu