

## Literatur

### Aktuell

DICKERSON 2012

Andrew K. Dickerson, Peter G. Shankles, Nihar M. Madhavan & David L. Hu, *Mosquitoes survive raindrop collisions by virtue of their low mass*. [PNAS \*\*109\*\* \(2012\), 9822–9827](#).

[pnas109-09822-Supplement.mp4](#)

In the study of insect flight, adaptations to complex flight conditions such as wind and rain are poorly understood. Mosquitoes thrive in areas of high humidity and rainfall, in which raindrops can weigh more than 50 times a mosquito. In this combined experimental and theoretical study, we here show that free-flying mosquitoes can survive the high-speed impact of falling raindrops. High-speed videography of those impacts reveals a mechanism for survival: A mosquito's strong exoskeleton and low mass renders it impervious to falling drops. The mosquito's low mass causes raindrops to lose little momentum upon impact and so impart correspondingly low forces to the mosquitoes. Our findings demonstrate that small fliers are robust to in-flight perturbations.

surface tension | splash | acceleration

FRANCIS 2012

Gregory Francis, *Evidence that publication bias contaminated studies relating social class and unethical behavior*. [PNAS \*\*109\*\* \(2012\), E1587](#).

Whatever its source, the presence of a publication bias means that the findings in Piff et al. do not provide useful information about the claimed effect. It remains an open question whether unethical behavior is related to social class, and only new experiments that are free from bias will be able to address the issue. If the effect of social class on unethical behavior turns out to be real, then the findings of Piff et al. almost surely overestimate its magnitude.

HERZOG 2012

Howard J. Herzog, Kurt Zenz House, Antonio C. Baclig, Ernst A. van Nie-roop & Jennifer Wilcox, *Reply to Realff and Eisenberger: Energy requirements of air capture systems*. [PNAS \*\*109\*\* \(2012\), E1590](#).

The fact that proposed air capture processes may have exothermic steps has absolutely no impact on the minimum work requirement; if there is an exothermic step in the process and that energy is not recovered, as is generally true for CO<sub>2</sub> absorption processes, that lost energy becomes a source of process inefficiency.

MORGAN 2012

Jennifer L. L. Morgan, Joseph L. Skulan, Gwyneth W. Gordon, Stephen J. Romaniello, Scott M. Smith & Ariel D. Anbar, *Rapidly assessing changes in bone mineral balance using natural stable calcium isotopes*. [PNAS \*\*109\*\* \(2012\), 9989–9994](#).

The ability to rapidly detect changes in bone mineral balance (BMB) would be of great value in the early diagnosis and evaluation of therapies for metabolic bone diseases such as osteoporosis and some cancers. However, measurements of BMB are hampered by difficulties with using biochemical markers to quantify the relative rates of bone resorption

and formation and the need to wait months to years for altered BMB to produce changes in bone mineral density large enough to resolve by X-ray densitometry. We show here that, in humans, the natural abundances of Ca isotopes in urine change rapidly in response to changes in BMB. In a bed rest experiment, use of high-precision isotope ratio MS allowed the onset of bone loss to be detected in Ca isotope data after about 1 wk, long before bone mineral density has changed enough to be detectable with densitometry. The physiological basis of the relationship between Ca isotopes and BMB is sufficiently understood to allow quantitative translation of changes in Ca isotope abundances to changes in bone mineral density using a simple model. The rate of change of bone mineral density inferred from Ca isotopes is consistent with the rate observed by densitometry in long-term bed rest studies. Ca isotopic analysis provides a powerful way to monitor bone loss, potentially making it possible to diagnose metabolic bone disease and track the impact of treatments more effectively than is currently possible.

osteopenia | biomarker | medical geology | biosignature | spaceflight

#### PIFF 2012

Paul K. Piff, Daniel M. Stancato, Stéphane Côté, Rodolfo Mendoza-Denton & Dacher Keltner, *Reply to Francis: Cumulative power calculations are faulty when based on observed power and a small sample of studies*. [PNAS 109 \(2012\), E1588](#).

Given that the cumulative power approach has considerable limitations when applied to a small set of studies, and is flawed without considering confidence intervals, we are confident that its problematic application and interpretation by Francis do not in any way invalidate our consistent results.

#### REALFF 2012

Matthew J. Realff & Peter Eisenberger, *Flawed analysis of the possibility of air capture*. [PNAS 109 \(2012\), E1589](#).

Although additional energy will clearly be needed to liberate the CO<sub>2</sub> from sorbent, it is the same to the first order for both air and flue gas capture and can be in the form of cheap heat and not the expensive carbon free electricity used by House et al.

## Anthropologie

#### GAVRILETS 2012

Sergey Gavrillets, *Human origins and the transition from promiscuity to pair-bonding*. [PNAS 109 \(2012\), 9923–9928](#).

A crucial step in recent theories of human origins is the emergence of strong pair-bonding between males and females accompanied by a dramatic reduction in the male-to-male conflict over mating and an increased investment in offspring. How such a transition from promiscuity to pair-bonding could be achieved is puzzling. Many species would, indeed, be much better off evolutionarily if the effort spent on male competition over mating was redirected to increasing female fertility or survivorship of offspring. Males, however, are locked in a “social dilemma,” where shifting one’s effort from “appropriation” to “production” would give an advantage to free-riding competitors and therefore, should not happen. Here, I first consider simple models for four prominent scenarios of the human transition to pair-bonding: communal care, mate guarding, food for mating, and mate provisioning. I show that the transition is not feasible under biologically relevant conditions in any of these models. Then, I show that the transition can happen if one accounts for male heterogeneity, assortative pair formation, and evolution of female choice and faithfulness. This process is started when low-ranked males begin using an alternative

strategy of female provisioning. At the end, except for the top-ranked individuals, males invest exclusively in provisioning females who have evolved very high fidelity to their mates. My results point to the crucial importance of female choice and emphasize the need for incorporating between-individual variation in theoretical and empirical studies of social dilemmas and behaviors.

food-for-mating | self-domestication

VAN VEELLEN 2012

Matthijs van Veelen, Julián García, David G. Rand & Martin A. Nowak, *Direct reciprocity in structured populations*. [PNAS 109 \(2012\), 9929–9934](#). Reciprocity and repeated games have been at the center of attention when studying the evolution of human cooperation. Direct reciprocity is considered to be a powerful mechanism for the evolution of cooperation, and it is generally assumed that it can lead to high levels of cooperation. Here we explore an openended, infinite strategy space, where every strategy that can be encoded by a finite state automaton is a possible mutant. Surprisingly, we find that direct reciprocity alone does not lead to high levels of cooperation. Instead we observe perpetual oscillations between cooperation and defection, with defection being substantially more frequent than cooperation. The reason for this is that “indirect invasions” remove equilibrium strategies: every strategy has neutral mutants, which in turn can be invaded by other strategies. However, reciprocity is not the only way to promote cooperation. Another mechanism for the evolution of cooperation, which has received as much attention, is assortment because of population structure. Here we develop a theory that allows us to study the synergistic interaction between direct reciprocity and assortment. This framework is particularly well suited for understanding human interactions, which are typically repeated and occur in relatively fluid but not unstructured populations. We show that if repeated games are combined with only a small amount of assortment, then natural selection favors the behavior typically observed among humans: high levels of cooperation implemented using conditional strategies.

repeated prisoner’s dilemma | game theory

## Bibel

WITZTUM 1994

Doron Witztum, Eliyahu Rips & Yoav Rosenberg, *Equidistant Letter Sequences in the Book of Genesis*. [Statistical Science 9 \(1994\), 429–438](#).

It has been noted that when the Book of Genesis is written as two-dimensional arrays, equidistant letter sequences spelling words with related meanings often appear in close proximity. Quantitative tools for measuring this phenomenon are developed. Randomization analysis shows that the effect is significant at the level of 0.00002.

Key words and phrases: Genesis, equidistant letter sequences, cylindrical representations, statistical analysis.

## Datierung

ZILHÃO 2011

João Zilhão, João Luís Cardoso, Alistair W. G. Pike & Bernhard Weninger, *Gruta Nova da Columbeira (Bombarral, Portugal): Site stratigraphy, age of the Mousterian sequence, and implications for the timing of Neanderthal extinction in Iberia*. [Quartär 58 \(2011\), 93–112](#).

The Gruta Nova da Columbeira is recurrently mentioned in the literature concerning the Middle-to-Upper Palaeolithic transition in Iberia as documenting the persistence

beyond 30 000 calendar years ago of a Neanderthal-associated Mousterian. This claim is based on conventional radiocarbon dates obtained in the 1960's and the 1970's. In order to assess its validity, we undertook archival research to obtain unpublished details concerning the actual composition and chemistry of the dated samples, replicated the dating of samples of the same kind (carbonaceous sediments) and collected in the same deposits from the back of the cave whence came the 1970's results, and obtained an U-series age estimate for a bone tool from the base of the Mousterian sequence excavated at the entrance of the cave in 1962. We then cross-checked all the stratigraphic and dating information thus assembled against the original field documents. Our results show that (a) the cave entrance sequence formed between MIS-5 and early MIS-3, (b) the deposits at the back of the cave probably formed in the Tardiglacial, and (c) the presence in these deposits of significant amounts of inherited charcoal derived from the entrance area explains the "Early Upper Palaeolithic" (EUP) age determinations obtained for the 1970's samples. The association of such determinations with the Mousterian has been based on an unwarranted assumption of lateral stratigraphic continuity. While the entrance deposits correspond to an in situ Mousterian sequence, those from the back of the cave are primarily made of clay accumulated under temporary waterlogged conditions, with the few artefacts of Middle Palaeolithic affinities recovered therein being in secondary position. The evidence from Gruta Nova can no longer be used to counter the existence of a late Aurignacian in the region. In southern and western Iberia, the Neanderthal-to-modern and Middle-to-Upper Palaeolithic transitions occurred no later than about 37 000 years ago.

Zusammenfassung – Auf der Grundlage konventioneller Radiokarbonaten aus den 1960er und 1970er Jahren werden Grabungsergebnisse aus der Gruta Nova da Columbeira (Bombarral) in der Fachliteratur auch heute noch verschiedentlich als Beleg für eine zeitliche Überlappung des späten Moustérien mit dem älterem Jungpaläolithikum genannt. Die unerwartet jungen 14C-Daten werden weiterhin als Beleg für eine Fortdauer der Neanderthaler bis in eine Zeit jünger als 30 000 Jahre vor heute herangezogen. Zur Überprüfung dieser Hypothese haben wir zahlreiche historische Dokumente zu den früheren Grabungen, wie auch der 14C-Datierungen, zusammengestellt und einer kritischen Sichtung unterzogen. Mit Hilfe der historischen Grabungsdokumente konnten zahlreichen Details der ursprünglichen Stratigraphie von Gruta Nova rekonstruiert werden. Auf dieser Grundlage wurden dann gezielt Nachuntersuchungen vorgenommen, um Probenmaterial zur erneuten 14C-Datierung aus gleicher stratigraphischer Position zu erhalten. Ferner wurde eine U/Th-Datierung an einem Knochenwerkzeug des Moustérien aus der Basis der Schicht 8 vorgenommen. Die Datierungsergebnisse zeigen, (1) dass es am Höhleneingang tatsächlich Fundschichten mit Artefakten gibt, die zwischen MIS-5 und MIS-3 datieren, aber (2), dass die ursprünglich anhand der 14C-Daten als ein "frühes Jungpaläolithikum" interpretierten Schichten im rückwärtigen Teil der Höhle wahrscheinlich aus dem Spätglazial und durch Sedimente mit alten Holzkohlen aus dem Eingangsbereich kontaminiert wurden. Wie die Rekonstruktion der stratigraphischen Situation zeigt, gibt es in Gruta Nova – bei den heute nicht mehr akzeptablen 14C-Daten – keine ernstzunehmenden Indizien für die Existenz eines späten Moustérien. Damit liegt auch kein Beleg für einen späten Übergang – nach 37 000 Jahren vor heute – vom Mittel- zum Jungpaläolithikum im südlichen und westlichen Bereich der Iberischen Halbinsel vor.

Keywords – Middle Palaeolithic, Neanderthals, Iberia, Portugal, Radiocarbon, U-series, Mittelpaläolithikum, Neanderthaler, Iberia, Portugal, Radiokarbon, U-Serien

## Klima

BEREITER 2012

Bernhard Bereiter, Dieter Lüthi, Michael Siegrist, Simon Schüpbach, Thomas F. Stocker & Hubertus Fischer, *Mode change of millennial CO<sub>2</sub> varia-*

bility during the last glacial cycle associated with a bipolar marine carbon seesaw. *PNAS* **109** (2012), 9755–9760.

Important elements of natural climate variations during the last ice age are abrupt temperature increases over Greenland and related warming and cooling periods over Antarctica. Records from Antarctic ice cores have shown that the global carbon cycle also plays a role in these changes. The available data shows that atmospheric CO<sub>2</sub> follows closely temperatures reconstructed from Antarctic ice cores during these variations. Here, we present new high-resolution CO<sub>2</sub> data from Antarctic ice cores, which cover the period between 115,000 and 38,000 y before present. Our measurements show that also smaller Antarctic warming events have an imprint in CO<sub>2</sub> concentrations. Moreover, they indicate that during Marine Isotope Stage (MIS) 5, the peak of millennial CO<sub>2</sub> variations lags the onset of Dansgaard/Oeschger warmings by  $250 \pm 190$  y. During MIS 3, this lag increases significantly to  $870 \pm 90$  y. Considerations of the ocean circulation suggest that the millennial variability associated with the Atlantic Meridional Overturning Circulation (AMOC) undergoes a mode change from MIS 5 to MIS 4 and 3. Ocean carbon inventory estimates imply that during MIS 3 additional carbon is derived from an extended mass of carbon-enriched Antarctic Bottom Water. The absence of such a carbon-enriched water mass in the North Atlantic during MIS 5 can explain the smaller amount of carbon released to the atmosphere after the Antarctic temperature maximum and, hence, the shorter lag. Our new data provides further constraints for transient coupled carbon cycle-climate simulations during the entire last glacial cycle.

abrupt climate change | CO<sub>2</sub>-temperature phasing | ice age variability | paleoclimate | greenhouse gas

## Kultur

JUNKER 2010

Thomas Junker, *Art as a biological adaptation, or: why modern humans replaced the Neanderthals, Kunst als Anpassung, oder: Warum moderne Menschen die Neanderthaler ersetzten*. *Quartär* **57** (2010), 171–178.

Newer biological theories attribute important adaptive functions to human art and thus provide an important, so far mostly overlooked factor that may explain the survival of modern humans and the disappearance of the Neanderthals. The oldest known objects unambiguously identifiable as art were found in Central and Western Europe and date from around 36 000 years ago. According to all that we know, they were created solely by modern humans who had migrated from Africa to Europe just a few thousand years before. Thus art seems to be the only fundamentally new characteristic that the ancestors of today's humans possessed compared to earlier and other hominids (e.g. Neanderthals or Homo erectus) and that can be proven on the basis of archaeological finds. Although this historical reconstruction is widely accepted no causal connection is seen between the ability of modern humans to produce art and their stunning evolutionary success. How would a Darwinian explanation of art look like? Does it help to understand the origins of art and its enormous significance for individuals and social groups?

Zusammenfassung – Neuere biologische Theorien sprechen der Kunst wichtige adaptive Funktionen zu und stellen so einen möglicherweise entscheidenden, aber meist übersehenen Faktor bereit, der das Überleben der modernen Menschen und das Verschwinden der Neanderthaler erklären könnte. Die ältesten bekannten, eindeutig als Kunstwerke identifizierbaren Gegenstände wurden in Mittel- und Westeuropa gefunden und auf ein Alter von rund 36 000 Jahren datiert. Nach allem, was wir wissen, stammen sie ausschließlich von den wenige tausend Jahre zuvor aus Afrika nach Europa eingewanderten sogenannten modernen Menschen, während sich bei den Neanderthalern nur vereinzelte Andeutungen finden. Damit ist Kunst die einzige grundlegend neue, an archäologischen Funden ables-

bare Eigenschaft, die die Vorfahren heutiger Menschen gegenüber früheren und anderen Menschenformen (z.B. Neanderthalern oder Homo erectus ) auszeichnet. Obwohl diese historische Rekonstruktion weithin akzeptiert wird, wird kein kausaler Zusammenhang zwischen dieser Fähigkeit der modernen Menschen und ihrem erstaunlichen evolutionären Erfolg gesehen. Wie kann eine Darwinische Erklärung der Kunst aussehen? Kann sie helfen, die Ursprünge der Kunst und ihre enorme Bedeutung für Individuen und soziale Gruppen zu erklären?

Keywords – art, behavioural modernity, Neanderthals, evolutionary psychology, superorganism

Kunst, Verhaltensmodernität, Neanderthaler, evolutionäre Psychologie, Superorganismus

## Mesolithikum

HARTZ 2010

Sönke Hartz, Thomas Terberger & Mikhail Zhilin, *New AMS-dates for the Upper Volga Mesolithic and the origin of microblade technology in Europe, Neue AMS-Daten zum Mesolithikum der oberen Wolga und das Aufkommen der Mikroklingentechnik in Europa*. *Quartär* **57** (2010), 155–169.

In the last 20 years several new peat bog sites have been detected in the Upper Volga area. The article presents a first series of AMS-dates for the Stanovoje 4 site. They assign the early Butovo Culture to the Preboreal and the middle Butovo Culture to the Boreal. In the second part of the article some new evidence for microblade technology and composite tools in the late Palaeolithic/early Butovo Culture is discussed. It is well possible that the introduction of microblade technology and slotted bone tools in the late Boreal/early Atlantic period in the western Baltic was stimulated by contacts to eastern hunter-gatherers.

In den letzten 20 Jahren wurden im oberen Wolgagebiet zahlreiche neue steinzeitliche Feuchtbodenplätze entdeckt. Der Artikel behandelt eine erste Serie von AMS-Datierungen für den mehrphasigen mesolithischen Fundplatz Stanovoje 4. Die Daten stellen die Schicht der frühen Butovo-Kultur in das Präboreal und die Schicht der mittleren Butovo-Kultur in das Boreal. Stanovoje 4 kann damit als Referenzfundplatz für die frühholozäne Kulturentwicklung im oberen Wolgagebiet gelten. Besondere Aufmerksamkeit verdient das Auftreten von Mikroklingen und Kompositgeräten wie Knochendolchen mit Flinteinsätzen in der frühen Butovo-Kultur, die im Spätpaläolithikum der Region ihre Vorläufer finden. Die Autoren diskutieren die Verbreitung und weitere Entwicklung dieser Innovation. Es ist gut möglich, dass das Aufkommen von Mikroklingen und Flintschneidendolchen im Ostseegebiet im ausgehenden Boreal/frühen Atlantikum auf einen Technologietransfer aus dem östlichen Europa zurückgeht.

Mesolithic, Upper Volga, Butovo Culture, microblade technology, cultural contacts, transfer of technology, Mesolithikum, Obere Wolga, Butovo Kultur, Mikroklingen-Technologie, Kulturkontakt, Technologietransfer

## Mittelpaläolithikum

GIBBONS 2003

Ann Gibbons, *A Miss for Moderns And Neandertals*. *science* **300** (2003), 893–894.

Ever since paleoanthropologists discovered that Neandertals and early modern humans had lived in caves as close as 100 meters apart in Israel, the obvious question has been: Did these two types of humans live there at the same time? The answer is no, judging from a new study of the ancient climate and landscape at three caves where fossils of

early humans and their prey were found. In a talk at the Paleoanthropology Society meeting, a team of American and Canadian researchers concluded that early modern humans and Neandertals lived in the caves under different climatic conditions.

#### HALLIN 2012

Kristin A. Hallin, Margaret J. Schoeninger & Henry P. Schwarcz, *Paleoclimate during Neandertal and anatomically modern human occupation at Amud and Qafzeh, Israel: the stable isotope data*. *Journal of Human Evolution* **62** (2012), 59–73.

JHumEvo62-0059-Supplement1.pdf, JHumEvo62-0059-Supplement2.pdf, JHumEvo62-0059-Supplement3.pdf, JHumEvo62-0059-Supplement4.pdf, JHumEvo62-0059-Supplement5.pdf, JHumEvo62-0059-Supplement6.pdf, JHumEvo62-0059-Supplement8.pdf

The  $\delta^{13}\text{C}(\text{en})$  and  $\delta^{18}\text{O}(\text{en})$  values of goat and gazelle enamel carbonate indicate that Neandertals at Amud Cave, Israel (53–70 ka) lived under different ecological conditions than did anatomically modern humans at Qafzeh Cave, Israel (approximately 92 ka). During the Last Glacial Period, Neandertals at Amud Cave lived under wetter conditions than those in the region today. Neither faunal species ate arid-adapted C4 plants or drought-stressed C3 plants. The variation in gazelle  $\delta^{18}\text{O}(\text{en})$  values suggests multiple birth seasons, which today occur under wetter than normal conditions. The magnitude and pattern of intra-tooth variation in goat  $\delta^{18}\text{O}(\text{en})$  values indicate that rain fell throughout the year unlike today.

Anatomically modern humans encountered a Qafzeh Cave region that was more open and arid than Glacial Period Amud Cave, and more open than today's Upper Galilee region. Goat  $\delta^{13}\text{C}(\text{en})$  values indicate feeding on varying amounts of C4 plants throughout the year. The climate apparently ameliorated higher in the sequence; but habitats remained more open than at Amud Cave. Both gazelles and goats fed on C3 plants in brushy habitats without any inclusion of C4 plants. The magnitude of intra-tooth variation in goat  $\delta^{18}\text{O}(\text{en})$  values, however, suggest that some rain fell throughout the year, and the relative representation of woodland dwelling species indicates the occurrence of woodlands in the region.

Climate differences affecting the distribution of plants and animals appear to be the significant factor contributing to behavioral differences previously documented between Neandertals and anatomically modern humans in the region. Climate forcing probably affected the early appearances of anatomically modern humans, although not the disappearance of Neandertals from the Levant.

Keywords: Neandertal | Anatomically modern humans | Late Pleistocene | Israel | Tooth enamel | Goat | Gazelle | Paleoclimate | Carbon and oxygen stable isotope ratios | Seasonality

#### ORSCHIEDT 2008

Jörg Orschiedt, *Der Fall Krapina – neue Ergebnisse zur Frage von Kannibalismus beim Neandertaler, The Krapina case – new results on the question of cannibalism of Neanderthals*. *Quartär* **55** (2008), 63–81.

The human skeletal remains from Krapina of almost 900 fragments have been considered for a long time as a proof of Neanderthal cannibalism. Although this opinion was frequently criticised, the fragmentary nature and traces of manipulations on the skeletal remains were mentioned as evidence. Several investigations resulted in contradicting interpretations whether the condition of the human remains are the result of burial activities or ritual cannibalism. The re-examination of the skeletal remains was carried out in order to put a closer look to the breakage patterns and the cut marks. The revision of the inventory of human remains shows that certain skeletal elements like the facial

skeleton, skull base, hand- and foot bones as well as vertebrae are underrepresented or missing. It seems therefore unlikely that the bodies were buried in anatomical connection. The investigation also proved that the breakage patterns were not caused by human activity. Although several bones especially the long bone diaphysis, clavicles and pelvis fragments display breakage patterns related to perimortem breakage like spiral fractures, any kind of human activity is absent. In fact the breakage is related to sediment pressure, particularly to rock fall, and carnivore activities. Damage on bones caused by carnivore activity is well visible by bite marks on long bone fragments and on Cranium 3. Any detailed analysis of the cut marks is problematic, since the bones were covered with shellac. Therefore, the analysis by a scanning electron microscope did not yield any significant result. The study of the cut marks revealed serious doubt on their nature. The macroscopic investigation, however, showed that the traces are not consistent regarding their orientation and location with traces commonly related to disarticulation and dismemberment activities. Cut marks related to this kind of activity usually occur in areas of muscle attachments and joints. Several cut marks show evidence for a recent origin. The most striking evidence for this is found on a long bone splinter of a diaphysis. The cut marks located on this fragment cut through the "F" (for femur) written in ink of the bone. The shellac was added only later covering the bone. It seems possible in only two cases that cut marks on two scapulae were caused by dismembering activities. The well known Cranium 3 exhibits possible cut marks on the frontal bone, which might indicate skinning activities like the removal of the scalp. Nevertheless the position and the small size of the marks fail to prove such an activity. A ritual behaviour might be a possible explanation.

Zusammenfassung – Die menschlichen Reste aus Krapina wurden lange Zeit als Beleg für Kannibalismus angesehen. Obwohl diese Ansicht teilweise kritisiert wurde, galten vor allem der fragmentarische Zustand und Manipulationsspuren als Hinweise auf kanibalistische Rituale. Bei der Nachuntersuchung der Skelettreste wurden in erster Linie die Bruchmuster und die Schnittspuren näher untersucht. Diese Analyse zeigte, dass die Bruchmuster nicht durch menschliche Aktivität hervorgerufen wurden, vielmehr dürften sie sowohl durch Sedimentdruck, vor allem durch Felsstürze und durch Karnivorenverbiss entstanden sein. Die Analyse der Schnittspuren gestaltet sich problematisch, da eine rasterelektronenmikroskopische Untersuchung aufgrund der Überdeckung der Knochen mit Schellack nicht möglich ist. Die makroskopische Analyse zeigt jedoch, dass die Spuren hinsichtlich ihrer Orientierung und der anatomischen Zuordnung nicht mit Schnittspuren übereinstimmen, die bei einer Zerlegung und Entfleischung von Tieren entstehen. In einigen Fällen ließ sich zudem eine rezente Entstehung der Spuren belegen. Allerdings sind in zwei Fällen tatsächlich Zerlegungsaktivitäten in Schulterbereich nachweisbar. Das bekannte Kranium 3 weist Schnittspuren im Bereich des Stirnbeins auf, die Schnitte in die Kopfhaut in dieser Region belegen. Allerdings ist aufgrund der anatomischen Position und der geringen Länge der Spuren eine Entfernung der Kopfhaut nicht nachweisbar. Der Grund für diese Manipulation erscheint unklar und könnte allenfalls in einem rituellen Kontext zu suchen sein.

Keywords – Neandertaler, Kannibalismus, Karnivorenverbiss, Schnittspuren, Manipulationen, Bruchmuster

Neandertaler, cannibalism, carnivore damage, cut marks, manipulation, breakage pattern

## PASTOORS 2009

Andreas Pastoors, *Blades ? – Thanks, no interest! – Neanderthals in Salzgitter-Lebenstedt, Klingen? – Danke, kein Interesse! – Neanderthaler in Salzgitter-Lebenstedt. Quartär 56 (2009), 105–118.*

The discussions about the significance of technological innovations in lithic production systems at the Middle to Upper Palaeolithic transition are characterised by constant changes. Differing interpretations of blades and bladelets make this particularly clear. In



this article, we present a technological analysis of the core configuration of the Middle Palaeolithic assemblage from Salzgitter-Lebenstedt. Besides the dominant Levallois methods, a typical Middle Palaeolithic unidirectional blade method was detected. It becomes clear that the available technological knowledge of efficient, economic core configuration was not used. A possible explanation lies in the low residential mobility of Neanderthals and a disinterest in blades as blanks. This in turn throws new light on the interpretation of late Middle Palaeolithic bladelet-production in Cantabria. Moreover, the presence of the bladelet-production is evidence of a constant level of technological knowledge instead of a local transition from Neanderthals to anatomically modern humans.

Zusammenfassung – Die Diskussionen um die Bedeutung technologischer Innovationen in der Grundformproduktion für den Übergang vom Mittel- zum Jungpaläolithikum sind geprägt von ständigen Veränderungen. An den verschiedenen Interpretationen von Klingen und Lamellen wird dies besonders deutlich. In diesem Beitrag werden die Ergebnisse der technologischen Untersuchungen der Kerngestaltung des mittelpaläolithischen Inventars von Salzgitter-Lebenstedt vorgestellt. Neben den dominanten Levallois Methoden findet sich auch die unipolare Klingenmethode mit charakteristischer mittelpaläolithischer Klingenproduktion. Es kann wahrscheinlich gemacht werden, dass das vorhandene technologische Wissen zu effizienter, ökonomischer Kerngestaltung nicht genutzt wurde. Eine mögliche Erklärung hierfür liegt in der geringen Residenzmobilität der Neanderthaler und dem Desinteresse an der Klinge als Grundform. Dies wiederum wirft ein neues Licht auf die Interpretation der spätmittelpaläolithischen Lamellenproduktion in Kantabrien. Ihr Vorkommen ist vielmehr ein Beleg für das konstante Niveau technologischen Wissens im Mittel- und Jungpaläolithikum und weniger für den lokalen Übergang vom Neanderthaler zum anatomisch modernen Menschen.

Keywords – Late Middle Palaeolithic, core configuration, blade production, AMS-radio-carbonates, efficiency

Spätes Mittelpaläolithikum, Kerngestaltung, Klingenproduktion, AMS-Radiokohlenstoffdatierungen, Effizienz

## SERANGELI 2008

Jordi Serangeli & Michael Bolus, *Out of Europe – The dispersal of a successful European hominin form, Out of Europe – Die Ausbreitung einer erfolgreichen europäischen Menschenform. Quartär 55 (2008), 83–98.*

This paper presents the results and implications of a study of the geographical distribution of anthropological remains of Neandertals. Based on distribution maps of excavated Neandertal remains, the Neandertals are highlighted as an indigenous European hominin form which had its core-area in southern and southwestern Europe. The present study shows that Neandertals were adapted to moderate climate rather than to cold or even extremely cold climate. Under favorable climatic and environmental conditions, they repeatedly left their core-area to move into areas of temporary occurrence. During the last Glacial, Classical Neandertals enlarged their originally exclusive European settlement area, expanding into the Near East, parts of Central Asia and even as far as the Altai region. We call this dispersal the Out of Europe-Movement of the Neandertals. This movement started about the same time that Anatomically Modern Humans, who originated in Africa, started their movement Out of Africa. Possible encounters and interactions of both hominin forms are discussed.

Zusammenfassung – Die Schwerpunkte des Beitrages liegen auf der Verteilung der Knochenfunde von Neandertalern und den Schlussfolgerungen, die sich aus dieser Verteilung ziehen lassen. Auf der Grundlage von Kartierungen der bis heute ausgegrabenen Neandertalerreste werden die Neandertaler als eine genuin europäische Menschenform hervorgehoben, deren Kerngebiet in Süd- und Südwesteuropa lag. Eines der wichtigsten Ziele des Beitrages ist es, zu zeigen, dass die Neandertaler eher an gemäßigte als an kalte oder sogar extrem kalte Klimate angepasst waren. Unter günstigen klimatischen Bedingun-

gen und Umweltverhältnissen verließen sie immer wieder ihr Kerngebiet, um in Gebiete vorzudringen, in denen sie sich nur zeitweilig, bis zur Verschlechterung der dortigen klimatischen Bedingungen bzw. Umweltverhältnisse, aufhielten. Offensichtlich im Verlaufe der letzten Eiszeit haben klassische Neandertaler ihr ursprünglich ausschließlich europäisches Siedlungsgebiet bis in den Nahen Osten, in Teile Zentralasiens und sogar bis in das Altai-Gebiet hinein erweitert. Wir nennen diese Ausbreitung die Out of Europe-Bewegung der Neandertaler. Sie setzte ungefähr zu der gleichen Zeit ein, als anatomisch moderne Menschen, die in Afrika entstanden waren, mit ihrer Bewegung Out of Africa begannen. Mögliche Begegnungen und Wechselbeziehungen beider Menschenformen werden diskutiert.

Keywords – Neandertals, Neandertal evolution, Neandertal geography, Core-area, Anatomically Modern Humans, Out of Europe, Out of Africa, Middle and Upper Paleolithic Neandertaler, Neandertaler-Evolution, Neandertaler-Geographie, Kerngebiet, anatomisch moderne Menschen, Out of Europe, Out of Africa, Mittelpaläolithikum, Jungpaläolithikum

## Religion

STRASSMANN 2012

Beverly I. Strassmann et al., *Religion as a means to assure paternity*. [PNAS 109 \(2012\), 9781–9785](#).

Beverly I. Strassmann, Nikhil T. Kurapati, Brendan F. Hug, Erin E. Burke, Brenda W. Gillespie, Tatiana M. Karafet and Michael F. Hammer

The sacred texts of five world religions (Buddhism, Christianity, Hinduism, Islam, and Judaism) use similar belief systems to set limits on sexual behavior. We propose that this similarity is a shared cultural solution to a biological problem: namely male uncertainty over the paternity of offspring. Furthermore, we propose the hypothesis that religious practices that more strongly regulate female sexuality should be more successful at promoting paternity certainty. Using genetic data on 1,706 father-son pairs, we tested this hypothesis in a traditional African population in which multiple religions (Islam, Christianity, and indigenous) coexist in the same families and villages. We show that the indigenous religion enables males to achieve a significantly ( $P = 0.019$ ) lower probability of cuckoldry (1.3% versus 2.9%) by enforcing the honest signaling of menstruation, but that all three religions share tenets aimed at the avoidance of extrapair copulation. Our findings provide evidence for high paternity certainty in a traditional African population, and they shed light on the reproductive agendas that underlie religious patriarchy.

evolution | extrapair paternity | mating | nonpaternity | Y DNA