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References

Aktuell

Rahimi-Aghdam 2019

Saeed Rahimi-Aghdam et al., *Branching of hydraulic cracks enabling permeability of gas or oil shale with closed natural fractures.* PNAS **116** (2019), 1532–1537.

Saeed Rahimi-Aghdam, Viet-Tuan Chau, Hyunjin Lee, Hoang Nguyen, Weixin Li, Satish Karra, Esteban Rougier, Hari Viswanathan, Gowri Srinivasan & Zdeněk P. Bažant

While hydraulic fracturing technology, aka fracking (or fraccing, frac), has become highly developed and astonishingly successful, a consistent formulation of the associated fracture mechanics that would not conflict with some observations is still unavailable. It is attempted here. Classical fracture mechanics, as well as current commercial software, predict vertical cracks to propagate without branching from the perforations of the horizontal well casing, which are typically spaced at 10 m or more. However, to explain the gas production rate at the wellhead, the crack spacing would have to be only about 0.1 m, which would increase the overall gas permeability of shale mass about 10,000.. This permeability increase has generally been attributed to a preexisting system of orthogonal natural cracks, whose spacing is about 0.1 m. However, their average age is about 100 million years, and a recent analysis indicated that these cracks must have been completely closed by secondary creep of shale in less than a million years. Here it is considered that the tectonic events that produced the natural cracks in shale must have also created weak layers with nanocracking or microcracking damage. It is numerically demonstrated that seepage forces and a greatly enhanced permeability along the weak layers, with a greatly increased transverse Biot coefficient, must cause the fracking to engender lateral branching and the opening of hydraulic cracks along the weak layers, even if these cracks are initially almost closed. A finite element crack band model, based on a recently developed anisotropic spherocylindrical microplane constitutive law, demonstrates these findings [Rahimi-Aghdam S, et al. (2018) arXiv:1212.11023].

Keywords: fracking | poromechanics | Biot coefficient | seepage forces | damage

Significance: Development of a realistic model of fracking would allow better control. It should make it possible to optimize various parameters such as the history of pumping, its rate or cycles, changes of viscosity, etc. This could lead to an increase of the percentage of gas extraction from the deep shale strata, which currently stands at about 5 % and rarely exceeds 15 %.

Yuan 2019

Zhi-Ming Yuan, Mingxin Li, Chun-Yan Ji, Liang Li, Laibing Jia & Atilla Incecik, *Steady hydrodynamic interaction between human swimmers.* Journal of The Royal Society Interface **16** (2019), 20180768.

This study focuses on the hydrodynamic interaction between two or three human swimmers in competitive swimming. Although the swimming performance of a single swimmer has been widely examined, studies on the interaction between multiple competitive swimmers are very rare. Experiments showed evidence that the drag of a swimmer could bemodified by the existence of the otheradjacent

competitors (Chatard & Wilson. 2003 Med. Sci. Sports Exerc. 35, 1176–1181. (doi:10.1249/01.MSS.0000074564.06106.1F)). The following questions arise: (1) what mechanism determines the interaction; (2) which position experiences drag reduction or drag increase; (3) how much can drag be reduced or increased in a formation? According to the authors' knowledge, such questions have not been addressed by any published literature. Therefore, the main purpose of this study is to find the mechanism of the hydrodynamic interaction between human swimmers and to quantify this interactive effect by using a steady potential flow solver. The free-surface effect was fully taken into account in our calculations. We firstly calculated thewave drag of a swimmer swimming solely in an open swimming pool. Thenwe calculated thewave drag of the sameswimmerwhen he/she swamin thewake region of one or two leading swimmers. The results showed that the hydrodynamic interaction made a significant contribution to the drafter'swave drag. By following a leading swimmer, a drafter at wave-riding positions could save up to 63 % of their wave drag at speed of 2.0 m s21 and lateral separation of 2.0 m. Particularly, when a drafter is following two side-by-side leaders, the drag reduction could even be doubled. To the authors' knowledge, this study is the first to demonstrate that the hydrodynamic interaction between human swimmers can best be described and explained in terms of wave interference effect on the free water surface. When the wave cancellation effect is observed, the wave drag of a drafter could be minimized, and this wave cancellation effect can be achieved only when the drafter is in a wave-riding position.

Keywords: hydrodynamic interaction | drafting | competitive swimming | wave drag | swimming configuration

Zaidi 2019

Arslan A. Zaidi, Julie D. White, Brooke C. Mattern, Corey R. Liebowitz, David A. Puts, Peter Claes & Mark D. Shriver, *Facial masculinity does not appear to be a condition-dependent male ornament and does not reflect MHC heterozygosity in humans.* PNAS **116** (2019), 1633–1638.

pnas116-01633-Supplement1.pdf, pnas116-01633-Supplement2.txt, pnas116-01633-Supplement3.txt

Recent studies have called into question the idea that facial masculinity is a condition-dependent male ornament that indicates immunocompetence in humans. We add to this growing body of research by calculating an objective measure of facial masculinity/ femininity using 3D images in a large sample (n = 1,233) of people of European ancestry. We show that facial masculinity is positively correlated with adult height in both males and females. However, facial masculinity scales with growth similarly in males and females, suggesting that facial masculinity is not exclusively a male ornament, as male ornaments are typically more sensitive to growth in males compared with females. Additionally, we measured immunocompetence via heterozygosity at the major histocompatibility complex (MHC), a widely-used genetic marker of immunity. We show that, while height is positively correlated with MHC heterozygosity, facial masculinity is not. Thus, facial masculinity does not reflect immunocompetence measured by MHC heterozygosity in humans. Overall, we find no support for the idea that facial masculinity is a condition-dependent male ornament that has evolved to indicate immunocompetence.

Keywords: facial masculinity | MHC heterozygosity | sexual selection | immunocompetence handicap hypothesis | human evolution

Significance: Facial masculinity has been considered a sexual ornament in humans, akin to peacock trains and stag antlers. Recently, studies have questioned

the once-popular view that facial masculinity is a condition-dependent male ornament signaling immunocompetence (the immunocompetence handicap hypothesis). We sought to rigorously test these ideas using highresolution phenotypic (3D facial images) and genetic data in the largest sample to date. We found no support for the immunocompetence handicap hypothesis of facial masculinity in humans. Our findings add to a growing body of evidence challenging a popular viewpoint in the field and highlight the need for a deeper understanding of the genetic and environmental factors underlying variation in facial masculinity and human sexual dimorphism more broadly.

Anthropologie

Dennell 2019

Robin Dennell, *Dating of hominin discoveries at Denisova*. nature **565** (2019), 571–572.

Denisova Cave sheltered hominins at least 200,000 years ago, and excavations there have illuminated our understanding of early hominins in Asia. New dating analyses now refine this knowledge.

Farris 2019

Dominic James Farris, Luke A. Kelly, Andrew G. Cresswell & Glen A. Lichtwark, *The functional importance of human foot muscles for bipedal locomotion*. PNAS **116** (2019), 1645–1650.

pnas116-01645-Supplement.pdf

Human feet have evolved to facilitate bipedal locomotion, losing an opposable digit that grasped branches in favor of a longitudinal arch (LA) that stiffens the foot and aids bipedal gait. Passive elastic structures are credited with supporting the LA, but recent evidence suggests that plantar intrinsic muscles (PIMs) within the foot actively contribute to foot stiffness. To test the functional significance of the PIMs, we compared foot and lower limb mechanics with and without a tibial nerve block that prevented contraction of these muscles. Comparisons were made during controlled limb loading, walking, and running in healthy humans. An inability to activate the PIMs caused slightly greater compression of the LA when controlled loads were applied to the lower limb by a linear actuator. However, when greater loads were experienced during ground contact in walking and running, the stiffness of the LA was not altered by the block, indicating that the PIMs' contribution to LA stiffness is minimal, probably because of their small size. With the PIMs blocked, the distal joints of the foot could not be stiffened sufficiently to provide normal push-off against the ground during late stance. This led to an increase in stride rate and compensatory power generated by the hip musculature, but no increase in themetabolic cost of transport. The results reveal that the PIMs have a minimal effect on the stiffness of the LA when absorbing high loads, but help stiffen the distal foot to aid push-off against the ground when walking or running bipedally.

Keywords: gait | intrinsic foot muscles | biomechanics | longitudinal arch | bipedal locomotion

Significance: Human feet have evolved uniquely among primates, losing an opposable first digit in favor of a pronounced arch to enhance our ability to walk and run with an upright posture. Recent work suggests that muscles within our feet are key to how the foot functions during bipedal walking and running. Here we show direct evidence for the significance of these foot muscles in supporting

the mechanical performance of the human foot. Contrary to expectations, the intrinsic foot muscles contribute minimally to supporting the arch of the foot during walking and running. However, these muscles do influence our ability to produce forward propulsion from one stride into the next, highlighting their role in bipedal locomotion.

Petr 2019

Martin Petr, Svante Pääbo, Janet Kelso & Benjamin Vernot, *Limits of long-term selection against Neandertal introgression*. PNAS **116** (2019), 1639–1644.

pnas116-01639-Supplement.pdf

Several studies have suggested that introgressed Neandertal DNA was subjected to negative selection in modern humans. A striking observation in support of this is an apparent monotonic decline in Neandertal ancestry observed in modern humans in Europe over the past 45,000 years. Here, we show that this decline is an artifact likely caused by gene flow between modern human populations, which is not taken into account by statistics previously used to estimate Neandertal ancestry. When we apply a statistic that avoids assumptions about modern human demography by taking advantage of two high-coverage Neandertal genomes, we find no evidence for a change in Neandertal ancestry in Europe over the past 45,000 years. We use whole-genome simulations of selection and introgression to investigate a wide range of model parameters and find that negative selection is not expected to cause a significant long-term decline in genome-wide Neandertal ancestry. Nevertheless, these models recapitulate previously observed signals of selection against Neandertal alleles, in particular the depletion of Neandertal ancestry in conserved genomic regions. Surprisingly, we find that this depletion is strongest in regulatory and conserved noncoding regions and in the most conserved portion of protein-coding sequences.

Keywords: Neandertal | selection | introgression | modern human | demography

Significance: Since the discovery that all non-Africans inherit 2 % of their genomes from Neandertal ancestors, there has been a great interest in understanding the fate and effects of introgressed Neandertal DNA in modern humans. A number of recent studies have claimed that there has been continuous selection against introgressed Neandertal DNA over the last 55,000 years. Here, we show that there has been no long-term genome-wide removal of Neandertal DNA, and that the previous result was due to incorrect assumptions about gene flow between African and non-African populations. Nevertheless, selection did occur following introgression, and its effect was strongest in regulatory regions, suggesting that Neandertals may have differed from humans more in their regulatory than in their protein-coding sequences.

Shipton 2015

Ceri Shipton & Mark Nielsen, *Before Cumulative Culture, The Evolutionary Origins of Overimitation and Shared Intentionality*. Human Nature **26** (2015), 331–345.

In the 7 million years or so since humans shared a common ancestor with chimpanzees we have colonized more of the planet's terrestrial habitat than any other mammalian species and come to account for more biomass than all other terrestrial vertebrates combined. Chimpanzees, in contrast to and under pressure from ourselves, have veered toward extinction. There are multiple reasons for the stark evolutionary trajectories humans and chimpanzees have taken. Recent theoretical and empirical interest has focused on the emergence of cumulative culture

whereby technological innovations are progressively incorporated into a population's stock of skills and knowledge, generating ever more sophisticated repertoires. Here we look at the role of high-fidelity imitation and intention-reading in the establishment of cumulative culture. By focusing on the lithic record, we aim to identify when in our evolutionary history these skills became part of our ancestors' behavioral repertoire. We argue that evidence of cooperative construction in stone tool manufacture, along with speculation regarding changes to the mirror neurone system, hint at the foundations of overimitation and shared intentionality around 2 million years ago. However, these are not the only ingredients of cumulative culture, which is why we do not see convincing evidence for it until slightly more than a million years later.

Keywords: Overimitation | Shared intentionality | Acheulean | Biface

Shipton 2018

Ceri Shipton & Mark Nielsen, *The Acquisition of Biface Knapping Skill in the Acheulean*. In: L. di Paolo, F. di Vincenzo & F. de Petrillo (Hrsg.), *Evolution of Primate Social Cognition*. Interdisciplinary Evolution Research (Cham 2018), 283–297.

The Acheulean stone tools of Homo erectus and Homo heidelbergensis are the longest enduring of all archaeological cultures, lasting for 1.5 million years. Three competing hypotheses have been proposed to explain this longevity: that Acheulean technology lies in a zone of latent, easy to invent solutions to problems that H. erectus and H. heidelbergensis would have encountered; that there was a genetic predisposition among H. erectus and H. heidelbergensis populations to make handaxes, and perhaps other stone tools characteristic of the Acheulean; or that high-fidelity social transmission was an integral part of the behavioural repertoire of H. erectus and H. heidelbergensis. In this chapter, the first two of these hypotheses are critiqued. Experimental and anecdotal evidence from modern stone knappers is reviewed to determine how knapping expertise is acquired. The chapter concludes with reference to archaeological evidence for social transmission in the Acheulean and a model of how knapping expertise is and was acquired.

Keywords: Imitation | Genetic determinism | Invention | Oldowan | Helical curriculum | Homo erectus

Shipton 2019

Ceri Shipton, Chris Clarkson & Rommy Cobden, *Were Acheulean Bifaces Deliberately Made Symmetrical? Archaeological and Experimental Evidence*. Cambridge Archaeological Journal **29** (2019), 65–79.

Acheulean bifaces dominate the archaeological record for 1.5 million years. The meaning behind the often symmetrical forms of these tools is the topic of considerable debate, with explanations ranging from effectiveness as a cutting tool to sexual display. Some, however, question whether the symmetry seen in many Acheulean bifaces is intentional at all, with suggestions that it is merely the result of a bias in hominin perception or an inevitable consequence of bifacial flaking. In this paper we address the issue of intention in biface symmetry. First, we use transmission chain experiments designed to track symmetry trends in the replication of biface outlines. Secondly, we use archaeological data to assess the symmetry of Acheulean bifaces from British, East African and Indian assemblages in relation to reduction intensity; the degree of bifaciality; and the symmetry of four Middle Palaeolithic bifacial core assemblages. Thirdly, we look at specific examples of the reduction sequences that produced symmetrical Acheulean cleavers at the sites of Olorgesailie CL1-1, Isinya, Chirki, Morgaon and Bhimbetka. All three lines of

evidence support the notion that symmetry was a deliberately imposed property of Acheulean bifaces and not an epiphenomenon of hominin visual perception or bifacial technology.

Bibel

Ganzel 2014

Tova Ganzel & Shalom E. Holtz, *Ezekiel's Temple in Babylonian Context*. Vetus Testamentum **64** (2014), 211–226.

Comparison between Ezekiel's visionary temple and Neo-Babylonian temples shows similar organization of space and personnel. These formal similarities stem from a similar root purpose: maintaining strict standards of sanctity.

Keywords: Ezekiel | Neo-Babylonian | Biblical temples

Karg 2003

Frank P. M. Karg, *Geheimnisvolles Siegel, Datierung des Auszuges von Moses aus Ägypten anhand eines Skarabäus*. Antike Welt **34** (2003), iii, 285–294.

Der Auszug unter Moses fand etwa zwischen 1188-1186 v.Chr., während der Regierungszeit des Siptah und /oder Tausret statt. Moses war der rebellische Stiefsohn von Sethos II., der von seiner Adoptivmutter Tausret unterstützt wurde. Wahrscheinlich erfolgte der Auszug der Israeliten am Ende der Regierungszeit von Königin Tausret, nachdem Kanzler Bai hingerichtet wurde, und die Macht von Tausret am stärksten war. Alles deutet daraufhin, daß die gute Beziehung zwischen Königin Tausret und den Hebräern bis zum Staatsstreich durch Sethnacht anhielt, und sie selbst von hebräischen Soldaten bis zum Auszug Moses gestützt wurde. Beide, naanäer und Tausrets Anhänger, wurden danach von Sethnacht bekämpft und verfolgt.

Kreuzer 1986

Siegfried Kreuzer, *430 Jahre, 400 Jahre oder 4 Generationen, Zu den Zeitangaben über den Ägyptenaufenthalt der "Israeliten"*. Zeitschrift für die Alttestamentliche Wissenschaft **98** (1986), 199–210.

Das AT bringt in Gen 15,13.16 und Ex 12,40f. verschiedene Angaben über die Dauer des Ägyptenaufenthalts der Israeliten. Der Beitrag zeigt die Aufnahme und Verwendung dieser Belege in neueren Darstellungen der Geschichte Israels. Anschließend werden das Alter und die Entstehung der Angaben (4 Generationen, 430 Jahre, 400 Jahre) untersucht und daraus Folgerungen für die Geschichte Israels einerseits und für die alttestamentliche Geschichtsbetrachtung andererseits gezogen.

de Moor 1990

Johannes Cornelis de Moor, *The Rise of Yahwism, The roots of Israelite monotheism*. (Leuven 1990).

Chapter 4.6: Beya and Moses

Skehan 1954

Patrick W. Skehan, *A Fragment of the "Song of Moses" (Deut. 32) from Qumran*. Bulletin of the American Schools of Oriental Research **136** (1954), 12–15.

Thus for this very limited portion of the OT, the new Qumran terials serve to confirm the existence of a divergent ancient Hebrew which the LXX translators had before them, and followed far closely than has generally been supposed. They also give us, in Hebrew, a number of specific divergent readings whose usefulness for the criticism of the text has long been recognized on the basis of the unsupported Greek.

Biologie

Luo 2018

Shiyu Luo et al., *Biparental Inheritance of Mitochondrial DNA in Humans*. PNAS **115** (2018), 13039–13044.

pnas115-13039-Comment1.pdf, pnas115-13039-Reply1.pdf, pnas115-13039-Supplement1.pdf, pnas115-13039-Supplement2.xlsx, pnas115-13039-Supplement3.xlsx, pnas115-13039-Supplement4.xlsx

Shiyu Luo, C. Alexander Valencia, Jinglan Zhang, Ni-Chung Lee, Jesse Slone, Baoheng Gui, Xinjian Wang, Zhuo Li, Sarah Dell, Jenice Brown, Stella Maris Chen, Yin-Hsiu Chien, Wuh-Liang Hwu, Pi-Chuan Fan, Lee-Jun Wong, Paldeep S. Atwal & Taosheng Huang

Although there has been considerable debate about whether paternal mitochondrial DNA (mtDNA) transmission may coexist with maternal transmission of mtDNA, it is generally believed that mitochondria and mtDNA are exclusively maternally inherited in humans. Here, we identified three unrelated multigeneration families with a high level of mtDNA heteroplasmy (ranging from 24 to 76 %) in a total of 17 individuals. Heteroplasmy of mtDNA was independently examined by high-depth whole mtDNA sequencing analysis in our research laboratory and in two Clinical Laboratory Improvement Amendments and College of American Pathologists-accredited laboratories using multiple approaches. A comprehensive exploration of mtDNA segregation in these families shows biparental mtDNA transmission with an autosomal dominantlike inheritance mode. Our results suggest that, although the central dogma of maternal inheritance of mtDNA remains valid, there are some exceptional cases where paternal mtDNA could be passed to the offspring. Elucidating the molecular mechanism for this unusual mode of inheritance will provide new insights into how mtDNA is passed on from parent to offspring and may even lead to the development of new avenues for the therapeutic treatment for pathogenic mtDNA transmission.

Keywords: human genetics | mitochondria | biparental inheritance | paternal transmission | mtDNA

Significance: The energy-producing organelle mitochondrion contains its own compact genome, which is separate from the nuclear genome. In nearly all mammals, this mitochondrial genome is inherited exclusively from the mother, and transmission of paternal mitochondria or mitochondrial DNA (mtDNA) has not been convincingly demonstrated in humans. In this paper, we have uncovered multiple instances of biparental inheritance of mtDNA spanning three unrelated multiple generation families, a result confirmed by independent sequencing across multiple unrelated laboratories with different methodologies. Surprisingly, this pattern of inheritance appears to be determined in an autosomal dominantlike manner. This paper profoundly alters a widespread belief about mitochondrial inheritance and potentially opens a novel field in mitochondrial medicine.

Vissing 2019

John Vissing, *Paternal comeback in mitochondrial DNA inheritance*. PNAS **116** (2019), 1475–1476.

If nuclear elements of mtDNA cannot explain the apparent biparental inheritance, then perhaps the greatest new finding in the paper by Luo et al. (4) is the clear evidence of a dominantly inherited pattern of biparental mtDNA inheritance. It is the first time that a hint at the potential mechanism for paternal mtDNA inheritance in humans has been proposed based on data. Not only must this dominantly inherited nuclear variant disable the selective destruction of paternal mtDNA during embryogenesis, but the high level of paternal mtDNA found in the persons with biparental mtDNA inheritance also suggests a selective replication of paternal vs. maternal mtDNA in the persons with biparental inheritance of mtDNA.

Although the new findings by Luo et al. do not change the fact that paternal inheritance of mtDNA is the exception, understanding the mechanisms underlying this form of inheritance may prompt development of ways to manipulate paternal mtDNA transmission in women carrying deleterious mtDNA mutations.

Datierung

Douka 2019

Katerina Douka et al., *Age estimates for hominin fossils and the onset of the Upper Palaeolithic at Denisova Cave.* nature **565** (2019), 640–644.

n565-0640-Supplement.pdf

Katerina Douka, Viviane Slon, Zenobia Jacobs, Christopher Bronk Ramsey, Michael V. Shunkov, Anatoly P. Derevianko, Fabrizio Mafessoni, Maxim B. Kozlikin, Bo Li, Rainer Grün, Daniel Comeskey, Thibaut Devièse, Samantha Brown, Bence Viola, Leslie Kinsley, Michael Buckley, Matthias Meyer, Richard G. Roberts, Svante Pääbo, Janet Kelso & Tom Higham

Denisova Cave in the Siberian Altai (Russia) is a key site for understanding the complex relationships between hominin groups that inhabited Eurasia in the Middle and Late Pleistocene epoch. DNA sequenced from human remains found at this site has revealed the presence of a hitherto unknown hominin group, the Denisovans1,2, and high-coverage genomes from both Neanderthal and Denisovan fossils provide evidence for admixture between these two populations3. Determining the age of these fossils is important if we are to understand the nature of hominin interaction, and aspects of their cultural and subsistence adaptations. Here we present 50 radiocarbon determinations from the late Middle and Upper Palaeolithic layers of the site. We also report three direct dates for hominin fragments and obtain a mitochondrial DNA sequence for one of them. We apply a Bayesian age modelling approach that combines chronometric (radiocarbon, uranium series and optical ages), stratigraphic and genetic data to calculate probabilistically the age of the human fossils at the site. Our modelled estimate for the age of the oldest Denisovan fossil suggests that this group was present at the site as early as 195,000 years ago (at 95.4 % probability). All Neanderthal fossils—as well as Denisova 11, the daughter of a Neanderthal and a Denisovan4—date to between 80,000 and 140,000 years ago. The youngest Denisovan dates to 52,000–76,000 years ago. Direct radiocarbon dating of Upper Palaeolithic tooth pendants and bone points yielded the earliest evidence for the production of these artefacts in northern Eurasia, between 43,000 and 49,000 calibrated years before present (taken as ad 1950). On the basis of current archaeological evidence, it may be assumed that these artefacts are associated with the Denisovan population. It is not currently possible to determine whether anatomically modern humans were involved in their production, as modern-human fossil and genetic evidence of such antiquity has not yet been identified in the Altai region.

Jacobs 2019

Zenobia Jacobs et al., *Timing of archaic hominin occupation of Denisova Cave in southern Siberia*. nature **565** (2019), 594–599.

n565-0594-Supplement.pdf

Zenobia Jacobs, Bo Li, Michael V. Shunkov, Maxim B. Kozlikin, Nataliya S. Bolikhovskaya, Alexander K. Agadjanian, Vladimir A. Uliyanov, Sergei K. Vasiliev, Kieran O'Gorman, Anatoly P. Derevianko & Richard G. Roberts

The Altai region of Siberia was inhabited for parts of the Pleistocene by at least two groups of archaic hominins—Denisovans and Neanderthals. Denisova Cave, uniquely, contains stratified deposits that preserve skeletal and genetic evidence of both hominins, artefacts made from stone and other materials, and a range of animal and plant remains. The previous site chronology is based largely on radiocarbon ages for fragments of bone and charcoal that are up to 50,000 years old; older ages of equivocal reliability have been estimated from thermoluminescence and palaeomagnetic analyses of sediments, and genetic analyses of hominin DNA. Here we describe the stratigraphic sequences in Denisova Cave, establish a chronology for the Pleistocene deposits and associated remains from optical dating of the cave sediments, and reconstruct the environmental context of hominin occupation of the site from around 300,000 to 20,000 years ago.

Datierung Bibel

Altenmüller 1982

Hartwig Altenmüller, *Tausret und Sethnacht*. Journal of Egyptian Archaeology **68** (1982), 107–115.

Geht man davon aus, daß die Regierung des Sethnacht sich zunächst als Gegenregierung zur Regierung der Tausret etablierte und daß Sethnacht nach seinem Sieg über Tausret seine eigenen Regierungsjahre mit dem Tod des Siptah beginnen ließ, werden die Ausführungen des Großen Papyrus Harris voll verständlich. Die dort erwähnte Zeit der Wirren und der Anarchie, die im Papyrus vor allem mit der Person des 'lirsw verbunden ist, fällt in die der Regierung des Sethnacht unmittelbar vorausgegangene Zeit des Siptah, der als Kind zwischen 9 und 14 Jahren den Thron bestiegen hat und zu Beginn seiner 6 Regierungsjahre bei allen Entscheidungen maßgeblich durch den Syrer Bai, der dann mit 'lirsw gleichzusetzen wäre, beraten wurde. In die Zeit der Alleinregierung der Tausret nach dem Tod des Siptah, also in die Zeit, als Sethnacht gegen Tausret kämpfte, würden dann die Stellen passen, in denen von der Gottlosigkeit der Mächtigen im Lande die Rede ist.

Nach Sethnachts Machtergreifung am 10. X. des 2. Jahres wurden Recht und Ordnung im Land wieder hergestellt. Doch scheint Sethnacht nach seinem Sieg über Tausret nur noch ungefähr 10 Monate ohne die verhaßte Gegenkönigin regiert zu haben. Am 25. IX. vermutlich seines 3. Regierungsjahres ist Sethnacht gestorben. Nach seinem Tod ging die Regierungsgewalt reibungslos in die Hände seines Sohnes Ramses' III. über.

Die kurze Zeit der Alleinregierung gestattete dem König nicht, eine eigene Grabanlage zu vollenden. Daher wurde Sethnacht bei seinem Tod trotz der bestehenden Vorbehalte in das Königsgrab seiner einstigen Gegnerin Tausret im Tal der Könige von Theben (KV 14) gebettet. Man ließ das Grab erweitern und mit den Bildern und Namensinschriften des Sethnacht versehen.

Energie

Richter 2019

Marcel Richter, Gerd Oeljeklaus & Klaus Görner, *Improving the load flexibility of coal-fired power plants by the integration of a thermal energy storage*. Applied Energy **236** (2019), 607–621.

Highlights:

- A detailed dynamic simulation model for a coal-fired power plant is developed.
- The integration of a steam accumulator into the water-steam cycle is presented.
- Charging the energy storage leads to a (minimum) load reduction of up to 7.0 %.
- Discharging the energy storage leads to an additional net power of up to 4.3 %.
- The integrated energy storage enhances the frequency control supply by ±2.8 %.

Improving the flexibility of conventional power plants is one key challenge for the transformation of the energy system towards a high share of renewable energies in electricity generation. Flexible and dispatchable power plants will contribute to this ongoing transformation process as they compensate the fluctuating electricity generation from renewable energy sources such as wind and photovoltaics. In this context, dynamic simulation models offer an efficient tool to evaluate flexibility measures and the resulting highly transient power plant operation. In this paper, the buildup of a dynamic power plant model using the modeling language Modelica in the simulation environment Dymola is presented. The detailed dynamic power plant model is validated successfully against measurement data from the underlying coal-fired reference power plant. The paper then focuses on the integration of a steam accumulator – also known as a Ruths storage – into the power plant process in order to increase its flexibility. The results of the dynamic simulations show that charging the steam accumulator leads to a reduction of the net power up to 7.0 %. By discharging the Ruths storage an additional net power of 4.3 % can be activated very quickly. Thus, the storage integration leads to an improved load flexibility with regard to a temporary reduction of the minimum load as well as to the possibility of performing a load change at a constant firing rate (e.g. to participate on the quarter-hourly intraday markets). Furthermore, the integrated energy storage enhances the provision of primary control reserve significantly by ±2.8 %.

Keywords: Dynamic simulation | Coal-fired power plant | Power plant flexibility | Primary control reserve | Thermal energy storage | Steam accumulator

Zhang 2019

You Zhang, Zengwei Yuan, Manuele Margni, Cécile Bulle, Hui Hua, Songyan Jiang & Xuewei Liu, *Intensive carbon dioxide emission of coal chemical industry in China*. Applied Energy **236** (2019), 540–550.

AppEn236-0540-Supplement1.xlsx, AppEn236-0540-Supplement2.docx

Highlights:

- Local CO2 emission factors of China's coal chemical products are published.
- The total CO2 emission from China's coal chemical industry was 607 Mt in 2015.
- The spatial disparity of CO2 emission from China's coal chemical industry is great.
- CO2 emission from modern coal chemical industry is predicted to be 417 Mt in 2020.
- Carbon capture, utilization, and storage has great potential to reduce its emission.

As the largest producer of coal chemical products in the world, China faces tremendous pressure to reduce its carbon emission. An accurate quantification of the carbon dioxide (CO2) emission of coal chemical industry in China is therefore

necessary. However, due to the variety of coal chemical products and limitations of CO2 emission factors, the total CO2 emission of coal chemical industry has yet to be determined. In this study, local CO2 emission factors of coal chemical products in China are published based on first hand data from twentythree coal chemical enterprises and the total CO2 emission of China's coal chemical industry is extrapolated. The provincial-level spatial distribution of the CO2 emission of coal chemical industry is presented to assist the government in identifying key emission reduction areas. Additionally, scenario analysis of CO2 emission for China's modern coal chemical industry in 2020 is conducted to determine whether the development of the modern coal chemical industry will have a significant impact on future CO2 emission, as well as the effect of carbon capture, utilization and storage technologies on the reduction in carbon emission. The estimate shows that the total CO2 emission of the coal chemical industry in 2015 was 607 million tonnes (Mt), accounting for approximately 5.71 % of China's total CO2 emission. The figure is higher than the total annual CO2 emission of a country such as Canada (555 Mt) or Brazil (486 Mt). Quantifying the emission of the coal chemical industry is therefore critical to understand the global carbon budget. The spatial distribution shows that Shandong, Inner Mongolia and Shanxi release one-third of the coal chemical industry's total CO2 emission. Considering the development of the modern coal chemical industry, its CO2 emission is predicted to be as high as 416.52 million tonnes in 2020. However, the CO2 emission could be reduced by 317.98 million tonnes when carbon capture, utilization and storage are applied to process and energy systems simultaneously. This paper quantifies the CO2 emission of the coal chemical industry in China for the first time, identifies key chemical products and the provinces in which they are produced, explores the carbon reduction potential by scenario analysis, and provides specific data to support the assessment of effective CO2 reduction policy.

Keywords: Coal chemical | Energy conversion | CO2 emission | Coal gasification | Coal liquefaction | China

Grabung Bibel

Altenmüller 1983

Hartwig Altenmüller, *Das Grab der Königin Tausret im Tal der Könige von Theben, Erster Vorbericht über die Arbeiten des Archäologischen Instituts der Universität Hamburg im Winter 1982/1983*. Studien zur Altägyptischen Kultur **10** (1983), 1–24.

Yoyotte 1962

Jean Yoyotte, *Un souvenir du "Pharaon" Taousert en Jordanie*. Vetus Testamentum **12** (1962), 464–469.

En fait, on peut lire clairement sur la photographie et sur le dessin T3-wsrt stpt.n.Mwt, c'est a dire le nom feminin Taousert — ou, pour mieux dire Twosre — suivi du qualificatif „l'élue de Mout". Il s'agit là d'une forme, connue par quelques objets, du nom personnel de la reine Taousert.

La trouvaille de H. J. Franken vient fort heureusement suggerér qu'entre l'Egypte asiatis – et l'Asie qui lui échappait, certaines relations, diplomatiques, commerciales ou autres, durent se maintenir en dépit des grandes transformations qui s'accomplissaient et ou se préparaient en Canaan.

Judentum

Ristine 2016

Jennifer Ristine, *The Magdala Stone: The Jerusalem Temple Embodied, Carved stone block depicts symbols of the Jerusalem Temple*. Bible History Daily **2016**, Oct. 27.

The richness and completeness of the symbols forces the question: Did the Jewish people in Magdala believe God's presence was among them in a particular way as they gathered around Scripture? If so, Magdala offers more than mere firstcentury archaeology. The site allows us also to ponder the crossroad of Jewish and Christian history and faith.

Schorsch 1989

Ismar Schorsch, *The Myth of Sephardic Supremacy*. Leo Baeck Institute Year Book **34** (1989), 47–66.

Counter-history fed both the impulse for rejuvenation and the desire for continuity. As construed by Ashkenazic intellectuals, the Sephardic image facilitated a religious posture marked by cultural openness, philosophic thinking, and an appreciation for the aesthetic. Like many an historical myth, it evoked a partial glimpse of a bygone age determined and coloured by social need.

Still there is little doubt that beyond the world-wide influence of Lurianic Kabbalah, the religious culture of Spanish Jewry held but slight allurement for a self-sufficient and self-confident Ashkenazic Judaism in its age of spiritual ascendancy. Ashkenazic religious leadership in the second half of the sixteenth century began to turn its back on the rich rationalistic legacy of Spain — its biblical exegesis, grammatical research, and philosophic enterprise. Typical of the growing assertiveness was the public attack delivered in 1559 by the chief rabbinic figure of Poznafi in the synagogue on the sabbath before Passover, in which he defended the Talmud as the sole and infallible source of all the knowledge required of Jews and depicted the burning of the Talmud in Rome in 1553 by order of the Papacy as an expression of divine displeasure at the publication of Maimonides's Guide of the Perplexed in Venice two years before.

What is more, Steinschneider was prepared to call this sustained leavening of rabbinic Judaism by the world of Islam Sephardic Judaism, after its dominant representatives — Spanish Jewry (Sefarad being the Hebrew term for Spain). But in this instance, the metonymy is not just a figure of speech; it is the sanctification of an ideal type that is more symbol than substance. The Sephardic bias had rendered Spanish Jewry synonymous with an era of Jewish history that shamed the religious fanaticism and cultural narrowness of medieval Christendom. To see that era as ended by the Christian-inspired expulsion from Spain only confirmed the truth of the periodisation.

Metallzeiten

Zangger 1993

Eberhard Zangger, *Plato's Atlantis Account, A Distorted Recollection of the Trojan War*. Oxford Journal of Archaeology **12** (1993), 77–87.

Parts of the lower town of Mycenaean Tiryns, Greece, became devastated and buried 3-5 meters deep during a torrential flood which coincided with a major earthquake at the transition from Late Helladic IIIB2 to Late Helladic IIIC1 (c. 1200 BC). These catastrophes contributed locally to the rapid demise of the Mycenaean civilization which commenced at this chronological boundary. Such a

collapse of an early Greek civilization accompanied by a simultaneous earthquake and flood is described by Plato (Timaeus 25D) in the legendary Atlantis account. Plato's report revolves around a war between an ancient Greek civilization and a mighty force abroad, called Atlantis. If the former coincides with Mycenaean Greece, the most obvious candidate for the latter must be Troy. Hence, the thus far inexplicable story of Atlantis might well represent an Egyptian recollection of Troy and the Trojan War, distorted by transmission and translation.

Zangger 2016

Eberhard Zangger, *Die luwische Kultur*, *Das fehlende Element in der Ägäischen Bronzezeit*. (İstanbul 2016).

Zangger 2017

Eberhard Zangger, *Die Luwier und der trojanische Krieg*, *Eine Entdeckungsgeschichte*. (Zürich 2017).

Vor 3200 Jahren zerstörten mysteriöse Seevölker die Länder am Mittelmeer – ein blutiges Inferno und eine zivilisatorische Katastrophe gigantischen Ausmaßes. Lange rätselte man, wer diese Angreifer gewesen sind. Doch dann taucht unerwartet eine fast dreißig Meter lange Inschrift von 1190 v. Chr. auf, in der die Überfälle, die Namen der Anführer, ihre Motive und Ziele geschildert werden. Das Buch über ein rätselhaftes Volk, das zu einer großen Macht werden sollte und über die nicht minder dramatische Geschichte seiner Entdecker.

Seit Generationen rätseln Archäologen über den Kultureinbruch ungeheuren Ausmaßes, der um 1200 v. Chr. die politische und kulturelle Landkarte des Mittelmeerraums grundlegend veränderte. Die griechischen Geschichtsschreiber sollen später schlicht vom "Trojanischen Krieg" sprechen. Doch ging es in Wirklichkeit um viel mehr als nur um Troja – es ging um die Frage: Wer regiert die Welt?

Die spektakuläre Wiederentdeckung einer Inschrift wirft nun endlich Licht ins Dunkel. Verfasst in luwischen Hieroglyphen und fast dreißig Meter lang, erklärt sie die Ereignisse am Ende der Bronzezeit im östlichen Mittelmeerraum und unterstreicht die zentrale Rolle der Luwier in diesem Geschehen. Eines der größten Rätsel der Archäologie nähert sich seiner Lösung.

Einzelne mutige Gelehrte und Privatforscher sind seit langem überzeugt, dass es auf der Ostseite der Ägäis einen ganzen Kulturkreis gab, den die Forschung bislang übersehen hat. Die Luwier. Doch ihre Forschungen werden lange ignoriert und behindert, ihre Reputation massiv beschädigt. Niemand stimmt ihnen zu – weder auf europäischer noch auf türkischer Seite. Bis heute herrscht so der Eindruck vor, im Westen der Türkei sei rund tausend Jahre lang nichts Bemerkenswertes geschehen. Doch diese Sichtweise wird sich nun ändern.

Metallzeiten Bibel

Altenmüller 1983

Hartwig Altenmüller, *Bemerkungen zu den Königsgräbern des Neuen Reiches*. Studien zur Altägyptischen Kultur **10** (1983), 25–61.

Der Ausgräber Ayrton hat im Schachtgrab KV 56 keine Spuren einer Beisetzung feststellen können. Daraus haben G. Maspero und andere geschlossen, daß es sich bei KV 56 um das Versteck eines Diebes handeln müsse, der Teile der Grabausrüstung der Tausret zur eigenen Bereicherung entwendet habe. G. Lefebvreund A.H. Gardiner gen dachten daran, daß der Juwelenhort nicht das Versteck eines Diebes gewesen sei, sondern als vorbeugende Maßnahme zur Rettung einiger Grabausrüstungsgegenstände der Tausret vor Sethnacht durch Anhänger der Tausret

eingerichtet worden sei. “The jewellery … must have been part of her funerary equipment, perhaps secretly hidden in order to save it from the rapacity of Setnakhte”.

In einer sorgfältigen Analyse des Befunds hat nun aber C. Aldred überzeugend dargelegt, daß das Schachtgrab KV 56 nicht ein Versteck für geraubte oder sichergestellte Grabausrüstungsgegenstände der Tausret war, sondern einst selbst als Begräbnisplatz diente, der seinerseits wieder in späterer Zeit beraubt worden ist1.

Mittelalter

Krzewinska 2015

Maja Krzewińska, Gro Bjørnstad, Pontus Skoglund, Pall Isolfur Olason, Jan Bill, Anders Götherström & Erika Hagelberg, *Mitochondrial DNA variation in the Viking age population of Norway*. Phil. Trans. Royal Society B **370** (2015), 20130384.

PhilTransRSocB370-20130384-Supplement.pdf

The medieval Norsemen or Vikings had an important biological and cultural impact on many parts of Europe through raids, colonization and trade, from about AD 793 to 1066. To help understand the genetic affinities of the ancient Norsemen, and their genetic contribution to the gene pool of other Europeans, we analysed DNA markers in Late Iron Age skeletal remains from Norway. DNA was extracted from 80 individuals, and mitochondrial DNA polymorphisms were detected by next-generation sequencing. The sequences of 45 ancient Norwegians were verified as genuine through the identification of damage patterns characteristic of ancient DNA. The ancient Norwegians were genetically similar to previously analysed ancient Icelanders, and to present-day Shetland and Orkney Islanders, Norwegians, Swedes, Scots, English, German and French. The Viking Age population had higher frequencies of K*, U*, V* and I* haplogroups than their modern counterparts, but a lower proportion of T* and H* haplogroups. Three individuals carried haplotypes that are rare in Norway today (U5b1b1, Hg A* and an uncommon variant of H*). Our combined analyses indicate that Norse women were important agents in the overseas expansion and settlement of the Vikings, and that women from the Orkneys and Western Isles contributed to the colonization of Iceland.

Keywords: ancient DNA | Vikings | Norway | human mitochondrial DNA | Scandinavia

Physik

Chen 2019

Ming-Cheng Chen et al., *Experimental demonstration of quantum pigeonhole paradox*. PNAS **116** (2019), 1549–1552.

Ming-Cheng Chen, Chang Liu, Yi-Han Luo, He-Liang Huang, Bi-Ying Wang, Xi-Lin Wang, Li Li, Nai-Le Liu, Chao-Yang Lu & Jian-Wei Pan

We experimentally demonstrate that when three single photons transmit through two polarization channels, in a well-defined preand postselected ensemble, there are no two photons in the same polarization channel by weak-strength measurement, a counterintuitive quantum counting effect called the quantum pigeonhole paradox. We further show that this effect breaks down in secondorder measurement. These results indicate the existence of the quantum pigeonhole paradox and its operating regime.

Keywords: single photons | quantum paradox | weak measurement

Significance: We have demonstrated the quantum pigeonhole paradox with three single photons. The effect of variable-strength quantum measurement is experimentally analyzed order by order and a transition of violation of the pigeonhole principle is observed. We find that the different kinds of measurement-induced entanglement are responsible for the photons' abnormal collective behavior in the paradox. The experimental violation of pigeonhole principle presents a challenge to the fundamental counting principle of nature.

Scerri 2019

Eric Scerri, *Can quantum ideas explain chemistry's greatest icon?* nature **565** (2019), 557–559.

Simplistic assumptions about the periodic table lead us astray, warns Eric Scerri.

This physical explanation justified previous ad hoc rearrangements of atoms in the periodic table, such as Mendeleev's switching of tellurium and iodine. (Iodine's atomic number is higher than that of tellerium, which has a higher atomic mass than iodine.)

According to the probabilistic approach of quantum mechanics, an atom can exist in a range of possible electronic configurations at the same time. For a given energy, there's a chance that an electron might lie in or across several orbitals. All of these options and their probabilities need to be considered when deriving the most stable configuration. After averaging, the predicted electronic states of most atoms agree with the Madelung rule. And the calculations predict the anomalous states correctly, in agreement with experiments.

Sprachlehre

Talmon 1989

Shemaryahu Talmon & Weston W. Fields, *The Collocation* **משתין בקיר ועצור ועזוב** *and its Meaning*. Zeitschrift für die Alttestamentliche Wissenschaft **101** (1989), 85–112.

We should like to stress that such "inner-biblical exegesis" in no way disparages or dismisses the value of etymological and philological considerations, nor of extra-biblical comparisons. But for reasons of proper methodology, it is preferable to derive the Interpretation of biblical words and phrases which seem to escape a meaningful explanation, first and foremost from the immediate context, and then from a comparison with their employment in similar contextual settings within the wider framework of the corpus of biblical literature. Such a method should prove to be especially helpful in dealing with expressions which appear to be in the nature of technical terms whose significance cannot be established by going to the etymological roots, but rather by searching for the root of the matter which they reflect in their societal Sitz im Leben. [...]

The comparative evidence appears to confirm what we have already established by an inner-biblical comparison and intra-Hebrew etymological investigation. In so proceeding, i. e., coming to the comparative semitic material last, we concur with Y. Muffs' caveat: "Only after new meanings emerge natiurally from the context of one language should comparative material be brought into the picture."

Woudhuizen 2016

Fred C. Woudhuizen, *Documents in Minoan Luwian, Semitic, and Pelasgian*. Publications of the Henri Frankfort Foundation 14 (Amsterdam 2016).

Story or Book

Pullen 1994

Daniel Pullen, *The Flood from Heaven*. Journal of Field Archaeology **21** (1994), 522–525.

The Flood from Heaven: Deciphering the Atlantis Legend. Eberhard Zangger. Foreword by Anthony Snodgrass, xi + 256 pages, several unnumbered plates, figures, maps, bibliography, index. New York: William Morrow, 1992. $25.00 clothbound. ISBN 0-688-111350-8.

Zangger has brought to Bronze Age Aegean archaeology the natural science concept of unified field theory whereby one explanation can be applied to the universe [...] Rather, Zangger has attempted to apply the rigors of scientific methodology to explaining the end of the Bronze Age in the Eastern Mediterranean.

The core of Flood is chapter five, "Deciphering a Legend," where Zangger breaks down Plato's Atlantis accounts and analyzes the parts in light of current archaeological, geological, and historical knowledge, as well as through comparison with other ancient sources. There is much in this chapter that one can question, as Zangger himself admits, but I do like his bold attempt. The Atlantis account in the Critias breaks off with Zeus calling a council of the gods to decide the fate of the Atlanteans; as Zangger shows, this is just where the Iliad begins, with the council of the gods gathered by Zeus to confer over the fate of the Trojans and Greeks.

Chapter seven, "Reconstructing Troy," in which Zangger utilizes ancient sources, especially Strabo, 19th-century topographical and geological observations, and contemporary geoarchaeological sources such as satellite photography to construct a history of the landscape around Troy. He suggests harbors and waterworks built by the Trojans to connect the area of Hissarlik to the coast, to the north at the Hellespont, to Sigaeum on the west, and to Besik Bay on the sw. Despite some confusion arising from the transposing of maps for pages 205 and 214, his reconstruction seems quite plausible given the technology in the Late Bronze Age. Zangger believes the harbor facilities would be necessary for Troy's position as gatekeeper to the Hellespont whereby the Trojans would, undoubtedly for a fee, provide safety and supplies until favorable winds and currents came along. If, as Zangger believes to be the case, metal ores came from beyond the Black Sea, Troy as controller of access to the Hellespont would be in a position to become rather wealthy.

In the concluding chapter of Flood Zangger presents eight arguments against his interpretations; as Snodgrass remarks in his foreword [pp. ix-xi], this is a remarkable risk for an author investigating the Atlantis story.

Pullen 1994

Daniel Pullen, *Ein neuer Kampf um Troia*. Journal of Field Archaeology **21** (1994), 522–525.

Ein neuer Kampf um Troia: Archäologie in der Krise. Eberhard Zangger. Vorwort by Jack L. Davis. 352 pages, several unnumbered figures and maps in text, chart on endpapers, bibliography, index. München: Droemer Knaur, 1994. Clothbound, no price stated. ISBN 3-42626682-2.

Zangger has brought to Bronze Age Aegean archaeology the natural science concept of unified field theory whereby one explanation can be applied to the universe [...] Rather, Zangger has attempted to apply the rigors of scientific methodology to explaining the end of the Bronze Age in the Eastern Mediterranean.

Zangger tackles Troy, the Trojan War, and the end of the Bronze Age in the eastern Mediterranean in Kampf. This work has a similar methodology to Flood,

in that Zangger tries to systematically and objectively assess all the evidence. The book can be broken down into three sections, the first presenting the problems with the sources and his theory about the importance of Troy for period. The well-written and clear summary of cultural, political, and economic developments in the various gions of the eastern Mediterranean, including Egypt, Syria/Palestine, central Anatolia, the Aegean, and, course, western Anatolia, forms the second part. In last part Zangger attempts to write a detailed history events from 1300 to 1160 B.C., integrating economic, cultural, and political developments of the various regions into one narrative.

Underlying Zangger's second book is the identification of "Ahhijawa" of the Hittite texts with Troy [...] Thus Zangger follows Mellaart (1968), Macqueen (1968, 1986), and other Anatolian scholars, not the Aegean scholars who identify the Ahhijawa with "Achaians," word Homer (and Zangger) uses to refer to the Mycenaeans of mainland Greece. But at the bottom he drops his bombshell: the state of Troy, located in western Anatolia, was populated by the peoples known through Egyptian sources as the "Sea Peoples," or "Asija" or "Ahhijawa" through the Hittite sources, and whose script is preserved for us in only one example, the Phaistos Disk.

In sum, then, Zangger proposes that the Sea Peoples, Ahhijawa, and Trojans are all essentially the same peoples, viewed from different pespectives (Egyptian, Hittite, and Achaian respectively). The Trojan War and the troubles relating to the Sea Peoples are the same events, again seen from different perspectives.

How acceptable are Zangger's ideas? In the "Nachwort" mentioned above, Zangger describes how Manfred Korfmann, the current excavator of Troy, has labeled his ideas as "untenable" and has called Zangger an "armchair chaeologist" [p. 281]. Zangger, however, shows how Korfmann has now accepted many of his ideas, though Korfmann's method of "publishing" through press conferences and the Korfmann-edited Studia Troica series, opposed to any objective medium, is heavily criticized; does not credit Zangger. It is unfortunate that this Trojan War" has broken out between Zangger and Korfmann, but one must at least credit Zangger with fully publishing in Flood and Kampfwell documented and readable expositions of his ideas.

Radford 2019

Tim Radford, *The Periodic Table*. nature **565** (2019), 564–565.

Tim Radford celebrates chemist Primo Levi's extraordinary short-story collection.

When, in 1985, I reviewed Raymond Rosenthal's translation of Levi's collection of short stories (by then a decade old), I called it gold. I wish I'd also said what I thought at the time: that this was a book that people would still be reading in 100 years. With each rereading, the chapters based on memoir seem even more perceptive, more profound.

Renfrew 1992

Colin Renfrew, *The Flood from Heaven: Deciphering the Atlantis Legend*. nature **356** (1992), 642.

The Flood from Heaven: Deciphering the Atlantis Legend. By Eberhard Zangger. Sidgwick and Jackson: 1992. Pp. 256. £17.50, $22. (To be published in the United States by William Morrow on 20 August.)

Inevitably, however, Zangger has to modify the Platonic data on time and place. Moreover, he accepts both the real existence of the Trojan War (a point disputed by many scholars, most notably the late Sir Moses Finley) and its identification with the site of Schliemann's excavations. These are inevitable difficulties. They

are compounded by the special arguments needed to make the Trojan landscape conform to the Platonic description of Atlantis, and by the absence of any satisfactory natural calamity to bring about the disappearance of Troy. For, if correctly identified, the site was still there in classical Greek times, when a temple was built, and remained to await the spade of Schliemann.

For the sceptic, therefore , for whom even the historical reality of Troy and the identification of Hissarlik with it are problematic, the central thesis that Atlantis was Troy is unpersuasive. As Atlantis books go, this is a perfectly sane and well-argued one, written by a competent scholar. But Aristotle was one of the first to suggest the view, pithily expressed by Francis Cornford in 1937 (and quoted by Zangger), that "serious scholars now agree that Atlantis probably owed its existence entirely to Plato's imagination". Until Egyptologists unearth the hieroglyphic inscriptions upon which Solon's Egyptian informants supposedly relied , I shall incline towards Aristotle and Cornford rather than towards Plato and Zangger.