

FIVE CONSTANTS FROM AN ACHEULIAN COMPOUND LINE

FELIKS John, (USA)

Abstract. The origin of advanced mathematics is always spoken of in Babylonian, Egyptian, Greek or Indian terms. In the case of Paleolithic mathematics we usually hear that the evidence represents little more than simple tallying or, at most, calendars. However, limited appraisals such as these are based less on rigorous study of the actual evidence than on a core assumption carried over from evolutionary anthropology, the belief that early peoples were incapable of mathematics. In this paper, I offer more evidence that by the time of Bilzingsleben—a Lower Paleolithic archaeological site 320,000–412,000 years old—*Homo erectus* people already had a long history of mathematical thought including in geometry, trigonometry and fractals; and whether by deliberation or intuition, an awareness of mathematical constants. Scientific techniques not usually applied to ancient artifact studies such as the elimination of variables are used to isolate the constants proposed. Although interpreting Paleolithic artifacts certainly entails a degree of subjectivity, over 15 years time the author has done countless tests similar to these, often to exacting tolerances of 4-5 decimals which collectively demonstrate the same basic mathematical capabilities. The artifacts from Bilzingsleben have the potential for precision studies such as these because they most certainly were engraved with the aid of a straight edge and feature a very high quality of line and angle.

Key words. Mathematical constants, Bilzingsleben, *Homo erectus*, Paleolithic mathematics

Mathematics Subject Classification: Primary 01A10, 00A30; Secondary 00A65

1 Definitions

Constant – A number that arises ‘naturally’ in mathematics and remains the same independent of physical measurement (e.g., **Fig. 1**).

Acheulian - Designation for a “pre-modern” human culture dating c. 1.8 million to c. 100,000 years ago. It is associated with *Homo erectus*—long regarded as ‘ape-men’ by the science community.

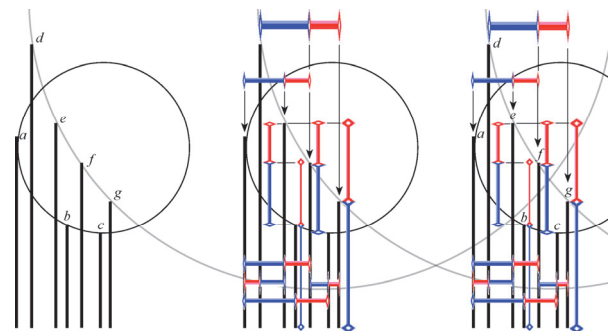


Fig. 1. Left: How the compound line suggested the two circles toward the 5 constants. Middle and right: The Golden ratio (Feliks 2008). See Fig. 5 for how the line itself was constructed.

Compound line - A musical term related to the musical style known as counterpoint (two or more independent melodies played together). Specifically, compound line is when one melody line has a zigzag quality where the outer notes of the zigzag can be read as separate melodies such as in the J. S. Bach *Lute Prelude in C Minor* in Fig. 2 below (here in A minor). Melody *a g a g a f a e* in the upper right of the measure can be read as “Lower” *a g a a a* and “Upper” *g f e*.



Fig. 2. Example of a compound line from Bach’s *Lute Prelude in C Minor*. The stems-up melody *a g a g a f a e* in the upper right of the measure’s last two beats can be read as “Lower” *a g a a a* and “Upper” *g f e*.

2 Geometric evidence

In several earlier papers (1, 3, 4, 5) beginning with *Phi in the Acheulian*, I demonstrated that one useful way to explore the unwritten knowledge of early peoples, even with evidence as limited as a single artifact, was by noting the presence of mathematical constants whose deliberate or intuitive representation within an artifact might be confirmed by way of their repetition. The evidence was presented first in relation to the *Golden ratio* (1.618) or *Phi* (e.g., Fig. 1). Figs. 3 & 4 demonstrate in a precision manner how four more apparently related constants were found to exist without any alterations except the removal of two variables—line angle and horizontal positioning—as detailed in Fig. 5.

— KEY —

1.) In a prior paper, *Phi in the Acheulian*, it was demonstrated that the seven engraved lines of the side-fan motif of Bilzingsleben Artifact 1 exhibited many repeated examples of the *golden ratio*. Here, as in two of the prior studies, the lines were pivoted to parallel and set to the same *x-axis* to remove the variables of angle and horizontal positioning at which point they exhibit a “compound line” (zig-zag relationships), labeled *adebfg*. The line shows two curves, one is labeled *abc* and the other *defg*. Every labeled point on these two curves is accounted for by the *golden ratio* and the two curves are related to each other exactly and repeatedly by the ratio. 2.) From the two curves were drawn two circles—smaller and larger. The first relationship between the two circles is ‘exactly’ *Lengyel’s constant*. 3.) When the small circle is duplicated left to right three times across the diameter of the large circle the remainder is ‘exactly’ *Viswanath’s constant*. 4.) The *Viswanath* decimal plus two small circles

Step 5

After pivoting the lines to parallel, another measurement variable is removed by setting all lines to the same *x axis*.

Step 6

Two circles, labeled *abc* (smaller) and *defg* (larger), are drawn from the two curves of the resulting compound line.

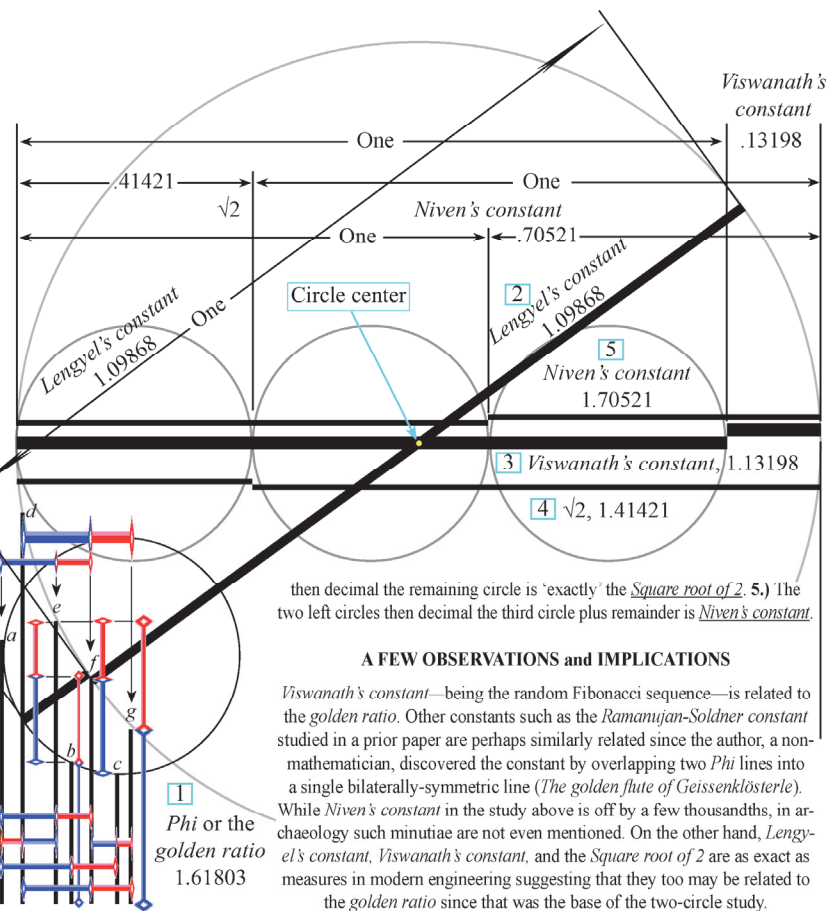


Fig. 3. Five constants from an Acheulian compound line: Overview. The constants demonstrated are 1.) the *Golden ratio* in the motif and circle, 2.) *Lengyel’s constant*, 3.) *Viswanath’s constant*, 4.) the *Square root of 2*, and 5.) *Niven’s constant*; each to a precision of 4-5 decimals. Details are explained in the figure’s key above.

Justifying the 5 constants in the larger circle through the smaller circle

6.) *Viswanath's constant*, the *Golden ratio*, *Niven's constant*, and *Lengyel's constant* (x2) enter as a 5-part interrelated group associated with both circles and the center point of

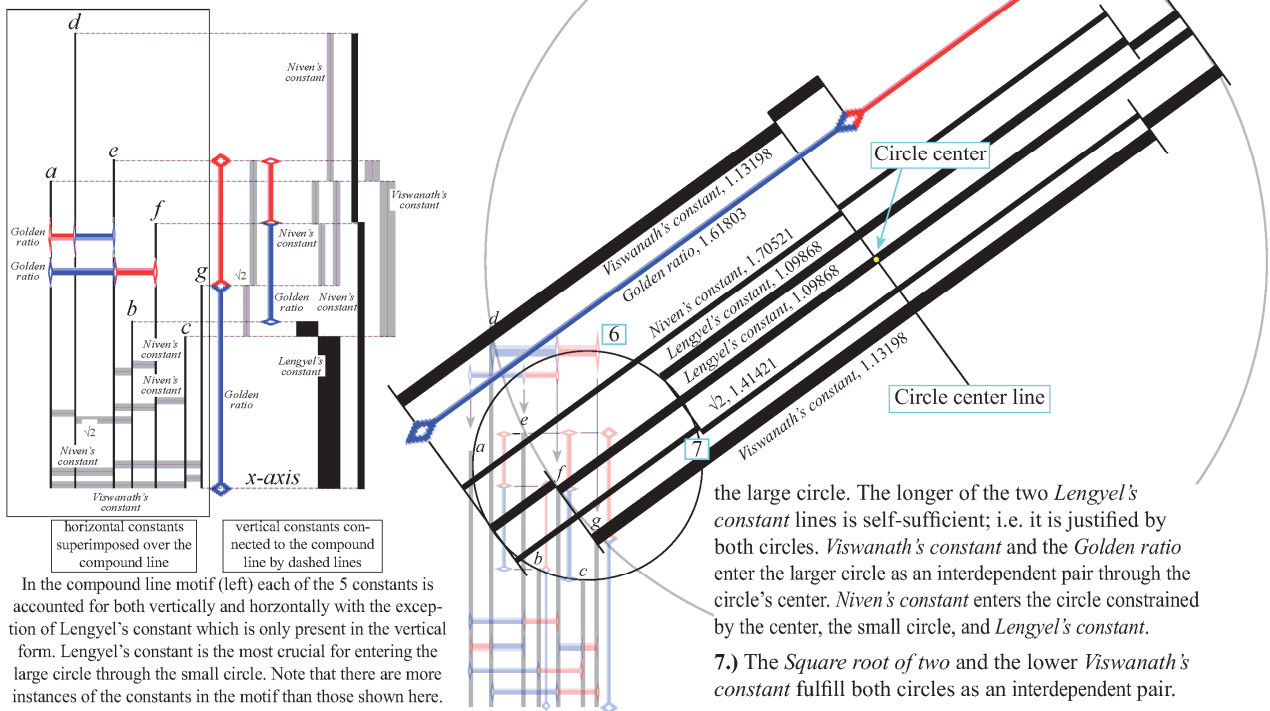


Fig. 4. Justifying the constants in the large circle. Each of the constants which are named and laid out to high precision in the compound line (left) are represented to equal precision within the two circles in the present figure (right) and in the prior, Fig. 3. The tolerances applied can be seen by zooming into each of the figures. This present study is an attempt to explain at least geometrically how it is that the constants in the compound line are somehow transferred through the small circle into the large circle as if by a sort of *encoding and decoding* process. While such a process was one of the author's initial inclinations, there is also the possibility that the idea of transfer is overly simplistic. It may instead be that just like the demonstrated interdependent relationship between *Viswanath's constant* and the *Golden ratio* (see Point #6 in the figure) as well as the interdependent *Viswanath's constant* and the *Square root of 2* (Point #7) the results imply that all three geometric elements—the compound line, the small circle and the large circle—are themselves interdependent and that none of the observed relationships would exist outside of this unique configuration. While already an enigma with just these five, there are surely additional constants within the configuration suggesting not only that the constants are related but that it is possible 'scholars' at the time of Bilzingsleben 400,000 years ago were *working with constants*. Obviously such a possibility extends beyond the already challenging idea of Mania and Mania that Bilzingsleben was a permanent long-term settlement with a complex culture (10), and even that idea conflicts with the standard science view that *Homo erectus* people were not even intelligent enough to have developed language let alone higher mathematics. I believe that the question will ultimately be one for mathematicians. This is because anthropology for the past 15 years has repeatedly demonstrated its unwillingness and inability to deal with such evidence objectively—censoring these and similar scientific observations from proper discourse and publication even in proceedings volumes where publication was promised in advance. Apart from the agendas of competitive researchers as peer reviewers controlling publication, this problem of censorship must be viewed in light of the fact that the evidence does not support the standard ape-man paradigm which the anthropology community has committed to by faith and enforces with an iron hand. Finally, while the author is open to the possibility that these and other constants which have made appearances in the Bilzingsleben artifacts may be related to the engravers' intuition, the precision demonstrated along with clear indication that the lines were engraved with the aid of a straight edge (2, 6, 7) makes it more reasonable to approach the subject from the perspective of mathematics and that there was likely great skill involved.

As mentioned in the Aplimat 2011 paper, *The golden flute of Geissenklösterle*, the idea that humans became gradually more and more intelligent over time is uncritically accepted in anthropology. It is presently known as ‘cognitive evolution’ and was first advanced as an aspect of evolutionary theory by Charles Darwin in his 1859 book, *On the Origin of Species*, where Darwin not only presents the idea as a way to explain the psychology of humans but also as the way to interpret human history:

“Psychology will be based on a new foundation, that of the necessary acquirement of each mental power and capacity by gradation. Light will be thrown on the origin of man and his history.” – Charles Darwin, 1859: 488

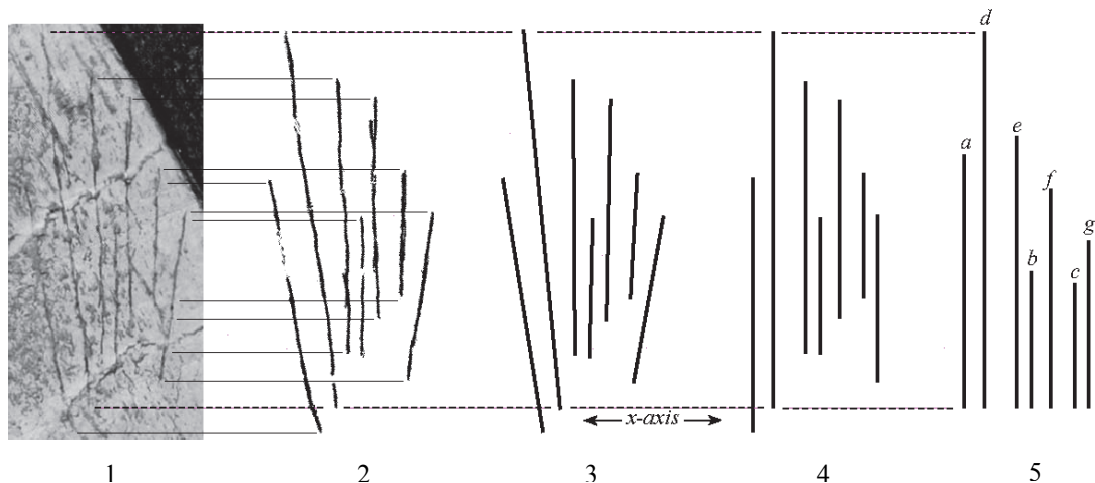


Fig. 5. Steps performed to isolate the compound line by removing two variables. As can be seen, there is a degree of subjectivity involved; however, similar results to those presented in this paper occur even with slightly different interpretations of the engraved lines. As background, the author has done systematic studies of the Bilzingsleben engravings and many other artifacts since 1993 both without alterations and with alterations to eliminate mathematical variables such as in this presentation. Although results may vary, the differences between the two are minor and many of the same mathematical constants tend to show up somewhere even with slightly different line lengths or spacing applied. 1.) 400,000-year old extinct elephant bone engraving from Bilzingsleben, Germany, discovered by Dietrich and Ursula Mania (9, 10, 11); Photo by R. Bednarik cropped with permission (6). 2.) Original line redraws using light table showing line length interpretations from 2004 (7). 3.) Lines redrawn digitally for geometric tests [Feliks 2008, *Phi in the Acheulian*; XV UISPP Congress, Lisbon 2006 (5)]. Unlike in normal proceedings volumes, immediately after presentation, the Congress attempted to block the *Phi* paper from publication on the grounds that it was highly problematic and would ruin the presenter’s credibility if published, and did block the requested Part 1 paper, *The Graphics of Bilzingsleben* (6), for 5 years after a long battle which began within one week of the congress, relegating it finally to an obscure miscellanea volume. The facts of censorship have become a primary and intertwined part of the story of this evidence. The latter mentioned paper was also circulated in anonymous peer review and then, not unexpectedly, blocked from publication by the evolutionary community. 4.) Angle variable is removed by pivoting the lines to parallel on their center points. 5.) Horizontal position variable is removed by setting all lines to the same x-axis. The resulting zigzag is what is studied as a compound line read as two curved lines labeled *abc* & *defg*.

So, once a premise such as cognitive evolution is accepted uncritically as it has been not only by the anthropology community but by the entire modern science community as though the level of evidence in this area is similar to that of claims in other sciences, the motivation for adherents is of only one kind—find evidence which supports the premise. If there is no evidence supporting the premise, then whatever evidence is available, pro or con, must be made to fit into the premise regardless of what it may actually suggest. The only other option for strict adherents since changing the paradigm is not one of them is to censor challenging evidence and ignore it as if it simply were not there. This is the main difference

between the three fields which have committed themselves to the evolutionary template—paleontology, biology, anthropology—and fields which follow a more normal scientific course and go wherever the evidence leads. For this reason I propose that the true nature of early human intelligence study needs to be taken out of the hands of anthropology and taken up by other fields such as mathematics or the arts as anthropology has continued to demonstrate that it can no longer be depended upon to provide objective assessments as it withholds evidence from the public in order to prevent challenging material from being seen. If one adheres to the paradigm uncritically, as most scientists do today, then one has no choice but to interpret cultural evidence in a way that supports the paradigm regardless of the intelligence indicated by such as ancient precision engravings or even collected and curated objects such as fossils (8).

3 Conclusion

It was not the author's original intent in 2006 to discover constants but only to continue studying engraved artifacts by geometric means. However, the *golden ratio* appeared repeatedly in three of the artifacts (5) which eventually led to the other constants suggesting that these also may have been accessible to Acheulian people. The constants are in the context of artifacts which exhibit very meticulous work and are confirmed by radiometric dating to be 320,000–412,000 years old (9, 10, and 11). In other words, the studies support the proposition that the origins of advanced mathematics does not begin with the Babylonians or the Egyptians but much farther back in time, at least as far back as *Homo erectus* at Bilzingsleben. Cognitive evolution is a faith-based paradigm which has been so persistently promoted in science as to create an impression in the public's mind that it is obvious and that any proposals such as those put forth in this paper and others are absurd. However, the weaknesses of the evolutionary paradigm become immediately apparent as soon as one begins to look at the evidence objectively outside the influence of the consensus scientific community. Instead of intelligence gradually increasing from ape-man levels then culminating in modern man, the evidence shows that there has been a verifiable continuity of human intelligence from earliest times. This opens a new door, one to genuinely ancient mathematics and philosophy.

About the author

John Feliks has specialized in the study of early human cognition for nearly twenty years using an approach based primarily on geometry and techniques of drafting. Feliks is not a mathematician; however, he uses the mathematics of ancient artifacts to show that human cognition does not evolve and that early people living hundreds of thousands of years ago were just as intelligent as anyone living today. He is founder of the Pleistocene Coalition, a group challenging mainstream science and its peer review which prevents evidence not adhering to the evolutionary template from being published creating the false impression that there is no challenging evidence. He is also layout editor for the group's newsletter, *Pleistocene Coalition News*. One aspect of Feliks' experience that has given unique perspective on the mathematical or symbolic qualities of ancient artifacts is his background in music; he is a long-time composer in a Bach-like tradition as well as a songwriter in the acoustic-rock tradition and taught computer music including MIDI, digital audio editing, and music notation in a college music lab for 11 years. This musical background was the inspiration to study more closely the Acheulian compound line and many other aspects of the artifacts from Bilzingsleben.

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Current address

John Feliks

Garden City, MI, USA

Website: pleistocenecoalition.com

E-mail: feliks@umich.edu