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FIRST INVESTIGATIONS OF THE THREE-DIMENSIONAL SCANS OF THE EPICUREAN INSCRIPTION OF DIogenes OF OINOANDA

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This article presents results of first systematic investigations made in 2013 on the 3D scans of the fragments of the Epicurean inscription of Diogenes of Oinoanda by Bianca Hinzer-AlHasan (BH) when she prepared her Staatsarbeit in Greek Philology at Frankfurt University under the supervision of Thomas Paulsen (Frankfurt) and Jürgen Hammerstaedt (JH).

While the scans of the stone fragments themselves were made by the team which was set up in 2008 by Tilman Müller and worked on the site of Oinoanda until 2012 under the guidance of Konrad Berner (University of Applied Sciences, Karlsruhe) during the surveys directed by Martin Bachmann, Deputy Director of the Deutsches Archäologisches Institut (DAI), Abteilung Istanbul, the squeezes of a number of Diogenes fragments which are now lost or whose condition has deteriorated since their first discovery by the French, Austrian, and British teams1 were scanned by Konrad Berner in 2012 in l’École Francaise d’Athènes in Athens, in the archive of the Kleinasiatische Kommission der Österreichischen Akademie der Wissenschaften in Vienna, and on the island of Foula in Shetland where Martin Ferguson Smith lives. We feel deeply indebted to so many members, advisers, and sponsors of the Oinoanda surveys that we cannot repeat all their names here.2 However we would like to express our deep gratitude to Martin Bachmann who started and made possible not only the scanning project but also the whole range of new research on Diogenes and on Oinoanda which was put into practice during the last years, to Martin Ferguson Smith who shared his experience and knowledge on the Diogenes inscriptions with us and gave us precious and friendly advice, and of course to Konrad Berner for his intense collaboration in the various technical aspects of this research.

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2 We refer to Smith/Hammerstaedt (2007) and Hammerstaedt/Smith (2008, 2009, 2010, 2011, and 2012) where the work of the Oinoanda survey concerning Diogenes is described and the institutions and individuals who contributed to the project in various ways are mentioned.
THE CHOICE OF FRAGMENTS AND MEASUREMENTS

The investigation focused on the 3D scans of 35 fragments of *Physics,* 350 fragments of *Ethics,* 12 fragments of *F(ourteen)L(ine)C(olumn) Letters* and 25 small letter fragments of uncertain position. The choice of these 122 Diogenes fragments out of 257 whose partial or complete scans are now available, as well as of the scanned squeezes, was made according to the following criteria: *Physics, Ethics,* and *FLC Letters* were probably inscribed in directly superimposed courses of the stoa wall and all of them are written in 14-line columns, using letters of small size (1.8–1.9 cm. high). Taking as a working hypothesis the – still unchallenged – view of Martin Ferguson Smith that the three courses originally had their position directly one above the other in the wall, these blocks seemed to be the best candidates for possible matches of shape between the upper and lower surfaces formed by blocks of different but adjacent courses. Besides, the similar letter-height of all three writings allowed for an elevated number of useful measurement parameters for comparison of mise en page and the disposition of columns inscribed on the blocks.

A check was made of measurements which had already been made in earlier times on the fragments or squeezes themselves, and the following measurements were taken for the first time:

1) Horizontal distance between line-beginnings of successive columns, line-length, and distance between line-end and line-beginning of the following column (minimal, maximum, and average intercolumnar space). These measurements should reveal how regular the horizontal

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5 Fr. 62 (YF 56), fr. 63 I (YF 166), fr. 63 II–III (YF 64), fr. 63 III–V (YF 65), fr. 65 (YF 11), fr. 66 (YF 44), fr. 68 (YF 120), fr. 69 (YF 84), fr. 70 (YF 71), fr. 71 (YF 83), fr. 72 (YF 70), fr. 73 (HK 51).

6 NF 138 (YF 198), NF 139 (YF 197), fr. 89 (YF 139), fr. 91 (YF 144), fr. 92 (YF 149), fr. 78 (YF 17), fr. 82 (YF 155), fr. 83 (YF 109), fr. 86 (YF 107), fr. 87 (YF 153), fr. 88 (YF 131), fr. 93 (YF 176), fr. 94 (YF 177), fr. 95 (YF 179), NF 149 (YF 208), NF 150 (YF 214), NF 151 (YF 205), NF 152 (YF 204), NF 153 (YF 222), NF 169 (YF 230), NF 170 (YF 238), NF 194 (YF 257), NF 195 (YF 268), fr. 85 (YF 140), fr. 79 (YF 39).

7 See Hammerstaedt/Smith (2012) 5 with n. 17.

8 For a list of squeezes scanned in Athens, Vienna, and Foula see Hammerstaedt/Smith (2012) 5 n. 18–20.


10 With the exception of the maxims of Epicurus in the continuous 15th line beneath the *Ethics* columns. Among the other writings, *Maxims* and *TLC Writings* are written in medium-sized letters (ca. 2.3–2.4 cm. high), *Old Age* in large letters (2.9–3.0 cm. high).
distances between columns are, providing thus a technical criterion for calculating the length of
missing parts of lines in incomplete columns.

2) Vertical distance between lines (including the interlinear area), from top of line 1 to top of
line 14, as well as to bottom of line 14. The main purpose of these measurements was to establish
whether differences between the line- and column-height of Ethics, Physics, and FLC Letters are
significant enough to serve as a new criterion for the attribution of unidentified small-letter frag-
ments to one of the three writings. Besides, possible variations within the single courses should
be identified, in order to assist the identification and better understanding of the factors that con-
ditioned the inscribing of these texts.

3) Vertical distances between the top edge of blocks and top of the first line of columns in
different horizontal positions of the blocks. Unlike previous measuring, which normally regarded
only the maximum height of the upper margins, these new measurements are intended to show
up unevennesses and other particular features of the upper margins of single stones.

4) Vertical distance between top of line 1 and lower edge of blocks, of course in different
horizontal positions. Taken together with the measurements mentioned under 3), the presence of
anomalies is expected to provide important clues for matching upper and lower edges of indi-
vidual stones belonging to adjacent courses.

5) Additionally, in the Ethics measurements were taken (in different horizontal positions) of
the following: the vertical distance from the bottom of line 14 to the top of line 15 — the line of
Epicurean maxims, carved in medium-size letters, that runs continuously beneath all the Ethics
columns; the vertical distance from bottom of line 15 to the lower edge of the block; and the
vertical distance from the top of line 1 to the top of line 15.

Of course, not every block offered the necessary conditions for all these measurements, but at
least the vertical distances between lines could be measured in most cases.

The measurements on the P(ortable)D(ocument)F(ormat)s of the 3D scans were taken by
BH who used the measuring option of the software Adobe Reader. It is easily available, easily
employed, and takes measurements with a precision in the range of millimeters. So it was quite a
surprise for both of us to find that these measurements contained an alarming number of incon-
gruencies which only to a certain extent could be explained by the general truth that every act of
measuring, even with the most sophisticated technical equipment, is conditioned by and depend-
ent on the individual approach of the person at work. Nevertheless BH completed the measure-
ments and drew those conclusions which were still feasible under these circumstances within the
limited time allowed for her thesis by the regulations. Only after the completion of BH’s thesis
did JH have the opportunity to be introduced by Konrad Berner at Karlsruhe to the method of
measuring in Adobe Reader and to address the emerging problems. A different software was
tested and approved. The necessary adjustments to all 3D documents were entrusted to a student
of Geomatics, Katherina Strohmaier (University of Applied Sciences, Karlsruhe), and will be
brought to completion in early 2014.

MEASURING THE HEIGHT OF LINES

The vertical measurements of spaces between lines, as explained above, reveal that the space
between lines in the columns of Ethics is on average significantly higher than in Physics and
FLC Letters. While the height of lines (together with the interlinear space which was included in
these measurements for the first time) in the 44 fragments of Ethics which could be used for such
Fig. 1: Physics sequence
measurements averages 32.8 mm., in the 41 suitable blocks of *Physics* the average is 29.8 mm. high, and in the *FLC Letters* 28.9 mm. The measured variation between the height of single lines in *Ethics* is 31–34 mm., in *Physics* 27–32 mm., and in *FLC Letters* 27–30 mm.

It is true that these results in many cases do not exclude multiple attributions; however, in some cases “small-letter fragments of uncertain position” can be attributed to specific writings in the inscription with high probability. We give some examples.

In fr. 89 (YF 139) the measured vertical spaces of 33 mm. point with much probability to *Ethics*, leaving *Physics* as a rather remote possibility and excluding almost certainly *FLC Letters*. The same distance of 33 mm. was measured in NF 149 (YF 208), and the same conclusion further narrows down the possibilities which had been taken into consideration by the editors.11

The extremely small line-distance of 25 mm. in fr. 88 (YF 131) seems to exclude *Ethics* and rather points to *Physics* or *FLC Letters*. The same possibilities of attribution are suggested by the line distance of 27 mm. in NF 151 (YF 205). This result would agree with Martin Ferguson Smith’s proposed restoration and interpretation of the fragment as either part of a discussion of chance in *Letter to Dionysius* (fr. 71 and fr. 72) or of the refutation of monistic theories of matter in *Physics* which begins in fr. 6.12

The upper margin of 3 cm. and the small size of letters of NF 145 (NF 205) persuaded the editors to attribute the fragment to *Physics* and nearly to exclude *Ethics* for the reason that only one other *Ethics* fragment has an upper margin under 4 cm., the average being about 5 cm.13 This is now confirmed by the line distance of 27 mm.

**THE FIRST LINE AS POINT OF REFERENCE FOR THE RECONSTRUCTION**

The different height of blocks, and especially of upper margins within the same course of the Diogenes wall, prompted the tacit assumption in Martin Ferguson Smith’s reconstruction that the upper and lower edges of these courses did not exactly line up. An important aim for future investigation of the 3D scans will therefore consist in identifying notches formed by different heights of adjacent blocks (fig. 1) and looking for upper or lower blocks of neighbouring courses with matching features.

In this way reliable data for the vertical reconstruction of the Diogenes wall may be gained. In addition during BH’s measurements on the 3D scans it was observed that the upper and lower surfaces and edges of many Diogenes blocks have slightly sloping (fig. 2) or even crooked features.

Most of them cannot be detected by mere looking but only by exact measuring. However, provided that the blocks already had this form in their original position in the stoa wall and no deformation occurred during their reuse after the demoli-

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11 Hammerstaedt/Smith (2008) 21: “*Ethics* is most likely, but *Letter to Dionysius* is also possible, since it discusses ethical as well as epistemological questions.” The *Letter to Dionysius* belongs to the *FLC Letters*.


13 Hammerstaedt/Smith (2008) 11. The one exception is fr. 34 I–III (YF 046 = HK 62), a block which may have been cut and reduced during the process of its reuse.
tion of the inscribed wall, these features certainly had an impact on the joining up of neighbouring blocks. So it is very likely that uneven features of blocks matched up with corresponding features of the blocks which lay above or below them in the wall. Because of the difficulties of measuring mentioned above a systematic investigation can only start when the PDFs of the 3D scans are ready for new and more reliable measurements in another software.

Nevertheless, the surprising frequency of unevenness of upper and lower surfaces in the Diogenes wall measured by BH brought up again the issue of the criterion for the exact alignment in the virtual-wall reconstruction of those blocks which do not have a strictly square or rectangular shape. The assumption that in each course of the inscription it is the tops of the columns rather than the tops of the stones that were horizontally aligned was easily confirmed by checking the exact alignment of all first lines of columns in those blocks which contain more than one column.

In this context further observations were made on blocks like fr. 47 III–IV (YF 085). While the top and bottom of line 1 are very straight and regular, the lower lines are less regular and slightly wavy. One has to conclude that the scribe exactly defined the regular horizontal trace of the first lines of the columns while he added the next lines without such a pre-alignment.

The continuous 15th line on the same block probably contains the end of Sent Vat. 33 and, after a blank space of six letters, the beginning of a new maxim which probably draws on Epic. ep. Men. 130–131. According to BH’s measurement, the new saying starts in a slightly lower position.14

14 Distance from top of line 1 to top of line 15 on the right 49.8 cm., on the left 49.1 cm. The last three letters of Sent Vat. 33 seem already to go slightly downwards, perhaps in order to compensate optically for the lower beginning of the next maxim.
The reason is not clear. Did the stonemason carve this line without pre-alignment too? Or did the slight variations of height of the 15th line serve as an optical compensation for the different heights of successive Ethics blocks?

**SPLITTING UP AND REARRANGING FR. 47**

The 3D scans show clearly that the two blocks of the Ethics which were brought together by Martin Ferguson Smith as fr. 47 I–II (YF 096) and III–IV (YF 085) do not fit together.

The distance measured from the line-beginnings of the second column to the utmost right extension of the block YF 096, which due to damage at the right end of the stone extends beyond the inscribed surface, is 37.9 cm., while the line-beginnings of the first and the second columns are 32.8 cm. apart and the extension of all other Ethics columns is far below 37.9 cm. Moreover, the first seven lines of YF 096 II are complete beyond doubt and no editor has tried to add further supplements at their right end.

A further reason for separating fr. 47 I–II (YF 096) from III–IV (YF 085) is offered by the content. While the text of YF 096 deals with the shortness of most extreme physical pain which is caused by accidents like a stroke of thunderbolt or the impact of a falling heavy stone block or decapitation with a sword, and immediately ends in death, the two columns of YF 085 seem

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15 The link was first ventured in Smith (1976) 302, was mentioned as an unpublished proposal of Adelmo Barigazzi in Canasova’s edition (1984) 269 App., and was canonized in Smith’s editions of 1993 and 1996. See also Smith 496–497.

16 On the basis of 20 successive columns, 33.5 cm. were measured as average distance between Ethic columns, with a minimum of 32.6 cm. (in fr. 34 VI–VII/YF 38A col. I–II) and a maximum of 34.2 cm. (in fr. 34 I–III/YF 46 col. II–III).
to treat pains caused by diseases which include the possibility of recovery. According to fr. 48, three different appearances of pain (εἴδη τρία τῶν ἀλγη[μάτων]) are neatly distinguished and treated in separate sections. While the section devoted to traumatic pain caused by blows and other injuries must have ended just before this text, the pathological pain caused by disease is the only one which has not yet been treated and is probably the next topic immediately following this disposition:


It would be easier to explain why Smith20 doubted that fr. 47 is part of the discussion about traumatic pain mentioned in fr. 48 if he had not referred explicitly to YF 096 (fr. 47 I–II/NF 44) but to the other block (YF 085/fr. 47 III–IV) which treats pathological, not traumatic, pains. Indeed it is very likely that the pathological pain mentioned in YF 085 I–II is part of the section

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18 Fr. 48 II 1–2.

19 Fr. 48 II 2–14. The words ἄρκει τοσοῦτον refer to preceding text. See Hoffman II 386; Smith (1993) 498.

Three-dimensional Scans of the Diogenes Inscription

devoted to the third class of pain which directly followed fr. 48. It is possible that NF 137 (YF 199) belongs to the same section, if indeed the editors are right in assigning the stone to Ethics.\(^{21}\)

Since YF 096 I–II belongs to a section which finished immediately before fr. 48, its shape as a stretcher, which was first confirmed in 2010, when it was removed from its find-place to the depot on the site,\(^{22}\) may lead to a further conclusion. Since the back of the left side of fr. 48 (YF 089) projects in the form of a square bulge, the next block to its left, which carried on its right side the missing parts of the column whose line-endings survive as fr. 48 I, must have had the shape of a stretcher.

It is not unlikely that this stretcher was YF 096. The broken right side of this block certainly contained part of a third column. If these were the missing left parts of fr. 48 col. I, the original width of YF 096, assuming the average distance of 33.5 cm. between columns of Ethics, would not have exceeded 95 cm., which is quite an acceptable width for a stretcher in the Diogenes wall.\(^{23}\)

It is expected that more detailed measurements of all scanned blocks, which will be made possible by the presently prepared new document formats\(^{24}\) and – hopefully – the discovery of more hitherto unknown Diogenes blocks, will help us to get still clearer ideas about the original disposition of the inscription of Diogenes on the wall of the stoa.

Abbreviations

Fr. = Fragment(s) of Diogenes’ inscription, unless otherwise indicated. The numbering is that of Smith (1993), unless otherwise indicated.


YF = Yazı Felsefi (Philosophical Inscription). The YF numbers are the inventory numbers of the fragments of Diogenes’ inscription.

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\(^{21}\) Smith/Hammerstaedt (2007) 5 measured an upper margin of (at maximum) 6 cm. which would be less than the previously encountered height of upper margins in FLC Letters. As a result of cleaning in preparation for the scanning, in 2011 more parts of the block could be reached and measured, and the height of the upper margin could be ascertained at 7.5 cm. at maximum. See Hammerstaedt/Smith (2011) 81 n. 18. So one can no longer exclude the possibility that NF 199 belongs to the FLC Letters. Nevertheless, the subject-matter fits well into Ethics and has not yet been encountered in any FLC Letter.

\(^{22}\) The missing measurement of its maximum depth (35 cm.) was made on 7 August 2010.

\(^{23}\) See the table in Smith (1993) fig. 7.

\(^{24}\) See above.
Bibliography


Özet


Satırlar arasındaki aralıkları saptayan ilk ölçüm, Etik’e ait kısımda satır aralıklarının, Fizik ile ilgili bölümdeki (29,8 mm) ve 14 satırlık sütunlardaki mektupların satır aralıklarına (28,9 mm) göre ortalama olarak belirgin bir şekilde daha yüksek (32,8 mm) olduğunu göstermektedir. Etik kısımda ölçülen satır yükseklikleri 31 ile 34 mm arasında değişirken, Fizik’te 27 ile 32 mm arasında ve 14 satırlık sütunlardaki mektuplar arasında 27 ile 30 mm arasındadır. Bu nedenle 33 mm satır yüksekliği olan 89 numaralı parça (YF 189) ve NF (= yeni buluntu) 149 (YF 208) büyük bir olasılıkla Etik’e ait kısıma dahil edilebilirler. Buna karşın 25 mm lik satır yüksekliği olan 88 numaralı parçanın (YF 131) ve 27 mm lik satır yüksekliği olan NF 151’iin (YF 205) Etik ile
ilk kısma dahil edilmesi ihimali yoktur. Bunlar daha çok Fizik ya da 14 satırlık sütunlardaki mektuplara ait parçalar olarak değerlendirilebilirler. İlk kez bu yazı yayınlananlara tarafından NF 145 numaralı yeni buluntunun (YF 205) Fizik’e dahil edilmesi (Etk’e dahil edilmemesi) tahmininin doğruluğunu 27 mm’lik yüksekliği ile onaylanmaktadır. Uzun bir süredir blok tarafların yüksekliklerinde farkların belgelendiği olduğu yazılı taşı duvarın aynı yatay seri halindeki taşı bloklarının tüm üst ve alt blok kenarlarının tam olarak aynı yükseklikte bulunmadıkları anlaşılmaktadır. İlk kez yapılan ölçümlerle edilemiş çok sayıda taşı bloğun yukarıda da aşağıda hafif eğimi olduklarını gösteren bu bilgiye birlikte bu saptama böylece gelecekteki üç boyutlu tarama araştırmalarında farklı duvar katmanlarındaki blokların ve Diogenes’in eserlerinin dikey doğrultudaki asıl konumlarının tahmin edilmesini kolaylaştıracaktır. Üç boyutlu taramaların ölçüyle elde edilen sonuçlar, yazılı taşı duvarın gelecekte yeniden sanal kurulması durumunda, her iki sütun satırının üst çerçevesinden başlanması gerektiği yönündeki tahminleri de onaylamaktadır. Yakından yapılan bir gözlem 47 numaralı parçanın III–IV (YF 085) ilk satırının kesin bir şekilde yatay yazıldığı buna karşın onu takip eden satırların düzeniz ve artık birbirlerinden bağımsız ölçümlerdiği, tam tersine her bir yukarısındaki satırına göre yazılmış olduklarını onaylamaktadır.


Burada tanıtılan araştırmaların devamı olarak çok daha küçük ve ayrıntılı üç boyutlu tarama ölçümleri öngörülmektedir. Umarız ki bu ölçümler, yakın gelecekte diğer Diogenes bloklarının bulunmalarıyla yazıt duvarının konumu hakkındaki ön görüşlerimizi daha da ayrıntılı bir duruma getirecektir.