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HERACLITUS REVISITED (PAP. DERVENI COL. I LINES 7–11)

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In this periodical some articles were published relating to the PDerveni, especially relating to colom i of the PDerveni.¹ As the Edd. of the PDerveni remark, the suggestions presented before their publication are no longer to be taken into full account.² After the study of some fragments by microscope I've come to the conclusion that the scala of possible interpretations of the PDerveni based on the readings thusfar presented are not exhausted as yet. This holds especially for the end of line 8 in col. i. The relating reading is the more so important here because it seems to heavily settle the construction of the phrase and thereby the intention of the relating phrases.³ Although Edd. come to a uniform maximum of length of lines in the PDerveni independent from each other, in the articles in the ZPE it is left uncommented.⁴ As the length of the lines is closely related to the conjectures to be taken into consideration, an account of its calculation seems of importance as well. These considerations form the base of this article. Therefore, in this article will be presented (1) the sources, (2) the palaeography, (3) the result of my microscopic enquire, (4) the calculation of the length of the lines in the PDerveni, (5) some conjectures and (6) my text of own preference for col.I lines 7-11.

¹ S.N.Mouraviev, The Heraclitean Fragment of the Derveni Papyrus, ZPE LXI (1985), 131-32; D.Sider, Heraclitus B 3 and 94 in the Derveni Papyrus, ZPE LXIX (1987) 225-228; A.V.Lebedev, Heraclitus in P.Derveni in ZPE LXXIX (1989) 39-47, hereafter to be referred to as Lebedev. Another publication on the PDerveni is, e.g., W.Burkert, Eraclito nel Papiro di Derveni: Due Nuove Testimonianze in: Atti del Symposium Heracliteum 1981 / A cura di Livio Rossetti, Roma: Edizione dell'Ateneo - 1983 (I)/1984 (II), 37-42.

² Prof. K.Tsantsanoglou and prof. G.M.Parássoglou (hereafter to be referred to as Edd.) Heraclitus in the Derveni-Papyrus in: Studi e Testi per il Corpus dei Papiri Filosofici Greci e Latini -3- edited by Leo S.Olschki at Florence, 1988. Edd., 125 n.1: 'The addition of one more papyrus fragment (F7), the more or less exact measurement of the distances between the fragments, and some better readings render it unnecessary to take into full account former editions or suggestions which were inevitably based on different data.'

³ Though Edd. view the possibilities of the reading differently they share the opinion that if a γ and a κ respectively are to be read, for each one of these letters one definite addition is most plausible and that the reading of this passus has far-reaching consequences for the construction of the sentence. For, as it will be made plausible below, a probable consequence of these additions is that at the end of line 8 either the beginning of the second part of the sentence is to be added or a word which belongs to the first part of the sentence. This letter is for that matter comparable to the ρ/φ on the stone EM 6568 of the Epigraphical Museum at Athens (cf. ZPE 83 (1990), M.H.Chambers et alii 38ff.)

⁴ For the length which was tended before cf. S.G.Kapsomenos, 'Ο ὀρφικὸς πάπυρος τῆς Θεσσαλονίκης in: Ἀρχαιολογικὸν Δελτίον 19 (1964), 19: 31-42; M.L.West, Orphic Poems, Oxford: Clarendon Press - 1983,76: ±30-±45; Lebedev, 46: -46?.

1. Sources

(a) Plutarchus. The texts which are known as fragment DK 22B94 will be reproduced in the context from which they originate. The transcription will be the one given by the Loeb edition:

De exilio 604A: καίτοι τῶν πλανήτων ἕκαστος, ἐν μιᾷ σφαίρα, καθάπερ ἐν νήσῳ, περιπολῶν, διαφυλάττει τὴν τάξιν· "ἥλιος γὰρ οὐχ ὑπερβήσεται μέτρα," φησὶν ὁ Ἡράκλειτος· "εἰ δὲ μή, Ἐρινύες μιν, Δίκης ἐπίκουροι, ἐξευρήσουσιν."

De Iside et Osiride 370D: Ἡράκλειτος μὲν γὰρ ἄντικρυς πόλεμον ὀνομάζει "πατέρα καὶ βασιλέα καὶ κύριον πάντων," καὶ τὸν μὲν Ὀμηρον εὐχόμενον

ἕκ τε θεῶν ἔριν ἕκ τ' ἀνθρώπων ἀπολέσθαι

λανθάνειν, φησί, τῇ πάντων γενέσει καταρώμενον, ἐκ μάχης καὶ ἀντιπαθείας τὴν γένεσιν ἐχόντων, ἥλιον δὲ μὴ ὑπερβήσεσθαι τοὺς προσήκοντας ὅρους· εἰ δὲ μή, γοργῶπάς μιν Δίκης ἐπικούρους ἐξευρήσειν.

*γοργῶπάς F.C.B. (= Ἐρινύες 604A): γλώττας.

(b) Placita. The fragment known as frg. DK 22B3 or as Aetius II.21.4 has been transmitted in various forms. Those versions which include the expression: εὖρος ποδῶς ἀνθρωπέου can be found in Ps.Plutarch Epit. II.21.4, in Stobaeus Florilegium C.XXV.1g and may be assumed to be present in the Aetius Arabus (Daiber, 156.23/24). The context in which the fragment figures are: **Περὶ μεγέθους ἡλίου** (Ps. Plutarch), **περὶ οὐσίας ἡλίου καὶ μεγέθους σφαιρώσεως τε καὶ τροπῶν καὶ ἐκλείψεως καὶ σημείων καὶ κινήσεως** (Stobaeus) and "Über die Größe der Sonne" (Aetius Arabus - Daiber) respectively. Only Stobaeus mentions a verb: (τὸ δὲ μέγεθος) ἔχειν.

(c) PDerveni. The transcription which Edd. give as col. i of the PDerveni, is:

1 [.]ου ε.[]ων[
 2 ὁ κειμ[....]μεταθ[]δοῦναι [
 3 μάλλ[ον τ]εῖνεται []α τῆς τύχης γ[ὰρ
 4 οὐκ εἴ[α λα]μμάνει[.]αρουτ[.....]νδε κόσμος· [
 5 κατα[....]α Ἡράκλ[ε]ιτος μαα[.....(.)] τὰ κοινὰ [
 6 ὡ κατ[]ει τὰ ἴδ[ι]α· ὅπερ ἴκε[λα]λόγωι λέγων []
 7 ἥλι[ος ...]. ου κατὰ φύσιν ἀνθρω[πείου] εὖρος ποδῶς []
 8 το[.....] οὐχ ὑπερβάλλων· εἰ γὰρ [....]ρους ε[]
 9 [.].....]. Ἐρινύε[ς] νιν ἐξευρήσου[σι, Δίκης ἐπίκουροι]
 10 [ca. 11 ὑπερ]βατὸμ ποῆι κ[
 11]αθυο[

2. Palaeography

With regard to the transcription as given by Edd. I take a look at the following readings:

3 μᾶλλ[ον τ]είνεται. In relation to passus at Aristoteles and Pyrrho I considered possibilities to read here μᾶλλ[ον φ]αίνεταί.⁵ After consulting prof. Tsantsanoglou (Thessaloniki, Nov. 1989) I came to the conclusion, however, that the material hardly offers a starting-point for such a reading.⁶

7 ἥλι[ος ...]: On request of Prof. Parássoglou, (Oct. 10, 1990) I took another look at these letters. It resulted in the same reading as Edd. Since there is uncertainty both about the (potential) noun to be supplemented and about its (eventual) case it seems right to leave both points open for the moment. So the reading will be ηλι[ος ...].

7] ου: Edd., 127 write: 'a faint trace, most likely of a high horizontal: γ, ε, ζ, ξ, τ are possible'. Prof. Tsantsanoglou confirmed Nov. 8, 1989, reacting upon my question that according to the description a ς is also possible. For the readings]μου en]νου (Lebedev, 46) I found neither indications nor independent justification. That's why they won't be taken into account.

8 το.[Edd., 127 write: 'immediately before the break a faint trace, perhaps best identified as the right-hand upper end of τ or υ'. This astonishes in a certain way, since the missing part is at the right side. My supposition that Edd. mean here 'left-hand upper end' was affirmed by prof. Tsantsanoglou.

8] ούχ: Edd., 127 write: 'before ο space for a half a letter, covered with a layer of papyrus. To the left of ο and below the level of its bottom curve, a slight trace resembling the end of the right-hand hasta of α, λ, or μ may or may not be ink.' When I pointed out to prof. Tsantsanoglou at Nov. 9, 1989 that on the base of this description a 'lunate sigma' may be added again as another possibility, he agreed. By the way, the addition τοῦ[ς ὄρους] given by Edd. implied this.

8 εἰ γὰ[ρ According to Edd. on this place εἰ γὰ[ρ] should be read, to be supplemented to εἰ γὰ[ρ].⁷ Moreover they state (p. 127): 'of α only the bottom tip of the left-hand hasta survives in a tiny dot.' The original reading by Edd. was εἰς and its supplement εἰς[οτας]. This reading was abandoned, however, after microscopic research by prof. Parássoglou on 14 en 28 november 1984.⁸ After almost two years of correspondence and personal contacts, Prof.

⁵ Meteorologica 373^b 10-13 (Loeb) οἶον καὶ ἥλιος καὶ ἄστρα ἀνίχοντα καὶ δύνοντα μᾶλλον ἢ μεσουρανοῦντα. Of somewhat later date is the remark by Pyrrho (Diog.Laertius IX,86): ἔτι ὁ ἥλιος ἀνίχων μὲν ἀλλοῖος, μεσουρανῶν δ' οὐχ ὅμοιος. The respective remarks by Epicurus and followers won't be mentioned. The described phenomenon is known as the moon illusion. Cf. note 28.

⁶ A comparison of several alphas and their crosses esp. showed a great regularity as to the height of the cross and a distinguished difference of height with respect to the supposed cross here.

⁷ Edd., 132: εἰ γὰ[ρ] is unavoidable, in spite of Plutarch's twice repeated εἰ δὲ μή. On Oct. 12, 1991 prof. Parássoglou declared to me that 'εἰ γὰ[ρ] is unavoidable in the sense that γε[ρ] is absolutely impossible and εἰ μ[ὴ] is also impossible.'

⁸ Prof. Tsantsanoglou, Thessaloniki, 7 nov. 89; per litteras Febr. 22, 1990; Prof. Parássoglou, Thessaloniki, Oct. 10, 90.

Tsantsanoglou attempted a counter-check of this locus in the first week of 1990, an attempt which failed to give any indication for either reading.⁹ This locus was studied by me together with some other loci at Oct. 11 and 12, 1990 by various means, the result of which will be presented in the next section.

9 J.: Edd. write: 'the upper part of a vertical'. I went through the various possibilities with Prof. Tsantsanoglou Nov. 12, 1989. Prof. Parássoglou considers the three letters as equal possibilities. Prof. Tsantsanoglou himself prefers the reading η for the following reasons: a ι as written in the PDerveni has a sharp inclination to the left in general and if it still has an inclination to the right it is less than the inclination this part of the vertical presents on this spot. On the contrary the right vertical of a ν has an inclination to the right but rises above the average height of the letters. This circumstance would explain the reading of prof. Kapsomenos: η and will be taken for reading. Dismissing a ι , the supplements ad locum by Mouraviev (ZPE 61, 1985, 131/2), Sider (ZPE 69, 1987, 225-228), Lebedev and most supplements by Edd. have no more value. Thus its dismissal has far-reaching consequences.

3. The results of my searching for $\epsilon\iota \gamma\kappa[\rho]$

On the base of the photograph presented by Edd. as enclosure to their publication a vertical combined with three dots might be read on this spot. A comparative analysis of the original photographs, the one used by Edd. as well as the one used in the sixties by Prof. Kapsomenos showed that (1) the papyrus has various fissures here; (2) due to these fissures shadows have appeared at the exposures which were misread as ink; (3) various (horizontal) fibres are read as ink on the pictures and influence the perception, therefore; (4) at reproduction graphic means may almost reduce the blackness due to the fibres, whereas some dots still remain; (5) various parts of the papyrus have shifted in relation to each other and (6) both photographs lack the sharpness to the right side of frg. G 4 which would enable a definite choice between a γ and κ . These data were basically admitted by Edd. The photographic material, therefore, grants no decision.¹⁰

When I had a discussion with prof. Tsantsanoglou about this letter at Nov. 7, 1989, he told me that their original reading had been κ as well but that prof. Parássoglou had studied the fragment under the microscope and had found that a γ was definitely present. Considerations for prof. Parássoglou had been hereby that he clearly had observed that an alleged dot to the right of the vertical pointing to a SW-NE-hasta was no ink but the fibrous structure of papyrus and, moreover, that the dot which had been read as an eventual end of a NW-SE hasta of a κ did have the ductus of a SW-NE-hasta. Prof. Tsantsanoglou recognized, however, that this argumentation was insufficient as a basis for the judgement

⁹ Prof. Tsantsanoglou by telephone Jan. 1990; per litteras Febr. 22, 1990.

¹⁰ These notes are a concise rendering of correspondence and conversations from the summer of 1987 until the autumn of 1990.

'εἰ γὰρ[ρ is unavoidable' and decided to a countercheck, to be executed by himself. As mentioned above it gave no concrete results for the reading.¹¹

I did my microscopic research on Oct. 11 and 12, 1990. It proved to me that the reading of frg. G4 depends extremely on the lighting and angle of perception, thus dangerously giving rise to a subjective reading. It convinced me of the necessity to collect reproducible data as opposed to the data based on autopsy by Edd. which were severely dependent on the weather of that moment. The reproduction of my data involves a technical account which didn't please Edd., but which is a fleabite compared to the technical means used to decipher the stone of Chambers and colleagues.¹²

The related fragment G4 is situated in a rectangular (landscape) display of about A4 size. The aim of my investigation was: a) to come to an observation justifying the reading εἰ γὰρ[ρ and to analyze the disposition which was responsible for this reading; b) to come to an observation justifying the reading εἰκ[and to analyze the disposition which gave rise to this reading; c) to devote special attention to the dot which Edd. read as the bottom tip of the left-hand hasta of an α and d) to give an evaluation of the circumstances which gave rise to both readings and to present a final reading. The equipment I used consisted of (1) an Eschenbach microscope, model 1172, with a magnifying factor 40-60x, adapted to the purpose by having cut off a part at one end, (2) a Japanese made loupe with a three-layered lense and a magnifying factor of 16, (3) a Mini-Maglite® AA halogen torch with a diameter of 19 mm and (4) a Polaroid® polarization filter.

In general it may be remarked that the readability of the 3 or 4 characters in question is quite poor. It happened that at various angles of incidence the word ὑπερβάλλων on the left side of these letters, ἐξευρήσου[beneath them and ἀνθρώ[above them were quite visible by the naked eye, whereas at the same time no trace at all was to be seen of the letters εἰ γὰρ[. There were angles of incidence, too, where the reading seemed to be ὑπερβάλλων ω..[or ὑπερβάλλων ν..[. Neither through the microscope nor through the loupe any trace of ink was visible. This might be ascribed to the nature of the lenses or their respective magnifying factor. Parássoglou noted that he did see ink with his microscope, but that the difference between observation by the naked eye and through the microscope consisted in the ink being glossy and the papyrus being mat in the one case and the reverse in the other case. According to my own observation by the naked eye the ink was mat against a shiny background.

¹¹ Cf. note 7. In a subsequent letter dated Febr. 5, 1991 Prof. Tsantsanoglou seems to prefer εἰ γ[ὰρ in this locus. Cf. note 15. Though this was stated after my research it added fresh fuel to its necessity.

¹² Reaction K.Tsantsanoglou, Jan., 1991; G.M.Parássoglou, May 15, 1991. Cf. ZPE LXXXIII (1990), 43: 'Comparisons based on human observation remain subjective, but the image processor, free of the wish to discover any archon on historical grounds, showed that 35 and 36 are most probably iota, phi.' Although my research lacked the objectivity of an image processor, it provided at least a reproducibility. A discussion on the possibilities which technical means may offer to arrive at a greater objectivity might be an interesting topic. By the way, the preservation of the PDerveni is due to technical means, since Anton Fackelmann succeeded in peeling off the fragments by means of electrostatic.

Parássoglou also noted that with his microscope he could see a whole letter at once. With my microscope qua magnification only a small part of a letter was to be seen. The polarization filter which I had taken along to exclude nocious influences from the lighting proved ineffective. Edd. have done experiments with ultra-violet and infra-red light, likewise without result.

The observations by Edd. were substantially dependent on atmospheric conditions.¹³ Moreover, the spot in question is seriously marked by a network of fissures. Since the papyrus is not positioned flat on the supporting paper, these fissures cause shadows. These shadows might be - and in fact were - read as ink, either at direct observation or from photographs. The main fissure extends from a hole to the left of the ι (of εἰ γὰρ[ρ] at the base of the letter to above the middle of a supposed horizontal of a γ to the North-East and continues from there in a descending slope to the right to the end of the fragment. (cf. drawing 1, p.21). An assumed end of the horizontal seemed to be sometimes above the fissure and sometimes under it. Therefore, the observations are strongly dependent on the angles of incidence and perception.

On a microscopic level the papyrus exhibits a three-dimensional structure, such as a mountain landscape, which complicates both the observation and the resulting description. In order to prevent misunderstandings, an observation along the surface of the papyrus will be expressed according to a system of x-y axes, thus distinguishing it from elevations perpendicular to its surface. The axes consist of (1) an x-axis moving sagittarily to the right with respect to the text of the papyrus and parallel to the long side of the display and (2) an y-axis moving sagittarily to the top of the text parallel to the short side of the display. I take the lower end of the left-hand hasta of the α of ἀνθρω[πείου in line 7 as origin of this axis-system. Distances will be expressed in millimetres. α is the angle between the x-axis and the perpendicular of the direction of perception on the display, β is the angle between the direction of perception and the surface of the display, γ is the angle between the x-axis and the perpendicular of the angle of the light on the surface of the display and δ is the angle between the direction of the light and the surface of the display. The centre of the light-cone on the display is indicated by 'O'- If 'O' is not mentioned it is supposed to coincide with the letter under research. The mains fissure and the edges of the fragment served as points of orientation to correlate the observations through the microscope with those by the naked eye.

With regard to the reading εἰ γὰρ[ρ] the best disposition was obtained at: α=350°, β=60°, γ=70°, δ= 40° and O=[0,50]. In this disposition a vertical was seen to the right of the letters εἰ, split in two above the middle by a diagonal SW-NE-break in the papyrus, as well as two dots A and B, A a the right-hand side of the supposed horizontal and B somewhat under the middle of this horizontal. The tip of the vertical has a protrusion to the right. The tip of that part of the vertical which is situated beneath the fissure has a protrusion to the right as well

¹³ G.M.Parássoglou, Thessaloniki, Oct. 12, 1990.

(see drawing 2, p.22). By means of the loupe I could clearly see that the part of papyrus beneath the fissure had somewhat drifted negatively along the y-axis and that the part where dot B was situated was a bit bended upward. As a result of the angle of perception this dot might then have its origin just in the middle of the supposed horizontal. When I made this observation I was about to get up and go to prof. Parássoglou to congratulate him with the final reading γ .

Making a circular movement with the torch, however, ($\alpha=350^\circ$, $\beta=60^\circ$, $\gamma=70^\circ$, $\delta=40^\circ$, $x_0^2+y_0^2=50^2$), all letters and/or traces of ink of the whole fragment disappeared to the naked eye (till complete extinction at $O = [-10,-49]$), except this one dot. This dot had a greater blackness, moreover, than the normal letters which were rather dark brown. And, as indicated in the introduction, sometimes the dot seemed to possess a smaller y value than the fissure ('under the fissure') and sometimes a greater one ('above the fissure'). Thereupon I directed my microscope to dot A again and discovered (cf. drawing 3, p.22):

- i. that the piece beneath the fissure partly overlaps the piece above the fissure;
- ii. that another piece of papyrus is situated under the lower piece, which lies under the upper piece as well;
- iii. that the blackness around the fissure is wider than the actual fissure and
- iv. that this structure of layers entails various shadows and may, therefore, account for the intense blackness.

This may be the reason why the right-hand tip of a horizontal is observed by the naked eye. Along with the other circumstances this dot is in all probability no ink.

With regard to dot B microscopic examination revealed that a broad 'trail' of papyrus along the y-axis with innumerable cross-lines are embedded like an upside-down railway under the general surface. This railway crosses a fold parallel to the x-axis. As a result one might expect a shadow to appear having the crossing points of the rails and the fold as its foci. When I took a close look at this spot again by the naked eye ($\alpha=250^\circ$, $\beta=70^\circ$, $\gamma=40^\circ$, $\delta=40^\circ$; to facilitate the observation the display was tilted along the x-axis by 15° ; the letters were seen upside-down), I discovered that the dot actually had the form of a heart (♥) with its point toward the fissure and its convexities at the predicted foci (cf. drawing 4, p.22). This observation could not be falsified by changing the direction of lighting ($180^\circ < \gamma < 360^\circ$). Although the letters $\epsilon\iota$ were still visible at $\gamma=225^\circ$ and dot B was no more so at this angle, this by itself does not prove that dot B was only shadow, since all letters were faint at this angle. By the correspondence of the predicted shadow and the form of the observed dot, however, I will consider dot B not to be ink. The protrusion at the top of the vertical might be read as the left-hand tip of the horizontal, but also as the serif belonging to the vertical of a κ (cf. the κ in $\kappa\omicron\iota\nu\acute{\alpha}$ in line 5). Therefore, this protrusion cannot be held as an argument for this reading.

The best reading $\epsilon\iota\kappa$ was obtained under the circumstances $\alpha=225^\circ$, $\beta=80^\circ$, $\gamma=60^\circ$, $\delta=75^\circ$. Thus a NW-SE hasta was visible, as well as some ink under the conjunction of the

vertical with the supposed hasta. By the naked eye ($\alpha=250^\circ$, $\beta=50^\circ$, $\gamma=45^\circ$, $\delta=25^\circ$, $O=0$, -50), as well just with day-light ($\alpha=250^\circ$, $\beta=50^\circ$, the display tilted 15° along the x-axis), a small silvery stroke was observed which has a bend in the middle and is inclined towards the NW-SE to the left of the bend and sagittarily along the x-axis to the right of it. This stroke was observed on or somewhat under the spot where a supposed NW-SE hasta might be situated. Neither the ink nor the stroke could be attested under the microscope. A yellow horizontal stroke with a length of 0.6 mm. was seen under the microscope but could not be attested either by the naked eye. At the spot of the observed hasta/conjunction the microscopic survey displayed an isosceles plateau with its top to the positive y-axis and surrounded by 'hills'. This plateau debouches along the x-axis into a horizontal bed (cf. drawing 5, p.22). Some papyrus hairs of a minimal thickness were observed as well, some of which had a NW-SE direction. The hills produce a shadow on the plateau which may account for the observed hasta and/or connection with the vertical. The hairs may by their reflecting image likewise account for the bended stroke. On this locus, therefore, there is no reason either to suppose ink. The protrusion at the vertical beneath the fissure might be read as the lower end of a SW-NE-hasta and/or upper end of a NW-SE-hasta. In view of its dimension it requires additional support, however, to settle the matter.

A special case is the dot, described by Edd. as:

$\gamma\alpha[\rho]$: of α only the bottom tip of the left-hand hasta survives in a tiny dot.

This dot was not observed by me at all and its observation confronted professor Tsantsanoglou with problems as well.¹⁴ Under microscopic examination this spot proved to consist of a pile of 'flocs' (see drawing 6, p.22), each one of a minimal thickness, pressing the general surface along the y-axis down. The resulting shadows (the shaded surface in drawing 6, p.22) were observed under the microscope ($\alpha=250^\circ$, $\beta=70^\circ$, $\gamma=60^\circ$, $\delta=30^\circ$). Hence I'm inclined to believe that this spot is no ink either. So did prof. Tsantsanoglou in his letter dd. Jan., 1991: 'I agree that the bottom dot is unlikely to belong to an A, because then the two letters would have been too close to each other.'

During the original observations by prof. Parássoglou on Nov. 28, 1984, the reading of $\epsilon\pi[\]$ was dismissed because of the reading of this dot as ink.¹⁵ Disregarding the latter reading the reading of $\epsilon\pi[\]$ becomes a possibility again. If one considered a reading of $\epsilon\iota.[\]$, there would be enough space on the papyrus for the next letter. Even the reading of $\epsilon\iota \gamma\alpha[\rho]$ does not grant the fissure to coincide with the supposed horizontal of a γ in a way that no ink would have to be expected. The criterium applied by papyrologists that ink vanishes only at

¹⁴ K.Tsantsanoglou by telephone, Febr. 12, 1990; per litteras Febr. 22, 1990.

¹⁵ Parássoglou Okt. 12, 1990; his notes Nov. 28, 1984. Tsantsanoglou per litteras Jan., 1991 seems to dismiss $\epsilon\iota \gamma\alpha[\rho]$ in favour of $\epsilon\iota \gamma[\alpha\rho]$, comparing it with analogous loci in col. i, line 3 and col. ii, line 9. Cf. note 11.

breaks cannot be applied as the only criterium: irrespective of the reading, which may be $\epsilon\upsilon\gamma$ [, $\epsilon\iota\epsilon$ [, or $\epsilon\iota\mu$ [, next to the mentioned letters, more or less ink has disappeared.¹⁶

These result may thus be summarized:

- (i) After the vertical of the letter, which is read by Edd. as γ , there are no traces of ink in all likelihood.
- (ii) Ink has disappeared at places where no ink is seen, but where it might be expected.
- (iii) Next to the reading of $\epsilon\iota\ \gamma[\acute{\alpha}\rho$ other readings like $\epsilon\iota\pi$ [, and $\epsilon\iota\kappa$ [, belong to the primary possibilities.
- (iv) A final reading cannot be established without autopsy, but neither by autopsy alone. Each reading depends on one or more criteria.

To my opinion the result is that at least the readings $\epsilon\iota\kappa$ [, $\epsilon\iota\ \gamma[\acute{\alpha}\rho$ and $\epsilon\iota\pi$ [, are to be taken seriously. If the last letter before the fissure is to be read as a κ , the position of this letter shifts a bit to the right with regard to the position of a supposed γ . Since the accurate number¹⁷ of missing letters is determined by the supplement [$\pi\epsilon\acute{\iota}\omicron\upsilon$] in line 7 and since this supplement contains a ι , in combination with the shift in position by reading κ it may point to a reading [....] instead of [.....]. The reading will be: $\epsilon\iota$.[.....(.)] therefore.

4. The length of the lines

A.V.Lebedev gives an eventual supplement in his article which leads to 46 letters in one line. Moreover, he suggests that consultations about it have taken place with prof. Tsantsanoglou.¹⁸ This surprises in view of the fact that Edd. come to the same calculation independently from each other but one which differs from the point of view by Lebedev: Then the supplement $\acute{\epsilon}\omicron\nu\ \kappa\acute{\alpha}\iota$ would be too long (cf. Lebedev, 46).

The procedure which Parásoglou follows to calculate the length of the lines is to supplement $\alpha\rho$ in line 3 after γ and leave room for one more letter.¹⁹ The procedure which K.Tsantsanoglou follows is to convert the forms of the pieces of the PDerveni to three basic forms which correspond with a definite spot on the papyrus when it was rolled-up. The difference in diameter between successive layers being constant so was the difference in circumference between successive layers. By starting from inside layers where conjectures are more reliable than those in column i, the (eventual) distance between corresponding forms may be established after correction for the diminishing size of the respective basic forms as the radius increases. This enables determining the distance between frg. H 46/F 15

¹⁶ It struck me during observation that the 'railway' mentioned above continued from the fissure sagittarily to the y-axis to the place where by the naked eye no problem occurred with the reading (i.e. the letters $\alpha\upsilon\theta\rho\omega$). It should mean that the surface is undamaged to a great extent.

¹⁷ As mentioned before one method of determining the rough position of the fragments in relation to each other consists in the comparison between the columns in question. Thus one conjecture is assigned to be the 'main conjecture' as a guide to the number of missing letters in the other lines.

¹⁸ Cf. Lebedev, 46: $\acute{\epsilon}\omicron\nu\ \kappa\acute{\alpha}\iota$ in line 7 and o.c., 39 n.1.

¹⁹ G.M.Parásoglou, Thessaloniki, Okt. 10, 1990.

and the first fragment of column ii. Since some fragments show the distance between columns, a maximum length of line may thus be established which amounts to 45 letters.²⁰

5. Conjecture

The uncertainty around the reading at the end of line 8 implies not only various possibilities of reading of this locus but different directions of interpretations as well. The conjectures may then be divided according to, e.g., the readings εἰ γ[ὰρ and εἶκ[στασ. I will give an indication of the possibilities this last reading renders based on joining the sources mentioned above.

7 ηλι[.....]. ου: The paragraphos will pace Edd., 130 be considered an indication that lines 7ff. render a verbatim-quotation, though not necessarily in the original dialect. The various conjectures show up that lines 7-9 may form one phrase. Since line 8 contains the participle ὑπερβάλλον, one may assume that in the same phrase a main verb was present. Both at Plutarch and in the PDerweni a main verb ἐξευρήσου[σι is contained which by its form belongs to an other part of the phrase than ὑπερβάλλον.²¹ The (potential) main verb on which ὑπερβάλλον depends is lost but was conjugated in the 3rd p.s. and, regarding the future tense of the still existing verb, probably in the future tense. A subject of ὑπερβάλλον after line 9 seems improbable due to the structure of the phrase. If a noun formed its subject no room is left for it at the end of line 7 or the beginning of line 8 if, pace Edd., τοτ[or του[is read.²² A potential noun in the nominative before the end of line 8 thus has to be located at the beginning of line 7. Joining the sources this will be ἥλιος.

Roughly there are two possibilities: ἥλι[ος ...].ου εν ἥλι[ος ...]. ου. Cf. Edd., 131: 'Heraclitus twice in the preserved fragments uses the expression κατὰ φύσιν, both times without the negative but also without a dependent genitive.' There has been some discussion about the question whether the expression οὐ κατὰ φύσιν is philologically justified.²³ Nonetheless the expression οὐ κατὰ φύσιν might be regarded equivalent to παρὰ φύσιν. Since the denial aims at κατὰ φύσιν and not at the potential verb it does not necessarily

²⁰ Other attempts to determine the maximum length of line may be obtained by statistical means by determining the length of the lines which afford a smooth reading. It strikes one that the PDerweni-scribent must have sharpened his pen when about to write the third column as a result of which he went on writing 10 à 15 % smaller than before. On one fragment both the smaller and bigger writing is to be seen. The relation between interlining and interspacing remained the same, however.

²¹ According to the assumption that frg. M52(a¹) is verbatim at least in regard of the verb in the last part of the phrase.

²² According to LSJ there are but 3 nouns fulfilling these conditions: τουράκιον, τούρπαινα and τοῦφος. None of these three nouns seems to fit a potential supplement. LSJ mentions no verbs beginning by του or τοτ.

²³ Advocates of this are Mouraviev (p. 132: 'Thus Heraclitus' darkness, untrue to nature, was probably contrasted with Orpheus' allegorical mode of expression which on the contrary was κατὰ φύσιν'). and Tsantsanoglou (Thessaloniki, nov. 1989). Opponent is Lebedev, 46: 'The reading οὐ is out of question: first, because it is contra usum dicendi (which requires παρὰ φύσιν); second, because it contradicts the consensus of ancient tradition which ascribes to Heraclitus the acceptance, and not the denial of the ἥλιος ποδιαίος.'

contradict Aetius II,21,4 or, for that matter, Lebedev's alleged consensus. Edd. suggest it is bound up to 3 μᾶλλ[ον τ]εῖνεται outside the quotation of Heraclitus. An adjective or pronoun seems to offer here a sound possibility. Edd., 131/2 propose θνη]τοῦ²⁴ and ἐαυ]τοῦ. One might think of a short adjective or pronoun separated from ἥλι[oc by a particle, e.g., ἥλι[oc δὲ ἰ]coῦ or ἥλι[oc δὲ ὀ]coῦ. Words like μέcos, πόcos or τόcos would require an interjacent word due to the number of letters to be supplemented which seems improbable. On the other side doxography has transmitted a fitting adjective used by Heraclitus for ἥλιoc: νέoc, as rendered by Aristotle, which would render ἥλι[oc νέo]c οὔ.²⁵ Obviously any thought of a possessive pronoun is to be rejected.

7/8 ποδὸc []: One may expect 5 letters at utmost after ποδὸc [. As far as known, in the PDerveni hyphenation is rare, so one may expect a whole word at the end of the line. Supplementing a verb on the previous conditions leaves no room for another noun, unless the supplemented verb were [ἦν]. But the future tense in line 9 impedes this supplement, so the possibility of both a noun and a verb will be attempted no longer. A verb for the subordinate clause might be expected. Edd., 131 propose here [έcτι], which might fit well. So our supplement will be [έcτι].

Lebedev puts the verb at the end of line 6. This construction was not used by any other commentator. Making conjectures in lines 7-9 depends heavily on whether this possibility is allowed. At the beginning of line 8 the reading by Edd. leaves no room for a verb. At the beginning of line 9 reading]η leaves no room for a verb in present or future tense. A supplemented main verb of more than 5 letters not located at the end of line 6 will have to be located at the end of line 8 under the conditions mentioned. Thus supplementing a potential main verb belonging to lines 7-8 depends strongly on the point whether the phrase might start at line 6 and what is to be supplemented in line 9. If it does start in line 7 and if no verb is in the beginning of line 9 and yet a main verb of more than 5 letters is maintained, it can only be supplemented at the end of line 8.

8 το].[.....]: Edd., 131 propose here τοῦ]c ὄρουc], which seems to have been strongly induced by their reading 8 εἰ γὰ]p. If the last letter before οὔχ in line 8 is a α, λ, μ or c, no possibilities seem to be present for a verb ending 3 p.s., nor for a verb followed by another word. For these reasons no verb will be supplemented here. A word like τότε doesn't seem to fit. If a noun has to be supplemented it is no subject nor does it start with του]: A sound possibility is to supplement a definite singular article, e.g., τό or τοῦ. The first possibility would entail a noun starting with τ or υ specifying εὔpoc. One might think of a contraction

²⁴ Prof. K.Tsantsanoglou made this suggestion as well in a letter dd. April 25, 1988, in a reaction on my doubts on then construction.

²⁵ Aristotle Meteorologica B2, 355a14-16; 55,13-15 Louis): ὁ ἥλιoc οὔ μόνov καθάπερ ὁ Ἡράκλειτόc φηcι, νέoc ἐφ' ἡμερη έcτιv, ἀλλ' ἀεὶ νέoc cυνεχῶc.

of the article with another word as well, like τοῦ[νείρου].²⁶ Τοῦ[νοματος] might fit a Heraclitean context but is too long. A definite article of 2-4 letters, contracted or not with another word, seems the gain.

In view of the well-known poem by Mimnermus making the sun rise at the Ethiopians, a specific tribe belonging to the Ethiopians might have served Heraclitus in enforcing his statement on Ἥλιος, possibly specifying Ἥλιος νέος. Yet it might not have been his habit to bring into practise a kind of folkloristic geography, on the contrary, he blamed Hecataeus in a certain sense for doing so.²⁷ Yet he might have used his Periegesis to arrive at this specification. My option is that he actually did so and used his description of the Sciapodes. A possible supplement is therefore τοῦ [κότου],.

8 εἰ.[...(.)]ρους: Edd. state: 'For]ρους either εὔ]ρους or ὄ]ρους appears equally attractive.' Supposing that line 8 belongs to the Plutarchian context and that Plutarch quotes ὄρους and not εὔρους, this equality pace Lebedev, 47 does not seem to hold. Since the aim of this article is to attempt a close correspondence between Plutarch and the relative lines in the PDerveni and since supplementing ὄ]ρους might help, the supplement ὄ]ρους seems preferable. As a result of the choice at the beginning of this section the whole supplement reads εἶκ[οταc ὄ]ρους then. This supplement casts doubt upon the tmesis between ὑπερβάλλων and εἶκ[οταc which was tended thusfar. As it seems to have been stated due to the reading εἰ γὰρ, it will no longer be maintained.

If εἶκ[οταc would have to be somehow connected to the ἀνθρω[πείου] εὔροσ ποδὸς[, one might connect it to the moon illusion. It has been written in the context of the moon illusion: 'It is perceived as the *proper size* for an object of its visual angle and *apparent position* at the horizon' (italics by me, L.S.).²⁸

8 ε[]: If a link to the beginning of line 7 is to be made and if one takes a look at frg. M58(a)/DK22B6 from which the supplement νέο]ς derives, one might be inclined to reconstruct into the text the expression ἐ[φ' ἡμέρηι] or even ἐφ' ἡμέρηι ἀεὶ]. As Aristotle quotes Heraclitus in the Ionic dialect, the authenticity of the fragment can hardly be doubted. If ἐφ' ἡμέρηι ἀεὶ is to be supplemented here, it would, or at least could, mean that frg. M58(a)/DK22B6 occurs in the PDerveni. Since the specific words of this fragment are lacking, this conjecture may be considered highly doubtful. Supposing ἀεὶ belongs to the

²⁶ Contractions occur in the PDerveni (transcription ZPE 47; 1982) in IV,9; V,9; V,10; VII,5; VIII,1; VIII,4 etc. Cf. V,2; VIII,3; IX,10 where no contractions are used.

²⁷ Frg. DK 22B40 (transcription Loeb - Diog. IX 1): "πολυμαθὴ νόον² οὐ διδάσκει· Ἥσιοδον γὰρ ἂν ἐδίδαξε καὶ Πυθαγόρην, αὐτίς τε Ξενοφάνεά τε καὶ Ἑκαταίον." The backgrounds of this statement involve the matter of these fragments in a complicated way. Dealing with it would surpass the scope of this article.

²⁸ Gregory R.Lockhead & Myron L.Wolbarsht, The moon and other toys, 262 in: M.Hershenson (Ed.), The Moon Illusion, An Anomaly of Visual Space Perception, Hillsdale, N.J.: Erlbaum - 1989, 259-266. A historical survey of theories on the moon illusion is to be found in: Plug and Ross, Historical Review in: Hershenson o.c., 5-27. The connection of the moon illusion with the experience of the sun as wide as a human foot dates from Ptolemy at least.

Heraclitean text, *συνεχῶς* in the text by Aristotle should have to be considered as an expressive generalisation of *ἀεί*.

9 [..][.....]ή Dismissing a ι, the supplements ad locum by Mouraviev (ZPE 61 - 1985, 131/2), Sider (ZPE 69 - 1987, 225-228), Lebedev and most supplements by Edd. have no more value. This entails the necessity of a thorough reflection on the possibilities. In his article Lebedev remarks that there is a 'slight semantical difference' between *ὑπερβάλλων ὄρουσ* and *ὑπερβήσεται μέτρα*. To my opinion there are three differences, i) the use of two different verbs, ii) the use of two different verb forms and iii) the use of two different nouns. Especially the second difference I would not call 'slight'. The fact is, a striking difference between the text by Plutarch and the one in the PDerveni is that Plutarch uses a form of *ὑπερβάλλειν* as main verb, whereas in the PDerveni the present participle is used.

Taking the lines for one phrase as a starting-point, the search for a particle should be undertaken. By reading *εἰ γ[ὰρ]* drops out. Moreover, when joining Plutarch's version the location of the participle right before *Ἐρίνυεσ* would be preferable, like Kapsomenos, Burkert and Mansfeld attempted. Within the new reading only the conjecture by Burkert still fits.²⁹ In both versions of frg. M52(a) a part of the sentence containing *ΗΛΙΟΣ* is joined to a part containing the verb *ἐξευρίσκειν* by means of the participle *εἰ δὲ μή*. A problematical factor is on the one hand that there is little historical material to check the meaning of *εἰ δὲ μή* before Heraclitus.³⁰ On the other hand there is a participle subject to shifts of meaning in archaic time and sometimes having a meaning in Homer which comes close to the classical meaning of *εἰ δὲ μή*. This participle is *εἰ μή*. So one may ask if the supplement *εἰ δὲ μή* is still to be maintained or if *εἰ μή* might be supplemented.³¹

If *ἀεί* is considered to belong to the previous line, it is not to be supplemented here. If *ἀεί* would not belong to line 8 and be supplemented here and if no main verb is supplemented at the end of line 8, as a result a main verb longer than 5 letters would probably lack at all, unless at the end of line 9 which doesn't seem sound. In view of the previous argumentation(cf. sub 7 *ἠλι[.....]. ου*) it will be assumed that there was a main verb. The verb *φαίνω* has been related to the frgs. M57/DK22B3 by e.g., Aristotle, Epicurus and Diogenes Laertius, as partly stated by Edd. Supplementing it here might be elegant and its

²⁹ Kapsomenos (Burkert, 39/40) supplements *εἰ δὲ μή*. Burkert, 41 supplements here *δέει / εἰ δὲ] μή*, Mansfeld *φοβοῦμενος - εἰ δὲ μή*. There is no room for this last supplement as hyphenation in the PDerveni is rare.

³⁰ Kühner-Gerth, § 577-6b write: 'Nach negativen Sätzen wird der Gegensatz durch *εἰ δὲ μή* eingeführt statt durch *εἰ δέ*, weil jene Form zur Aufhebung des vorhergehenden Satzes ganz allgemein geworden war.' Is there a 'negativer Satz' in the PDerveni as with Plutarch, and, if so, what do Kühner-Gerth mean by 'ganz allgemein geworden war' in the light of seven centuries between Heraclitus and Plutarch?

³¹ Due to metrical problems *εἰ δὲ μή* does not occur at Homer in its pure form. At Homer *εἰ μή* holds under the cover of its general meaning 'if not' a wide arrange of meanings which sometimes is at odds with the classical meaning 'unless'. So the question is under which conditions one may put Plutarch to have paraphrased the Heraclitian material if it is assumed that the PDerveni-text corresponds to the original text containing *εἰ μή*. The construction with the participle complicates an answer to this question in an extreme way and thus touching upon it surpasses the scope of this article.

short and excluded by palaeography. (c) refers to the closing sentence of frg. M51(0)/DK22B30: πῦρ ἀείζωον, ἀπτόμενον μέτρα καὶ ἀποσβεννύμενον μέτρα. In b) and c) a lacking main verb and the surplus of letters, insufficiently compensated by the amount of present iotas, make these supplements a lesser choice. Cf. Odyssee 12,383: δύσομαι εἰς Ἄϊδαο καὶ ἐν νεκύεσσι φαείνω.

10/11 [ca. 11 ὑπερ]βατόμ ποῆι κ[
]αῖθυο[

Thusfar it has been assumed that the phrase in the PDerveni joined to fragment 94 ends at line 9 and thereby the quotation of Heraclitus. Doxography gives no proof of the opposite. The amount of lacking letters seems to me, contra Mansfeld, Mouraviev and Lebedev, an impediment for further supplements.³²

6. Text of own preference

7 ἥλι[ο]ς νέο]ς, οὐ κατὰ φύσιν ἀνθρ[ω]πίου] εἶρος ποδὸς [έ]στι
8 τοῦ[κ]ότου], οὐχ ὑπερβάλλων εἰκ[ο]τασ ὄ]ρου εἰ[φ] ἡμέρηι (ἀεὶ)
9 [φ]α[νεῖ, εἰ μ]ὴ Ἐρινύε[ς] νιν ἐξευρήσου[σι, Δί]κῃς ἐπίκουροι]
10 [ca. 11 ὑπερ]βατόμ ποῆι κ[
11]αῖθυο[

Amsterdam, June 8, 1992

Loek Schönbeck

ZPE 96 (1993) 14

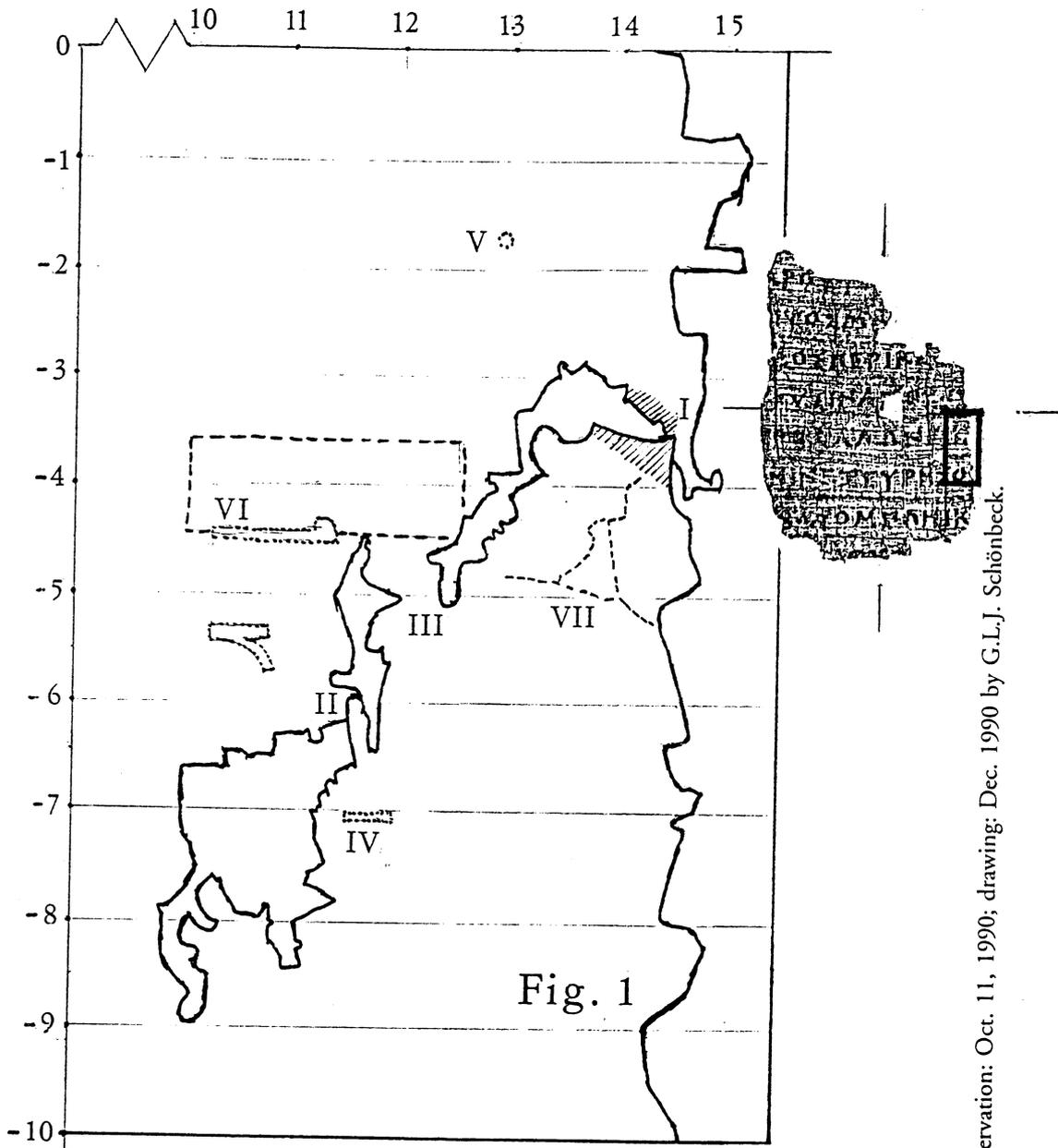
CORRIGENDA

ZPE 95,1993 S. 8, Z.3: lies nach "from which they originate. Cf. note 32."

S.14, Anm.15, Z.2: lies "dismiss εἰ γὰρ in favour".

S.17, Anm.24. Z.2: lies "doubts on the construction."

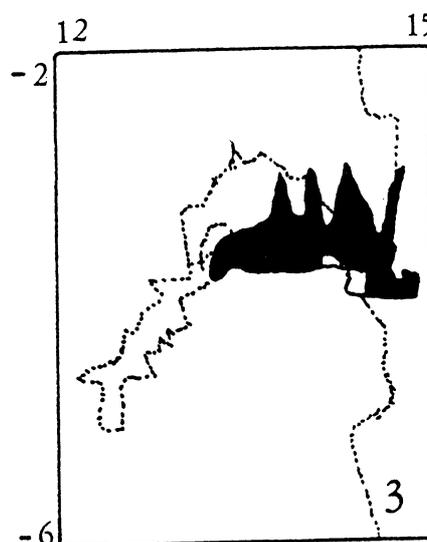
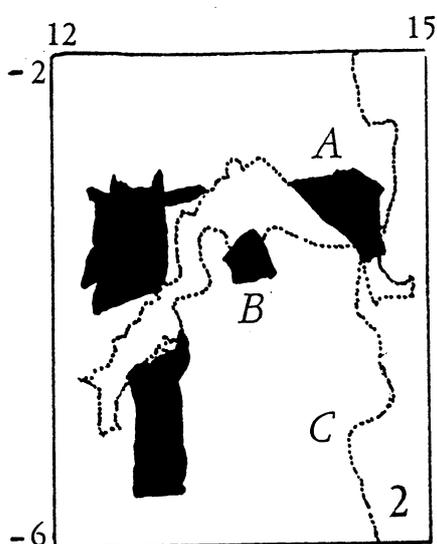
³² Marcovich mentions as frg. 52 (c) an emendation from Philodemus' Περὶ Θεῶν by Crönert-Diels, based on pap.Herc. 1428 frg. 6^a (70-Gomperz). Diels mentions in his FdV, 165n. ad l.8) 'vgl. Philod. de piet. 6a S. 70 G. <Θεοὺς Ἐρινύας θ' ὡς ἐπικούρους> εἰπε τῆς Δί]κῃς [B94] (...) Nach Crönerts Revision des Pap. unsicher erg. Diels.' After unsuccessful attempts to trace Crönerts audacious contribution to dig up a whole Heraclitian fragment from three letters, I consulted the Centro Internazionale per lo Studio dei Papiri Ercolanesi. May, 1992 Anna Angeli pointed to Diels' remarks in Hermes XIII (1878), 2ff. and added: 'che tuttavia non dà nessuna indicazione illuminante.' I see no reason to maintain the alleged fragment.



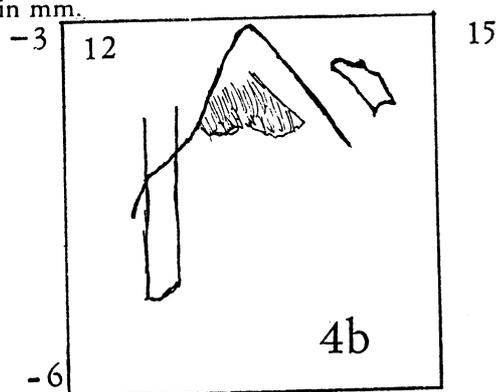
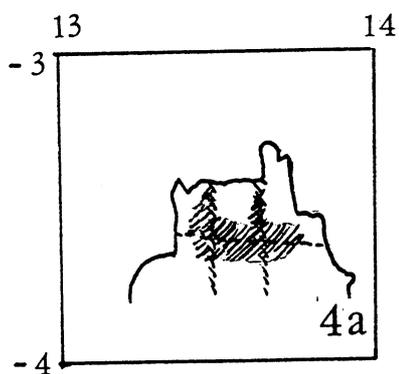
Observation: Oct. 11, 1990; drawing: Dec. 1990 by G.L.J. Schönbeck.

PDerveni - Fragment G 4 (Detail)

- I & II: places where pieces of papyrus definitely overlap.
- III: place where papyrus possibly overlaps. No difference in sharpness of depth observable. Vaulting VI (Quadrangle of strokes) prevents observing shadows.
- IV: unidentified yellow object.
- V: unidentified orange object.
- VI: (points:) unidentified black object; (strokes:) vaulting surface.
- VII: isosceles triangle.
- Scales: whole fragment: 1:1; detail: 15:1.
- The numbers at the sides refer to the coordinates in mm.



Figures 2, 3, 4b and 5: scale 15:1. Figure 4a: scale 37,5:1.
Figure 6: scale 75:1. All scales and coordinates are approximative.
The numbers at the sides refer to the coordinates in mm.



PDerveni - Fragment G 4 (Détail)

