The Codicology of the New Coptic (Lycopolitan) Gospel of John Fragment (and Its Relevance for Assessing the Genuineness of the Recently Published Coptic "Gospel of Jesus' Wife" Fragment)

Stephen Emmel
Professor für Koptologie, Universität Münster
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Summary:

Some weeks ago, Christian Askeland discovered a crucial piece of evidence that must now necessarily be the basis for any scientifically founded opinion as to the genuineness of the Coptic papyrus fragment called the "Gospel of Jesus' Wife." The new evidence is a second papyrus fragment from the same source, with a part of the Gospel of John in one of the "Lycopolitan" dialects of Coptic. Because the text of the John fragment is known from Herbert Thompson's 1924 edition of the fourth-century "Qau codex" (a few minor textual variants notwithstanding), and because the John fragment appears to have belonged to a codex leaf, it is possible to calculate hypothetically the approximate reconstructed dimensions of the complete leaf.

Using conservative measurements taken provisionally from scaled photographs, and assuming that the codex had only one column of writing on each side, the results of my calculations are as follows (the dimensions are given height × width):

minimally:	44 × 22 cm (and surely no smaller), proportion 0.50
on average:	49 × 25 cm (width quite possibly greater), proportion 0.51
maximally:	54 × 27 cm (width quite likely greater), proportion 0.50

These dimensions, if accurate, would mean that the John fragment represents the tallest papyrus codex yet known. Otherwise, the tallest papyrus codex known to me is a Greek codex, one complete leaf of which survives in the Berlin Papyrussammlung, measuring 40.4 × 21.5 cm. Papyrus codices taller than 35 cm are on the whole rare.

Assuming that the John manuscript was a two-column codex results in dimensions that are even more incredible (height × width):

minimally:	17 × 40 cm (and surely no smaller), proportion 2.35
on average:	20 × 45 cm (width quite possibly greater), proportion 2.25
maximally:	23 × 49 cm (width quite likely greater), proportion 2.13

The widest papyrus codex on record (so far as I know) is a Greek codex with dimensions of 28 × 37 cm (height reconstructed). As of 1977, the papyrologist and codicologist Eric G. Turner knew of only four such papyrus codices that are wider than they are tall. The greater than 2 : 1 proportion (width : height) of the hypothetical two-column John codex is without parallel in Coptic, Greek, and Latin papyrus codicology. The closest proportion recorded by Turner is 1.9 : 1, but the one known example with this proportion is small in size, only 9.8 × 19 cm. Papyrus codices laid out in two columns are in any case rather rare.

Thus the reconstructed John manuscript is either an extraordinarily tall and narrow single-column codex, or it is a short and even more extraordinarily wide two-column codex. If its existence be accepted as a fact, it would appear to deserve to be acknowledged as the tallest (or widest) papyrus codex yet known. Among extant papyrus codices written in Coptic in particular, this hypothetical John codex would stand out as even more extraordinary.

For myself, this codicological analysis of the John fragment strengthens still further the conclusion to be drawn from observations that other scholars have brought forward in recent weeks about its text, orthography, and paleography: I do not see how there can be any room for doubt in anyone's mind that the John fragment is anything other than the product of a hoax. That this conclusion has implications for judging the genuineness of the Gospel of Jesus' Wife fragment is obvious, and the demonstrable certainty that the John fragment is a fake confirms the opinion that the Gospel of Jesus' Wife fragment too is a fake, a product of the same hoax that has brought us a new (but worthless) witness to the Lycopolitan Coptic version of the Gospel of John.

On the other hand, the application of several "hard science" techniques to the analysis of both the Gospel of Jesus' Wife and the Gospel of John fragments—namely, radiometric dating and two types of spectroscopy—has resulted in a quantity of useful data, but the interpretation of these data must now be reviewed in light of the exposure of both fragments as having been inscribed only recently. In the hope and expectation that an increasing number of ancient manuscripts will be subjected to such analyses, students of ancient manuscripts need to become at least somewhat familiar with how these analytical techniques work, what kinds of data they produce, how the data are to be interpreted, and—perhaps most importantly—what questions the data might be used to answer.

Finally, as seriously as I take codicology, radiometric dating and spectroscopic analysis of ancient manuscripts, Coptic grammar and orthography—and also the existence of faked Coptic papyri—nevertheless, at the end of my paper I offer a somewhat light-hearted bit of food for thought in connection with the question of what might have motivated the person who faked these Coptic texts.

Contents:

THE CODICOLOGY OF THE NEW COPTIC (LYCOPOLITAN) GOSPEL OF JOHN FRAGMENT

(AND ITS RELEVANCE FOR ASSESSING THE GENUINENESS OF THE RECENTLY PUBLISHED COPTIC "GOSPEL OF JESUS' WIFE" FRAGMENT)

Stephen Emmel
Professor für Koptologie, Universität Münster
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Introduction

1. Some weeks ago, Christian Askeland discovered a crucial piece of evidence that must now necessarily be the basis for any scientifically founded opinion as to the genuineness of the Coptic papyrus fragment called the "Gospel of Jesus' Wife" (GJW), recently published by Karen King.[1] The crucial new evidence is a second papyrus fragment from the same source, with a part of the Gospel of John (5:26–6:14) in one of the "Lycopolitan" dialects of Coptic, namely dialect *L5*. The John fragment is mentioned briefly in King's publication (p. 154 n. 107), as she had mentioned it also in a draft of her article posted on line in September 2012, but photographs of the fragment, and thus also the first detailed information about it, became available only in April 2014, in two technical reports posted on line at the same time as the appearance of the printed publication of GJW.[2] As Askeland discovered, the text of the John fragment is effectively identical to the text of the main witness to the *L5*-version of John, namely the fourth-century papyrus "Qau codex" (discovered in an archeological excavation in Upper Egypt in 1923), and in particular to Herbert Thompson's careful edition of it, which required critical restoration of a number of lacunas throughout the damaged manuscript, hereafter abbreviated T.[3] Joost Hagen has provided a useful transcription of the text of the "Harvard John fragment," as it may be called temporarily, hereafter abbreviated H, prepared on the basis of the photographs available on the internet, with restorations of the lacunas based on T.[4] On the basis of a collation of the text of H against that of T, Askeland had already concluded that H is a modern forgery. Here I offer the results of a codicological analysis of H, which provide additional evidence that it is a fake.

How Much Text Is Missing from the "Harvard John Fragment"?

2. Because the text of H is known from T (a few minor textual variants notwithstanding), one can calculate with near certainty how much text is missing not only from the broken lines on H's recto and verso, but also between the last line of the recto and the first line of the verso. These calculations are easy, both because the left margin survives on H's recto and the

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[1] Karen L. King, "'Jesus Said to Them, "My Wife . . ."': A New Coptic Papyrus Fragment," *Harvard Theological Review* 107 (2014) 131–159. See also: Christian Askeland, "Jesus Had a Sister-in-Law" (2014-04-24) at http://evangelicaltextualcriticism.blogspot.de. I am grateful to Dr. Askeland for the many ideas and pieces of information and advice that he has shared with me over the course of the past several weeks.

[2] James T. Yardley and Alexis Hagadorn, "Report: Ink Study of Two Ancient Fragments through Micro-Raman Spectroscopy" (2013-05-13) at https://s3.amazonaws.com/hds-high-traffic-assets/yardleyharvardfragmentreportrev07.pdf, pp. 6–7 figs. 4.1 and 4.2; Joseph M. Azzarelli et al., "Study of Two Papyrus Fragments with Fourier Transform Infrared Microspectroscopy" (2013-12-27) at https://s3.amazonaws.com/hds-high-traffic-assets/swagergjwtirffinalreport.pdf, pp. 11–12 figs. 7 and 8.

[3] Herbert Thompson, *The Gospel of St. John According to the Earliest Coptic Manuscript* (London 1924), pp. 7–9 for the passage relevant to the new fragment of John.

[4] Joost L. Hagen "Possible Further Proof of Forgery: A Reading of the Text of the Lycopolitan Fragment of the Gospel of John" etc. (2014-04-30) at http://suciualin.files.wordpress.com/2014/05/hagen-on-the-forged-gospel-of-john-fragment.pdf, pp. [2]–[3].

right margin on its verso, and because every surviving line of the fragment, both recto and verso, begins and/or ends exactly where lines in T begin or end, according to the pattern that one line of H equals exactly two lines of T, except for H verso line 8, which corresponds to only one line of T, namely Coptic p. 25 line 1 (i.e., T 25:1, Thompson, p. 9).[5]

3. It is a reasonable assumption that if additional fragments of H were to come to light, they would conform to this same pattern of correspondence with T. On the assumption that the last line of H recto (Hr) corresponds exactly to T 21:23–24, and the first line of H verso (Hv) to T 24:20–21, the text of John 5:31–6:11 that is missing between the last surviving line of Hr and the first surviving line of Hv occupies 102 lines of T (21:25–36 + 22:1–36 + 23:1–35 + 24:1–19), which in H's layout would be 53 lines, the "proportional extension of text"[6] between H and T being 15/29 = 0.52, calculating only on the basis of those lines of H for which we can be certain about the line breaks at both beginning and end, which is 8 lines on the recto (out of 9), 7 on the verso (out of 8). However, because the last line on the verso is clearly aberrant (as mentioned in § 2 above), it is better to omit this line too from the calculation. Doing so results in a proportional extension of text of 14/28 = 0.50 exactly, so that we may assume that 102 × 0.50 = 51 lines of text are missing between recto and verso of H.

What Are the Dimensions of the Harvard John Fragment?

4. Before proceeding, it is necessary to establish the physical dimensions of H, which have not yet been clearly and explicitly reported. So far as I know, the best indication of the size of H is a photograph included in one of the technical reports, where H and GJW are shown lying near enough to one another on a table that one can estimate their relative sizes (see fig. 1). Although the image is small and includes no scale, one can see that H is about twice as tall as GJW and also somewhat wider. (From the greatly magnified images of GJW that have been in wide circulation on the internet, one can get the opposite impression.) GJW has been reported to be ca. 4 × ca. 8 cm (height × width; see King, p. 133). From these dimensions and a close look at the image reproduced here in fig. 1 (see also Yardley & Hagadorn, p. 3 fig. 3.1, where "GJW" in the caption is an error for "GospJohn"), one can estimate H to be about 8 × 10 cm. This estimation is nearly the same as the dimensions reported in a document accompanying GJW and H, as reported by Prof. King: a papyrus in the same collection "having nine lines of writing, measuring approximately 110 by 80 mm, and containing text from the Gospel of John"[7] is presumably the John fragment that I am here calling H. For the more precise measurements needed for a codicological analysis of the John fragment, it would seem that we have recourse to two of the four published photographs of H

Fig. 1: The Harvard John fragment (Hv) lies to the left of GJW and is plainly larger than GJW (image from Yardley & Hagadorn, p. 4 fig. 3.3; cf. p. 3 fig. 3.1, with Hr [*sic*]).

[5] There are several possible explanations for this aberration in H, but it is in any case of no great consequence for the codicological analysis presented here.

[6] See Stephen Emmel, "On Using 'Proportional Extension of Text' as a Criterion for Placing Fragments in a Dismembered Codex," in: *Christianity in Egypt: Literary Production and Intellectual Trends. Studies in Honor of Tito Orlandi*, edited by Paola Buzi and Alberto Camplani (Studia Ephemeridis Augustinianum 125; Rome 2011), pp. 257–278 (referred to by King, p. 133 n. 5).

[7] King, p. 154 n. 107, photocopy of TLS, P. Munro to H. U. Laukamp, 1982-07-15, translated by King from German (cf. p. 153: "photocopies of correspondence in German").

referred to at the beginning of this paper (n. 2 above). In all four photographs, a yellow grid has been superimposed onto the images of H, and in two of them, Azzarelli et al. figs. 7 and 8 (= recto and verso), one square of the superimposed grid is labelled as being 0.50 × 0.50 cm (see fig. 2, upper left), which is the same scale that is given to the grid that is superimposed onto the photographs of GJW in the same report (figs. 5–6). But if one measures the photographs of H according to this scale, the dimensions are at most 3.8 × 5.2 cm (height × width), which is a little less than half the size given by Munro in his letter to Laukamp. These dimensions make H about as tall as GJW and about two thirds as wide, which is not the case, as is clear from fig. 1. Therefore, the scale printed with Azzarelli et al.'s fig. 7 (our fig. 2) must be too large.

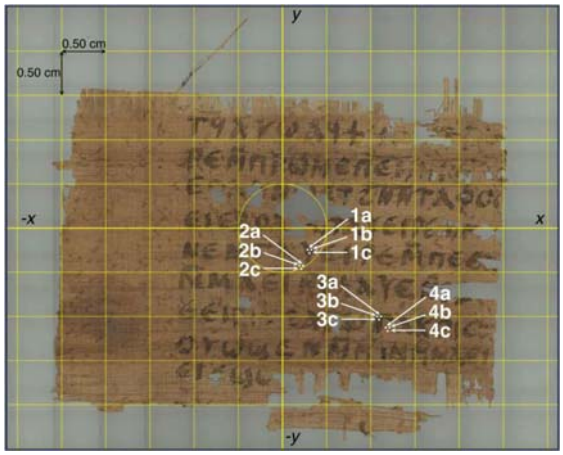

Fig. 2: The John fragment, recto, shown with a grid superimposed onto it, and a scale (upper left) added to the grid (image from Azzarelli et al., p. 11 fig. 7). But the scale can be shown to be too large for this photograph.

5. In the absence of any precisely recorded measurements of H, it seems to me to be a reasonable working hypothesis that the scale used by Azzarelli et al. is correct for GJW (i.e., one square of the grid is 0.5 × 0.5 cm, according to which the dimensions of GJW are 4.1 × 8.4 cm, in close accord with the measurements reported by King), but too large for the Harvard John fragment. If one assumes that the scale for H is exactly twice as large as it should be for the images onto which the grid and the scale were superimposed, then the dimensions for H come out to be (according to my measurements) 7.6 × 10.3 cm, which is roughly in line both with the reported dimensions of 8 × 11 cm (height × width) and with my estimation based on fig. 1. Others might get slightly different results depending on their technique for correcting the scale and for taking measurements, with variation of a few millimeters being likely (according to my experience of such things).

Reconstructing a Complete Codex Leaf from the Harvard John Fragment

6. It appears that H belongs to a codex leaf: the margins and text lines on recto and verso are approximately in alignment with one another, and the height and spacing of the lines of text on both pages are more or less uniform, all within the limits of the variation that one may expect to find in an ancient papyrus codex. In order to reconstruct what would have been the original dimensions of the codex leaf to which the surviving fragment appears to have belonged, one can make codicological calculations based on what survives.[8]

7. In order to calculate the width of the hypothetical original column, I have measured the extension of each string of surviving letters in each line, always including the interliteral space after each letter (i.e., to the right of it) and avoiding including in my measurements any very damaged or indistinct letters. For the recto, my measurements range between 0.40 and 0.51 cm for 1 letter + 1 interliteral space, for the verso between 0.49 and 0.60 cm, and the

[8] I will give only some of the details of my measurements and calculations. Others who might try to measure the same phenomena may get slightly different measurements. Judging from my experience in codicology, I would expect to get slightly different measurements myself if I were to take them all a second time. There is not a single, precise, and correct measurement when it comes to the kinds of phenomena that we are dealing with here, because in most respects manuscript books are not absolutely precisely uniform and consistent. But I also know from experience that the inevitable minute "imprecisions" in measurements of a manuscript's codicological features are not significant for the end results of the kinds of calculations offered here. (I put "imprecisions" into quotation marks because it is not necessarily the measurements as such that are imprecise, but rather the phenomena being measured fluctuate in degree and are thus, in a sense, themselves "imprecise" by their very nature.)

average from all my measurements on both sides together is 0.51 cm. On the recto, the width of the surviving written area is at least (i.e., minimally) 7.2 cm. Using 21.5 for the average number of letters per line that are missing to the right of the surviving recto,[9] I get a column width of minimally 21.5 × 0.40 = 8.6 + 7.2 = 15.8 cm, maximally 21.5 × 0.60 = 12.9 + 7.2 = 20.1 cm or more,[10] with an average of at least 21.5 × 0.51 = 11.0 + 7.2 = 18.2 cm. The surviving left and right margins are minimally 3.0 cm, maximally 3.4 cm, so that I calculate a total page width (column of text + two margins) of minimally 15.8 + 6.0 = 21.8 cm, maximally 20.1 + 6.8 = 26.9 cm or more, on average at least 18.2 + 6.4 = 24.6 cm (see table 1).

8. For calculating the original height of the codex leaf of which H appears to be a fragment, we need to know how many lines were on a page, and how tall one line is. We do not know whether H preserves the first line of each page, or the last line, or comes from somewhere in the middle of our hypothetical leaf. But this is no hindrance to the calculation. Let us assume that H comes from the very top of the column.[11] In this case, the number of lines on the recto must have been the number of surviving lines on the recto plus the number of lines that we calculated as missing before the first surviving line of the verso, that is: 9 + 51 = 60 lines. But now let us assume that H comes from the very bottom of the column. In that case, the number of lines on the verso must have been the number of lines that we calculated as missing before the first surviving line of the verso plus the number of surviving lines on the verso, that is: 51 + 8 = 59 lines. Any other assumed position of the fragment on the leaf will bring one or the other of these two results, because the position of H on the recto page necessarily determines its position on the verso, and the number of lines missing between recto and verso is fixed at 51. Only because of a difference in interlinear spacing between recto and verso do we have here a minimal and a maximal possibility, namely 59 lines and 60 lines per page.

9. On the recto, the height of 8 lines plus the interlinear spaces (that is, measured from the top of line 1 to the top of line 9) is 5.5 cm. Similarly on the verso, the height of 7 lines is

TABLE 1
CALCULATION OF THE ORIGINAL PAGE WIDTH OF THE HARVARD JOHN FRAGMENT
(Assuming a One-Column Layout)

STEPS IN THE CALCULATION		MINIMAL	AVERAGE	MAXIMAL
(a)	1 letter + 1 interliteral space	0.40 cm	0.51 cm	0.60 cm
(b)	× letters missing per line		21.5	
(c)	= width of lacuna	8.6 cm	11.0 cm	12.9 cm
(d)	+ surviving width of column	7.2 cm		
(e)	= width of column	15.8 cm	18.2 cm	20.1 cm
(f)	+ width of surviving margins × 2	6.0 cm	6.4 cm	6.8 cm
(g)	= width of page	21.8 cm	24.6 cm	26.9 cm

[9] I may note here that Hagen included in the margins of his transcription (see n. 4 above) useful data for such calculations.

[10] "Or more" because the figures that I am using are more likely to be too small than too large.

[11] This hypothesis has been sketched graphically by Gregg W. Schwendner, "Crude Analysis of the N[umber] of Lines Separating Cod[ex] Recto and Cod[ex] Verso of the Simulated GJohn" (n.d.) at https://www.academia.edu/6893103/crude_analysis_of_the_no._of_lines_separating_cod._recto_and_cod._verso_of_the_simulated_gjhn.

5.5 cm. As one can see in the photographs, the lines on the verso are somewhat more widely spaced than the lines on the recto are, and also the letters on the verso appear to be slightly taller than the letters on the recto (and on the verso they are also more widely spaced). On the recto, 1 line + 1 interlinear space is (on average) 5.5/8 = 0.6875 cm, on the verso 5.5/7 = 0.7857 cm, and on average for both sides together 11/15 = 0.7333 cm.[12] Now we can combine these results with the number of lines per page and obtain, for the original height of the column of writing, minimally 0.6875 × 59 = 40.6 cm, maximally 0.7857 × 60 = 47.1 cm, on average 0.7333 × 59.5 = 43.6 cm. Because these calculations have the result of adding in one superfluous interlinear space at the bottom of the column, let us reduce each result by 0.4 cm, which is a generous approximation of the height of one interlinear space: thus minimally 40.2 cm, on average 43.2 cm, maximally 46.7 cm. We must also add top and bottom margins, for which 2 + 2 = 4 cm is a conservative estimate, given that the surviving inner margin is about 3 cm wide; for an approximate "average" let us use 6 cm, and for a maximum (but still rather on the conservative side) let us use 7.5 cm.[13] Thus I calculate a total page height (column of text + top margin + bottom margin) of minimally 40.2 + 4.0 = 44.2 cm, on average at least 43.2 + 6.0 = 49.2 cm, and maximally 46.7 + 7.5 = 54.2 cm or more (see table 2).

10. The final results for the dimensions of a leaf of our hypothetical one-column early-medieval Coptic papyrus codex H would be as follows (height × width, with the figures rounded for simplicity's sake, because we are dealing here in any case with approximations):

minimally	44 × 22 cm (and surely no smaller[14])
on average	49 × 25 cm (width possibly greater)
maximally	54 × 27 cm (width likely greater)

TABLE 2
CALCULATION OF THE ORIGINAL PAGE HEIGHT OF THE HARVARD JOHN FRAGMENT
(Assuming a One-Column Layout)

STEPS IN THE CALCULATION	MINIMAL	AVERAGE	MAXIMAL
(a) 1 line + 1 interlinear space	0.6875 cm	0.7333 cm	0.7857 cm
(b) × total lines on page	59	59.5	60
(c) = height of column	40.6 cm	43.6 cm	47.1 cm
(d) – 1 interlinear space		0.4 cm	
(e) = adjusted height of column	40.2 cm	43.2 cm	46.7 cm
(f) + height of top + bottom margins	4.0 cm	6.0 cm	7.5 cm
(g) = height of page	44.2 cm	49.2 cm	54.2 cm

[12] Schwendner, "Analysis" (n. 11 above), gives the figure for the "leading" (1 line + 1 interlinear space) of the John fragment as only 0.60 cm, without reporting how he obtained this figure. As a result, his calculation of the height of the column of text (36 cm) is smaller than my minimal calculation (ca. 40.2 cm).

[13] The papyrologist E. G. Turner (see n. 15 below) observed that "a rule of thumb would allow the lower margin to be bigger in proportion of 3 : 2 than the upper margin" (Turner, p. 25). I was reminded of this sentence in Turner's book recently while reading Brent Nongbri, "Losing a Curious Christian Scroll but Gaining a Curious Christian Codex: An Oxyrhynchus Papyrus of Exodus and Revelation," *Novum Testamentum* 55 (2013) 77–88 (p. 80 at n. 10), which is an informative and useful exercise in codicological reconstruction.

[14] "And surely no smaller" because I have used very conservative minimal values at every step, both when calculating the height and when calculating the width.

Comparison of Reconstructed "Codex H" with Extant Papyrus Codices

11. Anyone who is familiar with the codicology of papyrus codices will know immediately that even the minimal height of 44 cm is surprisingly tall, while a height of 54 cm would be astonishing. According to data collected by E. G. Turner as of the mid-1970s, from something more than seven hundred papyrus codices or fragments of papyrus codices (48 of them being Coptic),[15] the tallest known Coptic papyrus codex is his no. C22, which is H. Thompson's "Books of the Old Testament" codex, "the largest dimensions of complete pages" being 36.5 × 26.5 cm (with 33–38 lines per page and an average written area of 28 × 21 cm),[16] so about the same width as our hypothetical codex H, but noticeably shorter.

12. Codex H could be taller than the tallest Greek or Latin papyrus codex known to Turner, which is P.Berl. inv. 11739 (assigned to the sixth or seventh century). From this codex there survives one well preserved leaf (plus a few fragments of at least one further leaf), such that the original dimensions of the codex can be directly measured as 40.4 × 21.5 cm (see fig. 3).[17] Unless a taller papyrus codex has been discovered in the meantime, our hypothetical *L5* John codex is at the very least about 4 cm taller than this tallest of all known papyrus codices and more likely 10 cm taller, or more. The papyrus leaf in Berlin is written in one column ca. 27 × 13 cm, with 38 lines per page (not counting a three-line title on the recto that is written in the top margin, not within the column of text, as is clear from a comparison with the verso); the inner margin is the same width as the surviving inner margin of H, ca. 3 cm, but the three other margins are each ca. 6 cm wide. If we use the margins of the Berlin leaf in our calculations of the size of H, which is not unreasonable given H's large size, we get dimensions between 52 × 25 cm and 59 × 29 cm, a

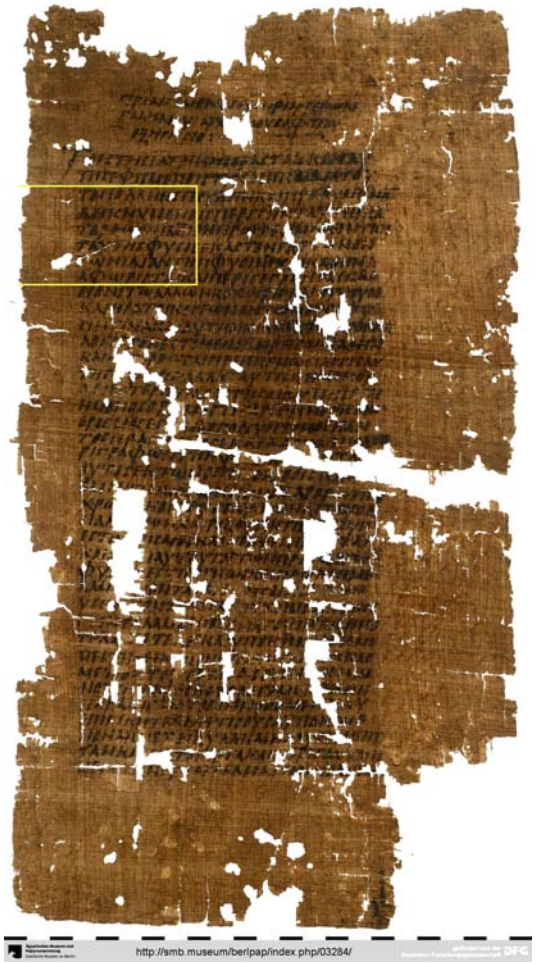

Fig. 3: P.Berl. inv. 11739Ar (40.4 × 21.5 cm, the tallest known papyrus codex leaf, Turner's no. 84; for the source of the image, see n. 17); the heading stands in the top margin and is not a part of the column of text (cf. verso); yellow marks an area approximately equivalent to H in its proportions relative to the column.

[15] Eric G. Turner, *The Typology of the Early Codex* ([Philadelphia] 1977); cf. n. 39 below.

[16] Herbert Thompson, *The Coptic (Sahidic) Version of Certain Books of the Old Testament from a Papyrus in the British Museum* (London 1908), p. vi; see the frontispiece for a photograph (British Library Or. 5984[41]v; reproduced by Frank Feder, "The Coptic Versions of the Book of Jesus Sirach," in: *Studies in the Book of Ben Sira*, edited by Géza G. Xeravits and József Zsengellér [*Journal for the Study of Judaism* Supplement 127; Leiden and Boston 2008], 11–20, p. 19).

[17] This codex is Turner's no. 84 (see pp. 14 and 105) = LDAB 1074 = P.Berl. inv. 11739 (A = the complete leaf, B = the fragments). For the dimensions, see Alfred Körte, "Literarische Texte mit Ausschluss der Christlichen," *Archiv für Papyrusforschung* 11 (1935) 220–283, pp. 275–276 no. 825. For scaled color photographs, see: http://smb.museum/berlpap/index.php/03284 (accessed 2014-05-17). The text that begins on the recto is a Neoplatonic commentary on a work of Galen, by an otherwise unknown author named Archimedes or Archonides (it is not a work by Galen himself, as labelled by Turner, following the way this work was listed by Roger A. Pack, *The Greek and Latin Literary Texts from Greco-Roman Egypt* [2d ed.; Ann Arbor 1965], 44 no. 456).

truly gigantic papyrus codex (see fig. 4). Among Turner's papyrus codices, there are three that have been reconstructed as having been as tall as 40 cm or more, as follows.[18]

No. 236 = P.Berl. inv. 10567 = *BKT* 5.1 no. 10 = LDAB 3077, Greek, Nonnos, *Dionysiaka*; two fragmentary bifolia (ff. 2^3 the center of a quire) and one fragmentary leaf (assigned date: sixth century[19]); calculated by its editors to have been ca. 40 × 28 cm.[20] The bifolium ff. 1^4 appears to survive to its full width, with wide outer margins, so that the codex was probably never any wider than its present extant width of 28 cm. Because the text is known and poetic, and parts of top margins survive (bottom margins are all wanting), calculating the numbers of missing lines, and thus the height of the column, is reasonably secure: for f. 1r the result is ca. 32.5 cm, with 48 lines (other pages have only 37–45 lines, not counting f. 1v, on which a title occurs in the middle of the column). On f. 4, the top margin survives up to ca. 3 cm (f. 1 is less well preserved, and I have no data for ff. 2 and 3). It seems that the editors allowed ca. 7.5 cm for top and bottom margins

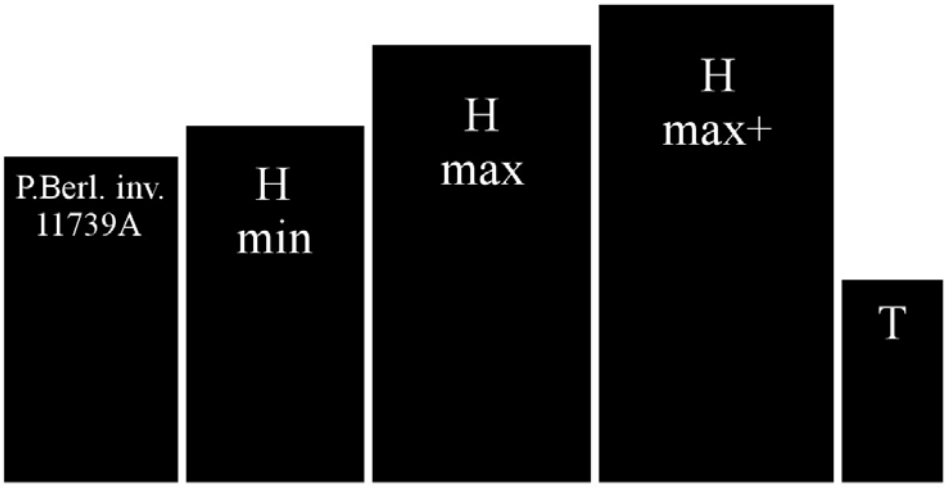

Fig. 4: The relative sizes of P.Berl. inv. 11739A (40.4 × 21.5 cm) and T (25 × 12.5 cm) as compared to reconstructed codex H (assuming a one-column layout), the latter calculated both minimally (44 × 22 cm) and maximally (54 × 27 cm), and also extra-maximally (max+, 59 × 29 cm) by adopting the widths of the Berlin codex's margins (if the *proportion* of the Berlin codex's margins to its written area were to be used instead of their absolute dimensions, then H max+ would be even larger).

[18] By "reconstructed" I mean that the dimensions of the original codices must be calculated on the basis of surviving fragments, just as we have reconstructed the dimensions of codex H on the basis of measurements taken from fragment H. No. 457 in Turner's list (pp. 14 and 124) is *P.Ant.* 1.29, a fragmentary leaf from a deluxe Latin papyrus codex of Vergil that the first editor calculated "cannot have measured less than 41 × 27.5 cm." But in fact it is unlikely to have been so large. Richard Seider (*Paläographie der lateinischen Papyri*, vol. 2.1 [Stuttgart 1978], 126 no. 51) has demonstrated convincingly that the original dimensions of this codex were most likely no larger than ca. 37.5 × 25 cm. For scaled photographs, see Kathleen McNamee, *Annotations in Greek and Latin Papyri* (American Studies in Papyrology 45; [n.p.] 2007), pls. 19–20, showing *P.Ant.* 1.29 frag. a and the two parts of frag. c (but not frag. b, which belongs between frags. a and c, nor the two very small frags. d and e). Seider's pl. 28 (without scale but in fact a little larger than 1 : 1) shows only *P.Ant.* 1.29 frag. c recto (the two parts labelled "51c" + "51d") and verso ("51a" + "51b").

[19] Turner, p. 113 with n. 24.

[20] Wilhelm Schubart and Ulrich von Wilamowitz-Moellendorf, *Griechische Dichterfragmente*, vol. 1: *Epische und elegische Fragmente* (Berliner Klassikertexte 5.1; Berlin 1907), 94. For scaled color photographs, see: http://smb.museum/berlpap/index.php/02832 (accessed 2014-05-29); "Platte A, Rekto" shows the bifolium ff. 4v^1r, "Platte A, Verso" ff. 1v^4r; "Platte C" is f. 6 with a number of small fragments; the bifolium ff. 2^3 is not shown.

combined, a somewhat conservative figure. If the top and bottom margins were as wide as the outer margins, which are very wide, up to ca. 10 cm, then a codex leaf might have been as large as ca. 52.5 × 28 cm, which makes it a possible rival to P.Berl. inv. 11739, and codex H, as the tallest known papyrus codex.

No. 447 = P.Vind. inv. G 30885a and 30885e = *P.Rain.Cent.* 163 = LDAB 554, Latin and Greek, a school-book "glossary to an author"[21] with text and *verbatim* translation of Cicero, *Cat.*, side by side in a narrow double column, one to three Latin words per line; four fragments belonging to the inner halves of two leaves, most likely consecutive[22] (assigned date: late fourth or fifth century); calculated by its latest editor to have been 40.5 × 29 cm.[23] Previous editors calculated 40 × 30 cm and 41.5 × 29–29.5 cm, respectively.[24] Only one double column survives on each page, but the layout of such glossaries in two double columns per page is well attested by manuscripts from the fourth and fifth centuries.[25] The number of lines per column can be calculated, as ca. 50, both because the text is known and because the layout can be predicted with near certainty. Each of the four fragments preserves one of four margins, with only an outer margin being entirely wanting. The published calculated dimensions are conservative, using the measurements of the extant margins (top and bottom being quite narrow, each only 1.5 cm), or only a little bit more (for the space between the two double columns). Thus this codex was certainly at least about the same height as P.Berl. inv. 11739. If, rather than taking the extant widths of the top and bottom margins to be original, we use instead 4.5 cm (which is half the width of one double column[26]), then the result is a height of 46.5 cm, which makes this codex another possible rival to P.Berl. inv. 11739, and codex H, as the tallest known papyrus codex.

No. 223a = P.Köln inv. 3328, Greek, Lollianos, *Phoinikika*, several fragmentary leaves (assigned date: late second century); calculated by its editor to have been perhaps as large as 40 × 25 cm (but perhaps only 35 × 20 cm).[27] The text of these fragments is not otherwise known. Reconstructing this codex as having been tall depends on accepting the editor's placement of frag. A1 as belonging to the top of the leaf of which frag. A2 is the bottom,[28] a placement that apparently cannot be checked by means of papyrus fiber continuity. The bottom margin survives on frag. A2, but the vertical distance between frags. A2

[21] Dario Internullo, "Cicerone latinogreco. *Corpus* dei papiri bilingui delle Catilinarie di Cicerone," *Papyrologica Lupiensia* 20–21 (2011–12) 28–150, at p. 33, his type 3.3 "glossari agli autori," specifically "glossari ad autori latini, in particolare a Virgilio e Cicerone."

[22] Whether or not the two leaves were conjugate, being thus the bifolium at the center of a quire (so Hans Gerstinger, "Ein neuer lateinischer Papyrus aus der Sammlung 'Papyrus Erzherzog Rainer'," *Wiener Studien* 55 [1937] 95–106, at p. 101, followed by Jerzy Axer, "Reedition of the Viennese Fragments of Cicero, *in Catilinam I*" [i.e., *P.Rain.Cent.* 163], 469–471; correctly dismissive of this hypothesis as only one possibility among others, Internullo, p. 47), depends on whether or not horizontal papyrus fiber continuity exists between f. 2v (frag. 2v) and f. 1r (frag. 1r), a question that no one seems to have tried to answer yet (perhaps unanswerable because of the poor condition of the papyrus of the two fragments to be compared).

[23] Internullo, p. 40, with careful presentation of his measurements and calculations, pp. 39–40. For scaled color photographs, see: http://aleph.onb.ac.at/F?func=file&file_name=login&local_base=ONB08 (search ["Schnellsuche"] for "G. 30885" and then find the link "Digitalisat" at the bottom of the entry, in the field "Digitalisiertes Objekt"). Black-and-white photographs accompany the editions by Axer and Internullo and have also been published elsewhere (for references, see the ÖNB and LDAB databases).

[24] Gerstinger, p. 102; Axer, p. 472.

[25] Internullo, pp. 33–34. If the codex was written in a single column, it would have to be twice as tall.

[26] See Axer, p. 472; Internullo, pp. 39–40.

[27] Albert Henrichs, *Die "Phoinikika" des Lollianos* (Bonn 1972), 2–3.

[28] Henrichs, p. 2 n. 11. To my limited knowledge (which is to say, judging by what was written twenty years ago by Susan A. Stephens and John J. Winkler, *Ancient Greek Novels: The Fragments* [Princeton 1995], 329–330), Henrichs's placement of frag. A1 has been accepted in scholarship on Lollianos's novel in consideration of the content of frag. A2 (and certainly I do not mean to challenge its placement).

and A1 is uncertain, as is the amount of text lost above frag. A1 and the width of the top margin, as well as the original width of the bottom margin. The extant height of frags. A1 + A2 with minimal space between them is only about 30 cm; the height of frag. A2 alone is 18 cm, it being the tallest of the surviving fragments. Accepting that this codex was even as much as 35 cm tall is thus, for the time being, at least, somewhat speculative.

Looking in Turner's lists for codices between 35 and 40 cm tall, I find only twelve items, nine of them reconstructed[29]; one of the three that can be directly measured is Thompson's "Books of the Old Testament" codex, mentioned above.[30] I should mention that the height of codex H exceeds also the heights of the first two items in Turner's list of "parchment codices classified by dimensions" (pp. 26–30), where the tallest measured codex is 40 × 35 cm (Codex Sinaiticus), while the "Vergilius Augusteus" has been reconstructed at 42.5 × 34.5 cm. Only one other codex in this list of parchment codices is as much as 40 cm tall (no. NTParch. 7). The Coptic parchment "saffron Gospels" codex in the British Library measures 44.5 × 33.7 cm.[31]

13. The proportion (i.e., width divided by height) of our codex H is very close to 0.50, that is, the codex is twice as tall as it is wide. Surviving papyrus codices that are 35–41 cm tall (all in Turner's group 1, "the largest sizes," on pp. 14–15 of his book) are not so very narrow: the closest comparison to be made in Turner's list is again with his no. 84 (see fig. 3 above), which at 40.4 × 21.5 cm is a proportion of 0.53. More typical of large papyrus codices is a proportion ca. 0.75. Papyrus codices with proportion 0.50, or close to it, constitute Turner's group 8, "breadth half height" (pp. 20–21), mostly single-quire, one-column codices from, or assigned to, the third and fourth centuries. The two tallest codices in this group are only somewhat more than 30 cm tall. But Turner distinguished a related group, his group 8 aberrant 1, "much higher than broad" (p. 21), the tallest codex of which is Chester Beatty biblical papyrus IX+X, measured as 34.4 × 12.8 cm,[32] thus with a very narrow proportion of 0.37 and much smaller even than our minimally reconstructed codex H. The tallest of the Coptic manuscripts in Turner's group 8 is his no. C41 (pp. 20 and 140), which is Nag Hammadi Codex I, measured at 30 × 14.4 cm, proportion 0.48. Also Thompson's (*L5*) John belongs to this group (Turner's no. C2) with proportion 0.50, dimensions 25 × 12.5 cm (see fig. 4 above, codex T).

14. Of the codices in Turner's group 8, including the related aberrant groups 1 and 2, only 8 out of 45 = 18% are over 30 cm tall (but none taller than 34.4 cm: see above, § 13), while the rest are 20–30 cm in height. Of 27 papyrus "codices having fifty or more lines to a page" in a single column, listed by Turner on pp. 96–97,[33] three might possibly have been as tall as 40 cm: no. 223a (cf. pp. 14 and 112), with 59+ lines per page, if the editor's reconstruction is correct (as already discussed above, § 12); no. 93, with a calculated 63 lines (Turner's own reconstructed dimensions [p. 14]: 36 × ? cm); and no. 158, with a calculated 65 lines (reconstructed dimensions: 39 × ? cm, marked by Turner with an additional question mark on p. 109). The average height of the remaining 24 codices in this list of Turner's is about 31 cm (only four of them measured, the rest reconstructed). The greatest number of lines recorded by Turner is the reconstructed number 69, in his no. 444, with reconstructed dimensions of

[29] Nos. 93 (cf. § 14 below), 97, 155, 158 (cf. § 14 below), 247, 257, 457 (= *P.Ant.* 1.29, the deluxe Latin codex discussed in n. 18 above), 480 (Latin), and OT57a, all Greek except for nos. 457 and 480. I have checked for myself the reconstruction only of no. 457.

[30] The two other codices in this range of heights that can be measured directly are: no. 478 = *PSI* 1.55 = LDAB 2553, Greek, an "Index" to Justinian's *Digesta*, 37.7+ × 20.6 cm (for 1 : 1-scale photographs, see *PSI* 1, pls. [8]–[11]); and no. 10 = *BKT* 5.2 no. 18.1 etc. = LDAB 378, Greek, Aristophanes, maximally 37 × 25 cm (for scaled color photographs of most of the fragments, see: http://smb.museum/berlpap/index.php/03641).

[31] W. E. Crum, *Catalogue of the Coptic Manuscripts in the British Museum* (London 1905), pp. xiii and 24.

[32] No. OT207a = OT183 (pp. 181 and 183; *P.Beatty* 7 = Chester Beatty Papyrus IX+X), 1 col., up to 57 lines.

[33] Note that no. 158 occurs twice in this list; cf. pp. 14 and 109. For no. OT36, I assume that the "number of lines to page" given in col. 5, which is only 31–38, is in fact the number of lines to a column, this codex being described in col. 3 as having "two columns per page."

30+ × 23 cm (pp. 15, 97, and 123). But excluding all such reconstructed numbers of lines, the greatest number of lines is only 63,[34] in no. 8, with reconstructed dimensions of 34 × 17 cm, or 32 × 16 cm (pp. 18, 97, and 102).

An Alternative Reconstruction: A Two-Column Codex H?

15. It is thus apparent that even the minimal reconstructed height of 44 cm for codex H is indeed unusually tall, not to mention a height over 50 cm. One way to bring the height of our hypothetical codex H down to a figure that is within the range of what is normal for papyrus codices is to suppose that H comes from a two-column codex and is part of the inner half of the leaf, the surviving text being from recto col. 1 and verso col. 2 (analogous to Turner's no. 447, see § 12 above). According to this hypothesis, our 59 or 60 reconstructed lines must be the equivalent of three columns, so that each column would have to have about 20 lines. This assumption results in a much less astonishing leaf height of ca. 17–23 cm (see table 3). But on the other hand, we must now double the width of the leaf and add something (conservatively, let us say 2 cm) for the space between the two columns on a page (see table 4), getting the following result for a leaf of our hypothetical two-column codex (height × width):

minimal	17 × 40 cm (and surely no smaller), proportion 2.35
on average	20 × 45 cm (width quite possibly greater), proportion 2.25
maximal	23 × 49 cm (width quite likely greater), proportion 2.13

16. According to Turner's observations, "the scheme of two columns to the page is used somewhat rarely in papyrus codices," and "codices which are broader than high are very rare indeed" (pp. 35 and 34 n. 7). Of the latter, he had only four examples, two of them Coptic (nos. C3 [= the Crosby-Schøyen codex[35]] and C6 [= Akhmimic Proverbs[36]] on pp. 22 and

TABLE 3
CALCULATION OF THE ORIGINAL PAGE HEIGHT OF THE HARVARD JOHN FRAGMENT
(Assuming a Two-Column Layout)

STEPS IN THE CALCULATION	MINIMAL	AVERAGE	MAXIMAL
(a) 1 line + 1 interlinear space	0.6875 cm	0.7333 cm	0.7857 cm
(b) × total lines in a column	20	20	20
(c) = height of columns	13.8 cm	14.7 cm	15.7 cm
(d) – 1 interlinear space		0.4 cm	
(e) = adjusted height of columns	13.4 cm	14.3 cm	15.3 cm
(f) + height of top + bottom margins	4.0 cm	6.0 cm	7.5 cm
(g) = height of page	17.4 cm	20.3 cm	22.8 cm

[34] Note that square brackets that are used in the "consolidated list of codices consulted" at the end of Turner's book (pp. 101–185; p. 101 for the meaning of the square brackets) in order to indicate numbers of lines that have "been won by reconstruction and inference" are mostly omitted on p. 97. Since the dimensions of most of these codices are reconstructed, I assume that the omission of the square brackets here was an error. According to the "consolidated list," only for nos. 106, 279a, 391, OT36, OT207a, 8, 60, 225, M1, 263, and A in the list on pp. 96–97 can the number of lines be counted with certainty.

[35] James E. Goehring, ed., *The Crosby-Schøyen Codex MS 193 in the Schøyen Collection* (Corpus Scriptorum Christianorum Orientalium 521 [Subs. 85]; Louvain 1990).

[36] Alexander Böhlig, *Der achmimische Proverbientext nach Ms. Berol. orient. oct. 987*, part 1: *Text und Rekonstruktion der sahidischen Vorlage* (Munich 1958).

TABLE 4
CALCULATION OF THE ORIGINAL PAGE WIDTH OF THE HARVARD JOHN FRAGMENT
(Assuming a Two-Column Layout)

STEPS IN THE CALCULATION	MINIMAL	AVERAGE	MAXIMAL
(a) 1 letter + 1 interliteral space	0.40 cm	0.51 cm	0.60 cm
(b) × letters missing per line		21.5	
(c) = width of lacuna	8.6 cm	11.0 cm	12.9 cm
(d) + surviving width of column	7.2 cm		
(e) = width of 1 column	15.8 cm	18.2 cm	20.1 cm
(f) × 2 = width of 2 columns	31.6 cm	36.4 cm	40.2 cm
(g) + width of surviving margins × 2	6.0 cm	6.4 cm	6.8 cm
(h) + 2 cm for intercolumnar space	2.0 cm	2.0 cm	2.0 cm
(i) = width of page	39.6 cm	44.8 cm	49.0 cm

137, both of them rather small, 14.6 × 15.2 cm and 12.2 × 14.3 cm, respectively, and only slightly more oblong than square, proportions 1.04 and 1.17). Turner's widest papyrus codex is his no. 28 = *P.Oxy.* 20.2558, Greek, Callimachus, 37 cm wide.[37] Then come: ? × 31.5 cm (no. 520 on p. 130; Greek, Ephrem the Syrian[38]); also no. 384, if the correct dimensions are 27.5 × 31.5 cm (Turner, p. 120 with n. 53 on p. 121; mathematical tables, proportion 1.15); 36 × 30 cm (no. 465, on pp. 14 and 125; Latin, glossary to Vergil; taller than wide, but height not certain); and ca. 40 × 30 cm (no. 447, on pp. 14 and 124; the Latin-Greek glossary to Cicero discussed above, § 12; also taller than wide). After that, all surviving widths are below 30 cm (p. 14, codices in Turner's group 1 described as "very broad" or "broad and very tall" etc.), even for two-column books. In the list of selected Coptic codices analyzed by Turner,[39] the widest is the same as the tallest, namely Thompson's "Books of the Old Testament" codex (no. C22), which at 36 × 27 cm has a proportion of 0.75, as opposed to our hypothetical oblong, two-column codex H with a proportion of something astounding around 2.2, that is, more than twice as wide as tall. To my knowledge such a proportion is unparalleled in Coptic, Greek, or Latin papyrus codicology.[40] And so, it is plainly evident that both the proportion

[37] Turner gave the dimensions as being reconstructed to be 28 × 37 cm. But in fact a bifolium (frag. C) survives to its full width (or nearly so) and so can be measured: for photographs, apparently 1 : 1, see *P.Oxy.* 20, pls. 13–16. Since the editor provided no measurements of any of the fragments, I assume that Turner himself measured the width and calculated the height. If his calculation of the height is correct (I did not try to check it for myself), then this codex had a proportion of 1.32. The poetic text is written in a single column, there being "a fair amount of evidence in favour of twenty-three lines as the normal complement of the column . . ., but there was certainly some irregularity . . ., of which we cannot gauge the kind or extent. . . . Accompanying the text [a]re notes in the same hand written smaller, a few placed between the lines, the bulk in the margins above and below as well as to right and left. . . . What with one thing and another the disposition of the commentary is not apt to afford unequivocal guidance in the assignment to their places in the text of the lemmata which it contains or refers to" (*P.Oxy.* 20, pp. 70–71).

[38] For more information, see Joseph van Haelst, *Catalogue des papyrus littéraires juifs et chrétiens* (Paris 1976), p. 371 no. 1220.

[39] Nos. C1–C53 on pp. 137–141, but comprising only 48 items, there being no nos. C36–C40.

[40] Cf. Theodore C. Petersen, "Early Islamic Bookbindings and Their Coptic Relations," *Ars Orientalis: The Arts of Islam and the East* 1 (1954) 41–64, p. 52: "The format of early Coptic codices, as well as of Greek, Latin,

and the absolute size of our hypothetical two-column John codex H are most unlikely (see fig. 5).

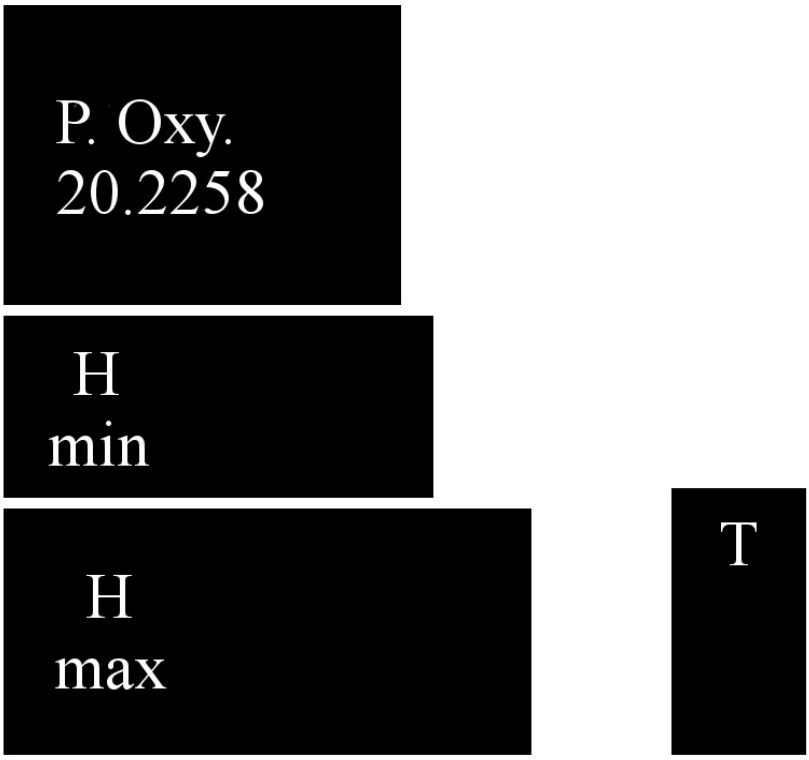

Fig. 5: The relative sizes of *P.Oxy.* 20.2258 = Turner's no. 28 (28 × 37 cm) and T (25 × 12.5 cm) as compared to reconstructed codex H (assuming a two-column layout), the latter calculated both minimally (17 × 40 cm) and maximally (23 × 49 cm).

No Codicological Reconstruction of H Is Entirely Credible

17. Our first hypothesis, then, of an extraordinarily tall, narrow, single-column *L5* John codex, appears to be much more likely than our second hypothesis, of a short, but even more extraordinarily wide two-column codex. But even the first hypothesis posits the existence of a single small fragment from a codex that must have been at least as tall as, and probably even much taller than the tallest papyrus codices so far known, regardless of language. And with respect to its proportion, the tall hypothetical codex must also have been much larger than any other similarly proportioned papyrus codex so far known, regardless of language. Among extant papyrus codices written in Coptic in particular, our hypothetical John codex would be more outlandish still. Of course one could construct other hypotheses to eliminate these codicological difficulties, for example that H is from a lectionary of some kind, such that fewer lines are missing between recto and verso than I have supposed, or that it is from a sermon in which only excerpts from John are quoted, with the same result. Or maybe there was a long omission in codex H between John 5:31 and 6:11, or several such omissions. But any such hypothesis would be special pleading. And any of these hypotheses would have to be accompanied by the confession that the exact match of every one of H's line breaks with line breaks in T, on both recto and verso, is an even more miraculous coincidence than it appears to be already on the relatively simple hypothesis that codex H was (intended to be) a complete copy

and Syriac books, was uniformly vertical-oblong [i.e., taller than wide], with only a few exceptions which approach the square form." Horizontal-oblong books in Arabic are known at least from the ninth–thirteenth centuries (Petersen, pp. 41–50, 61; the largest such books described by him are 27 × 37 cm [proportion 1.37] and 27.4 × 36.8 cm [proportion 1.34], while one with proportion 2.02 is very small in size, 5.2 × 10.5 cm).

of the Gospel of John in dialect *L5* (the occurrence of ⲉⲃⲟⲗ twice instead of ⲁⲃⲁⲗ notwithstanding).

Conclusions from the Codicological Analysis

18. For myself, taking the result of my codicological analysis of H into consideration together with observations that other scholars have brought forward in recent weeks about its text, orthography, and paleography, there can be no question but that H is the product of a hoax, created by someone who meant it to look like a piece of a Coptic Gospel of John codex, but who either did not care about codicology, and so created a fragment that is not codicologically credible (just as the fragment is incredible in other respects as well), or else made some kind of a blunder when choosing what to put onto recto and verso of the fragment, or perhaps was knowingly making a codicological joke. Even if H's papyrus support itself was manufactured about the eighth century, as radiometric dating has indicated,[41] the inscription on the papyrus must have been written sometime after 1924, the year in which Thompson's edition of the then newly discovered Qau codex was published, for H is indubitably a copy made from Thompson's printed edition. The validity of this assertion deserves to be demonstrated in detail,[42] for in fact a collation of H against T provides sufficient evidence for demonstrating that H is a fake. If its creator's intention was to pass it off as a piece from a genuinely ancient Coptic manuscript, then it must be condemned as a forgery.

19. Furthermore, I am also convinced of the truth of Christian Askeland's claim that a single individual wrote both H and the Gospel of Jesus' Wife fragment.[43] The validity of this claim too deserves to be demonstrated in detail, for it is the crucial link between H and GJW apart from the fact of their being together in a single collection of papyrus fragments.[44] If the claim is accepted, then GJW must also be a fake, even if its papyrus support too is over a thousand years old (as has been indicated by the same radiometric analyses), and it too must be condemned as a forgery. (This last is only for those who were not already convinced.)

20. For the purpose of making such codicological calculations as I have ventured to offer here, of course it would be desirable to have measurements of H made on the original papyrus itself. But I think that even in their absence, 7.6 × 10.3 cm must be close enough to the reality for it to be acceptable to have worked with these numbers provisionally, knowing that the results based on them might need to be adjusted slightly if more information about H becomes available. In any case, it should be noted that if the exact dimensions of H are in fact larger (as the reported dimensions 8 × 11 cm might suggest; see § 4 above, at n. 7), the result will be to increase the calculated dimensions of the hypothetically reconstructed codex leaf in both directions, and thus to make them still more incredible. The same result follows if one accepts a

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[41] Greg Hodgins, "Radiocarbon Dating the Gospel of John and the Gospel of Jesus['] Wife Papyri: Protocols, Stable Isotope Measurements, and Discussion of the Validity of the Radiocarbon Measurements" (2013-07-19, modified 2014-03-10) at https://s3.amazonaws.com/hds-high-traffic-assets/hodginssupplementalreport2013v4.pdf, p. 8 fig. 4; Noreen Tuross, "Accelerated Mass Spectrometry Radiocarbon Determination of Papyrus Samples" (2014-03-08) at https://s3.amazonaws.com/hds-high-traffic-assets/turossshortreportmarch82014.pdf, pp. [1]–[2].

[42] See Christian Askeland, "A Fake Coptic John and Its Implications for the 'Gospel of Jesus's Wife'," *Tyndale Bulletin* 65.1 (2014) 1–10. For preliminary discussions, see Askeland, "The Forgery of the Lycopolitan Gospel of John" (2014-04-27) at http://evangelicaltextualcriticism.blogspot.de, and other recent postings on the internet.

[43] Some useful preliminary comments and data for thinking along these lines have been offered by Gregg W. Schwendner, "The 'Gospel of Jesus['] Wife' as a Questioned Document: What Would Simulated Ancient Writing Look Like?" (2014-04-24) at http://www.academia.edu/6860965/the_gospel_of_jesus_wife_as_a_questioned_document_what_would_simulated_ancient_writing_look_like; and "Chart Comparing the Letter Forms in GJW and the Simulated GJohn" (n.d.) at http://www.academia.edu/6893096/chart_comparing_the_letter_forms_in_gjw_and_the_simulated_gjohn.

[44] This topic too is treated by Askeland, "Fake Coptic John" (see n. 42 above), esp. p. 10.

proportional extension of text between H and T of 0.52 rather than 0.50 as I accepted above (§ 3). I want to emphasize that, in general, the resulting dimensions given above for the hypothetical codex leaf to which H appears to have belonged are, if anything, too small, because I have tried always to use the smallest measurements possible for my minimal calculations, and even my maximal calculations are in principle conservative.

The Spectroscopic Studies: A Critique from a Layman

21. Fortunately, not only GJW, but GJW and H together were submitted by Prof. King for study by several physical analytical techniques, namely, radiometric dating and two types of spectroscopy. In the hope and expectation that an increasing number of ancient manuscripts will be subjected to such analyses, I have felt the need to become at least somewhat familiar with how these analytical techniques work, what kinds of data they produce, how the data are to be interpreted, and—perhaps most importantly—what questions the data might be used to answer. The four physical studies of GJW and H have resulted in a quantity of data, the interpretation of which needs to be reviewed in light of the exposure of H as certainly having been inscribed within the past century, and possibly—or even probably—quite recently.

22. In the full report by Azzarelli et al. (see n. 2 above) on their infrared spectroscopic study of the papyrus of the two fragments, undertaken in November 2013 "in order to determine if its chemical composition [i.e., the chemical composition of the papyrus on which the text of GJW is written] matches what would be expected of an ancient papyrus fragment," the authors have stated that "another papyrus document, GosJohn [i.e., H], was used *as a control*" (p. 3, italics added). Because H appears to be genuine papyrus, and its age had been determined in May 2013 to be about 1,200 years (see n. 41 above), it was reasonable to use it as a control for the purpose of the infrared spectroscopy.[45] I suppose that H was included in the two radiometric dating analyses (May 2013 and March 2014) and the micro-Raman spectroscopic study of the ink (March 2013) for the same reason that it was included in the infrared spectroscopy, namely "as a control." If so, then I suppose that the assumption was: H is an authentic ancient papyrus document, manufactured and inscribed many centuries ago (about twelve, as determined by radiometry), against which one may test GJW, the authenticity of which is has been challenged. The question to be posed now is: what do the data from these physical analyses tell us, on the different assumption that H is a modern text that was inscribed onto antique papyrus about twelve centuries after the papyrus was manufactured? More specifically: are there any data from the analyses that seem to contradict this new assumption? and: what do the data really tell us about the authenticity or inauthenticity of GJW?

23. Because there is no reason to doubt that the two fragments' supports—that is, the papyrus material as such—are both genuine papyrus (visual inspection, infrared spectroscopy) manufactured in antiquity (radiometry), my questions are posed only to the results of the micro-Raman spectroscopic analysis of the ink. Those results were the basis for Prof. King's statement that "the scientific testing completed thus far consistently provides positive evidence of the antiquity of the papyrus *and ink*, including radiocarbon, spectroscopic, and oxidation characteristics, with no evidence of modern fabrication" (p. 154, italics added). It seems to me that this claim, as it stands, is unwarranted. In fact the only unambiguously positive evidence for antiquity is the results of the radiometric dating of the papyrus—only the papyrus, not also the ink on the papyrus. The authors of the report on the infrared spectroscopy, who were inclined to take evidence of oxidation in both fragments (only the papyrus,

[45] The infrared spectroscopy was undertaken to try to determine the cause of an unexpectedly early radiometric dating of GJW to the fourth–third centuries BCE (King, p. 135). In the event, however, it served only to confirm that the papyrus of both fragments really is papyrus, a matter about which there was never any serious doubt (at least, not in my mind).

not also the ink) as signs of age, while stating that oxidation may have other causes as well,[46] were careful to state that the technique they used did *not* permit any conclusions regarding "the identity of the ink used on either fragment," and they formulated their summation with appropriate care: "nothing was found in the course of our analysis of both . . . fragments to suggest that the documents had been fabricated or modified at different times. These conclusions suggest that the documents should be considered to originate from the dates determined by other analytical methods [i.e., such as radiometry]" (Azzarelli et al., p. 21). I assume that "fabricated" here means "manufactured"[47] and that the intention of this part of the summation was to state that infrared spectroscopy does not contradict the claim that GJW is as old and authentic as the control specimen H was believed to be. But if H is a fake—old papyrus inscribed with modern ink—then the result of the infrared spectroscopy is, in fact, to not contradict the claim that GJW is the same type of fake that the control specimen H is.

24. The only analysis designed to provide information about the ink was the micro-Raman spectroscopy, and it could provide information only about the chemical composition of the ink, without necessarily being able (or being intended) to answer any questions about an ink's age. For the purpose of authenticating a purportedly ancient manuscript by means of Raman spectroscopic analysis of the ink, it would have to be possible to detect at least some feature of the ink that would distinguish a modern product from an ancient one. This possibility exists if a modern product happens to include any of the many substances whose "syntheses or refinement processes" were unknown before the eighteenth century (the industrial revolution).[48] But in the *absence* of any such substance from a given ink (as with GJW and H), the analysis can at best be only inconclusive with regard to the question of dating (see further § 35 below).

25. Raman spectroscopy can help to distinguish between *types* of pigments and inks, for example between carbon black ink and iron-gall black ink, which have distinct chemical properties that Raman spectroscopy can reveal clearly.[49] The analysis of GJW and H by Yardley and Hagadorn showed clearly that both fragments were written with carbon black ink on both recto and verso. The next question is: do the data from the Raman spectroscopy make it possible to determine whether more than one carbon black ink was used? In the remainder of my comments on this topic, I want only to indicate that, to a layman trying to understand the results of their analysis, not all of Yardley and Hagadorn's conclusions appear to be fully warranted. My impression from their data is that the ink on all four sides of the two papyri is

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[46] E.g., Azzarelli et al., p. 1: "Oxidation of the fragments is dependent on both their storage conditions and their ages, among other factors"; cf. pp. 13–14.

[47] But what exactly does "modified" mean here in the phrase "fabricated or modified at different times"? The word is not used anywhere else in this report that I can find. But a statement by Yardley & Hagadorn, "Report" (see n. 2 above), p. 25, "if there were modifications to the overall ink composition on one side or the other," might give a hint; cf. n. 59 below?

[48] Lucia Burgio and Robin J. H. Clark, "Comparative Pigment Analysis of Six Modern Egyptian Papyri and an Authentic One of the Thirteenth Century BC by Raman Microscopy and Other Techniques," *Journal of Raman Spectroscopy* 31 (2000) 395–401. The "modern Egyptian papyri" were fakes being offered for sale as genuinely ancient. All the telltale inks in this case were colored inks, except for one black ink, which was discovered to contain chromium (p. 398, end of the section on "Papyrus 3"), an element not known to have been used in pigments before the end of the eighteenth century. The presence of chromium was detected not by Raman spectroscopy, but by scanning electron microscopy and energy dispersive X-ray analysis (SEM/EDX).

[49] See, e.g., Ira Rabin et al., "Identification and Classification of Historical Writing Inks in Spectroscopy: A Methodological Overview," *Comparative Oriental Manuscript Studies Newsletter* 3 (2012) 26–30, available at: http://www1.uni-hamburg.de/COMST/newsletter.html, p. 26, concerning methods "for a typological identification of various writing materials that cannot be differentiated purely by visual appearance. . . . Soot, plant-material, and iron gall inks form different typological classes of historical black writing materials. . . . Despite the positive analysis development in the case of [colored] pigments, reliable experimental methods for identifying the black inks of the Middle Ages have only started to emerge during the last decade. They are not yet fully established and validated." Cf. Maurizio Aceto et al., "The *Vercelli Gospels* Laid Open: An Investigation into the Inks Used to Write the Oldest Gospels in Latin," *X-Ray Spectrometry* 37 (2009) 286–292, p. 291.

effectively one and the same. I understand that this conclusion would not prove that all the ink therefore *is* the same. Rather, the warranted conclusion seems to me to be that the data provide no evidence that any side was written with a different ink than was used for the other sides. If so, then the scientific testing completed thus far provides not only no evidence that any of the ink is antique, but also no evidence that GJW and H were written using more than one single ink. And that would mean that one must admit the possibility that GJW and H were both written with a single ink. If my interpretation is correct, then the data from the Raman spectroscopy support (but do not prove) the claim that GJW is as surely a fake as H is.

26. It is necessary for me to explain the basis of my contention, because the conclusion that I have come to conflicts with one of the conclusions drawn by the authors of the Raman spectroscopic study, namely their conclusion that "the ink or inks used in *GJW* are similar to, *but distinct from*, the ink used for the Gospel of John manuscript."[50] In the body of their full report (but not in its conclusions), the authors made a stronger statement: "These spectra [see their "Report," p. 24 fig. 8.3] make clear that the inks[51] used for the GospJohn manuscript are *quite* distinct from the inks used in the GJW manuscript."[52] The data on which the authors of the study based their conclusions are shown in their full report in four graphs, for the four sides of the two papyri, on pp. 19 (fig. 7.1) and 22 (fig. 8.1).[53] For purposes of comparison, they also present the data—in the form of "spectra"—obtained from two modern carbon black inks applied to modern papyrus, one of them "prepared from soot from burning oil" and called "lamp black," the other "prepared from soot derived from burned vegetable matter" and designated "vine black." The possibility of distinguishing between these two types of carbon black ink is apparent from the spectra shown here in fig. 6, which is fig. 8.3 from Yardley and Hagadorn's report (p. 24), showing the Columbia reference spectra from modern commercial "lamp black" ink and modern commercial "vine black" ink, together with the averaged spectra from GJWr, GJWv, and Hr. The occurrence of two peaks in all five of these spectra, one at around wavenumber 1350 and the other near wavenumber 1600, is generally characteristic of carbon-based inks. While the differences in amplitude (normalized

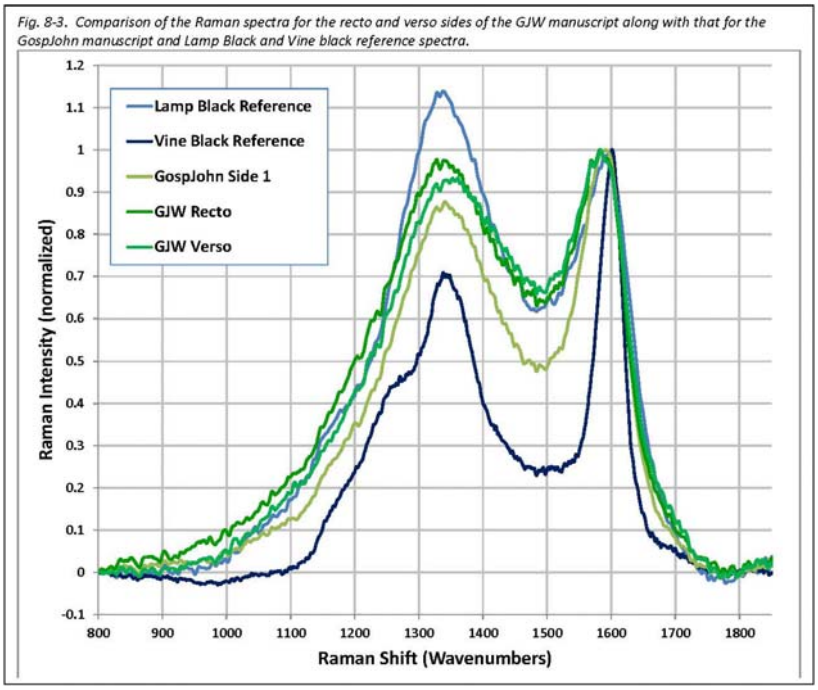

Fig. 6: A typical graphic representation of Raman spectra, obtained from several carbon black inks (image from Yardley & Hagadorn, "Report," p. 24 fig. 8.3).

[50] James T. Yardley and Alexis Hagadorn, "Characterization of the Chemical Nature of the Black Ink in the Manuscript of the *Gospel of Jesus's Wife* through Micro-Raman Spectroscopy," *Harvard Theological Review* 107 (2014) 162–164, p. 164 point 3, italics added to "but distinct from."

[51] Elsewhere in their conclusions, the authors stated that the data suggest that recto and verso of H "are written in *identical or similar inks*" (Yardley & Hagadorn, "Report," p. 26, fourth bullet under "Gospel of John," italics added).

[52] Yardley & Hagadorn, "Report," p. 25, italics added; cf. p. 26, third bullet under "Gospel of Jesus['] Wife."

[53] On pp. 6–18 the authors explain how they arrived at these data on the basis of the raw measurements collected by means of their spectrometer.

Raman intensity, the vertical axis) are not insignificant, more significant are the positions and widths of the peaks (wavenumbers, the horizontal axis) and occurrences of any distinctive features in a given spectrum, such as the shoulder in the vine black spectrum at about wavenumber 1250.[54]

27. Yardley and Hagadorn's fig. 7.1 (p. 19) shows "all [27] of the retained observed Raman spectra from the Gospel of John, side 1 and side 2" (p. 20), that is, 16 and 11 spectra from Hr and Hv respectively. The graduation of the scale provided with the two graphs in fig. 7.1 is not fine enough to permit me to give precise figures, but for Hr (fig. 7.1 top), the samples' peak amplitudes at the distinctive 1350 cm^{-1} band vary roughly between 0.80 and 0.92, and for Hv (fig. 7.1 bottom), between 0.78 and 0.99, for a total range of 0.78 to 0.99, which is a difference of 0.21; the data shown are too crowded for it to be possible to read from the graph the variation in position (wavenumber) of the peaks at the 1350 cm^{-1} band. Be that as it may, the investigators stated that "from these figures it is clear that the Raman spectra for each side [of H] are *essentially identical* within the overall experimental [margin of] error" (p. 20, italics added; here the spectra are also described as "quite similar"). Their fig. 7.3 (p. 21) shows that the "average renormalized Raman spectra" for Hr and Hv are "*certainly identical* within the experimental [margin of] error. Since it has been quite well established that the specific shape of the broader band near 1340 cm^{-1} [unlike the narrower band near 1600 cm^{-1}] is very sensitive to the precise nature of the ink preparation, these data strongly imply that the ink used in the production of side 1 of this manuscript is *the same* as the ink used to produce side 2" (pp. 20–21, italics added). Furthermore, "the similarity of the observed Raman spectra . . . taken at several different regions within the manuscripts [*sic*, but "manuscript" must be meant] . . . suggests strongly that the ink from all regions on both sides [of H] is *very similar if not identical* (at least as characterized by Raman spectroscopy)" (p. 21).

28. In these varying formulations (essentially identical; quite similar; certainly identical; the same; very similar if not identical) I sense what seems to me to be an as yet unresolved issue behind an apparent difficulty in answering the question (posed already above), do the data from the Raman spectroscopy make it possible to determine whether more than one carbon black ink was used for writing GJW and H? The methodological problem appears to be: how different must spectra be for it to be warranted to conclude that they belong to *two different inks*? What are the precise meanings, in this context, of the following expressions: identical/same; identical or similar; very similar; similar; differ/different/difference; and significant

[54] Just for the record: I have made a modest effort to understand Raman spectroscopy (named after Chandrasekhara V. Raman, discoverer of the "Raman effect," which is the basis of this technique), but I am well aware that my knowledge of physics is not such as to enable me to understand any type of spectroscopy in full detail. Nevertheless, according to my present understanding, in spectrographs such as the one shown in fig. 6, the horizontal axis represents "wavenumbers"—expressed in "inverse centimeters" (cm^{-1})—that measure the change ("shift") in wavelength that occurs when monochromatic (laser) light is reflected (as "inelastic scattering") by the material being analyzed. The shift in wavelength that occurs in the scattered light is due to the molecular structure of the reflecting material, and thus the shift provides very sensitive indications as to the chemical composition of that material. (In spectroscopy, it is normal to use wavenumbers instead of wavelengths to express the amount of shift—that is, the "position" along the *x*-axis—wavenumber being an inverse of wavelength.) The vertical axis of a spectrograph represents the intensity ("amplitude") of the reflected light signal at a given wavenumber. The Columbia scientists have normalized the scales used in their report such that the difference between the peak amplitude near wavenumber 1600 and a baseline drawn between wavenumbers 800 and 1800 is always exactly 1. Note that for "carbon black materials," the peak amplitudes near 1600 are "fairly consistent" (that is to say, they are more or less constant from one carbon black material to another), most probably because this peak "relates to the proper Raman spectrum of ordered carbon in large crystalline graphitic structures" (Yardley & Hagadorn, "Report," pp. 17–18); in other words, it relates to the molecular structure of what is by definition the common element of all carbon-based black inks. (I thank Dr. Ira Rabin, Dr. Adam Sears, and Dr. Wolfgang Zierau for their advice and guidance in matters of Raman spectroscopy.)

difference?[55] What is meant by "different but similar batches of ink," used by the Columbia scientists as a possible alternative conclusion given that "the Raman spectra obtained from the recto side and from the verso side [of GJW] are *very similar* [i.e., not identical, but only very similar] within experimental error" (pp. 1 and 26, italics added; cf. p. 25)? Also in a study of a Coptic parchment fragment in which I myself was involved, where the ink at issue was iron-gall black ink rather than carbon black, the authors of the report resorted to similarly varying interpretations of the fact that the results (in this case of several different types of analysis, including Raman and infrared spectroscopy among others) indicated "iron gall inks [on recto and verso, two copyist's alphabetic exercises] that differ in their metal salt composition": possibly "the two sides of the document were inscribed by two different persons, or by the same person at different times, even though this cannot be demonstrated by the analysis"; "two distinctly different iron/copper and iron/zinc ratios, reflecting differences in the original vitrol used for the ink manufacture"; "inks of the same recipe but most probably from different batches"; "the inscriptions on the two sides of the document were made with different iron gall inks."[56]

29. Returning to the Columbia University team's full report of their Raman spectroscopic analysis, let us consider taking the following as fixed points of reference (cf. § 27 above):

(1) on Hr, presumably written with a single batch of ink, the peak amplitude, in the 1350 cm^{-1} band, of spectra obtained from 16 scans at up to five different locations (parts of single letters; see Yardley & Hagadorn, "Report," p. 6 fig. 4.1) varied over a quantity of 0.92 – 0.80 = 0.12 (see § 27 above);
(2) on Hv, presumably written with a single batch of ink, and very likely the same (batch of) ink as Hr, the variation in the peak amplitude (in the same band) among 11 scans at up to six different locations (p. 7 fig. 4.2) was 0.99 – 0.78 = 0.21 (see § 27 above);
(3) the corresponding difference between the Columbia reference spectra for modern lamp and vine black inks is 0.43 (as measured on p. 17 fig. 6.3, or p. 20 fig. 7.2, or p. 24 fig. 8.3); and
(4) variation in amplitude up to at least 0.21 (point 2 above) was treated as being insignificant within the overall experimental margin of error, the spectra at issue being judged to be "essentially identical" (p. 20, already cited in § 27 above).

The data for GJW (taken from p. 22 fig. 8.1) corresponding to points 1 and 2 above are as follows:

(5) on GJWr, presumably written with a single batch of ink, from 23 scans[57] at up to seven different locations (p. 8 fig. 4.3), there is variation in peak amplitude of 1.17 – 0.80 = 0.37 (or, discounting the one very high peak from spectrum 009 [?]: 1.10 – 0.80 = 0.30);
(6) on GJWv, presumably written with a single batch of ink, but not necessarily the same (batch of) ink as GJWr, from 9 scans at up to three different locations (p. 9 fig. 4.4), there is variation in peak amplitude of 1.07 – 0.83 = 0.24.

In the case of GJW, the investigators described the spectra as "clearly similar to those found for" H, and they interpreted the similarity to mean "that the ink[s] examined through these spectra [from GJW] are based primarily[58] on carbon black pigments," while the fact that "the spectrum-to-spectrum variations appear to be greater than those" from H was interpreted as perhaps being "due to the intrinsic signal to noise [i.e., I assume, the intrinsically low signal-

[55] "Significant difference" occurs in "Report," pp. 1 and 26 (third bullet under "Gospel of John"), and p. 25 ("significant measured differences").
[56] Rabin et al., pp. 27–30 passim.
[57] Yardley & Hagadorn, "Report," p. 23, stated "a total of 25 spectra," but only 23 are itemized in fig. 8.1 top.
[58] What does "primarily" here mean? It recurs in the printed summary, *HThR* 107, p. 164.

to-noise ratio] for the experiments or it may be due to differences in inks for the recto versus the verso sides, or it may be due to possible difference in inks in different regions within a single side" (p. 23). Although these last statements seem to be somewhat confusing, it appears that:

(7) a difference in amplitude of 0.24 (GJWv, point 6 above)—that is, comparing (4) above, a difference greater than 0.21, or 0.22, or 0.23?—was judged great enough to indicate a "possible difference in inks" (i.e., two similar but different [batches of] carbon black inks?).

On the other hand, it is not apparent to me what it is in the data from GJW that could warrant the conclusion that there are any significant "differences in inks for the recto versus the verso" of GJW: the ranges 0.80–1.17 or even just 0.80–1.10 (GJWr, point 5 above) and 0.83–1.07 (GJWv, point 6 above) appear to be effectively identical, because the one range (0.83–1.07), falls entirely within the other (0.80–1.10).

30. "In order to examine the possibility that the ink composition may vary for different specific features or regions of the GJW manuscript," the Columbia scientists "examined the average normalized Raman spectra taken from different individual locations on the GJW manuscript" (pp. 23–24), that is, they averaged together the several spectra obtained from each of ten different locations, namely, the seven locations on GJWr and the three on GJWv; for purposes of comparison, they included also the average of all spectra obtained from H. Two bar graphs on p. 23 (fig. 8.2) show the values for these eleven quantities, one graph for the values of the averaged peak amplitudes in the vicinity of wavenumber 1350 cm^{-1}, the second graph for the averaged wavenumber at which the peak amplitude in this band occurs. The conclusion was drawn that "there is no clear or convincing indication of any specific differences in ink composition for specific regions of" GJW,[59] but that there might be "some difference between recto and verso sides of the document" (p. 24).

31. To illustrate this difference between GJW recto and verso, the graph in fig. 8.3 = fig. 6 above shows the averaged spectra for (in this order, from highest peak to lowest peak near wavenumber 1350): lamp black reference, GJWr, GJWv, Hr, and vine black reference. The differences in amplitude from peak to peak near wavenumber 1350 are, for GJWr, GJWv, and Hr, approximately the same (roughly 0.05 as measured on the authors' normalized Raman intensity scale). But these are the data that prompted the statement (already quoted in § 26 above) that "these spectra make clear that the inks used for the GospJohn manuscript are quite distinct from the inks used in the GJW manuscript" (p. 25). Thus here a difference in averaged peak amplitude of as little as ca. 0.05 was judged to be "quite distinct."[60] The difference between GJW recto and verso was given three possible explanations: "if, for example, the recto and verso sides were created at different times with different ink compositions"; or "if there were modifications to the overall ink composition on one side or the other"; or "if the two sides experienced different chemical or physical environments throughout [i.e., at some time or times during?] their lifetimes" (p. 25).

[59] This particular question was examined closely in order to test the hypothetical possibility that ⲧⲁ-ϩⲓⲙⲉ "my-wife" in GJWr line 4 might be the result of some kind of physical alteration to the text as originally written: see King, p. 136, "the ⲁ in ⲧⲁϩⲓⲙⲉ shows no sign of correction," with n. 24 referring to the results of the Raman spectroscopy.

[60] One may not necessarily compare this value (0.05) directly with the values for differences in amplitude between individual scans (such as are shown in figs. 7.1 and 8.1), because "the accuracy for the average spectra shown in Fig. 8-3 is higher than for the data shown in Fig. 8-2" (p. 25), which data are already lower-order averages of the data represented in figs. 7.1 and 8.1. Compare the relationship between the data presented in fig. 7.1, on the one hand, and figs. 7.2 and 7.3 on the other.

32. In view of the higher accuracy of the averaged data shown in fig. 8.3, the investigators gave also the precise values for GJW recto and verso that are represented in the graph, which are (note that ±0.13 and ±13 cm^{-1} are the margins of error for the respective values):

source	amplitude	wavenumber
GJWr	0.986 ±0.13	1334.8 ±13 cm^{-1}
GJWv	0.927 ±0.13	1352.2 ±13 cm^{-1}

The authors commented, "these data and the data of Fig. 8-2 indicate only *very small measured average differences* between the ink compositions for the two sides of the GJW document, both in terms of the peak position [i.e., wavenumber] . . . and in terms of its intensity [i.e., amplitude]. . . . The observed spectra . . . are *similar* within the 90% confidence limit uncertainties for these measurements. . . . Although the Raman spectra obtained from the recto side and from the verso side [of GJW] are similar within experimental [margin of] error, the data . . . admit the possibility that the recto and verso sides for this manuscript could be derived from *different but similar batches* of ink" (p. 25, italics added). The corresponding data for H must be read from fig. 8.2, where it appears clearly enough that for H the values are (approximately[61]):

source	amplitude	wavenumber
H	ca. 0.890 ±0.13	ca. 1341 ±13 cm^{-1}

Comparison with the values for GJW shows that the average wavenumber of the average peak amplitude for H (1341) falls halfway between the average wavenumbers for GJWr/v (1334.8 and 1352.2), while the average peak amplitude for H (0.890), although lower than the average peak amplitudes for GJWr/v, nonetheless lies well within the range covered by the margin of error for GJW, which is 0.797–1.116 (i.e., from 0.927 – 0.130 to 0.986 + 0.130). Thus, to a layman in these matters, it appears to be an inescapable conclusion that the ink of H is so similar to the inks on recto and verso of GJW that the conclusion to be drawn about H as compared to GJWr/v cannot be any different than the conclusion that was drawn about GJWr as compared to GJWv, namely (and here I simply imitate the language chosen by Yardley and Hagadorn, without prejudice to how the warranted conclusion might in fact be best formulated): these data indicate only very small measured average differences between the ink compositions for H and the two sides of GJW, both in terms of the peak position and in terms of its intensity; the observed spectra are similar within the 90% confidence limit uncertainties for these measurements; although the Raman spectra obtained from H and from the two sides of GJW are similar within experimental margin of error, the data admit the possibility that H and the recto and verso sides of GJW could be derived from different but similar batches of ink.

33. The question remains, just how significant are these "very small measured average differences"? I note that the total range of the average values here for the peak amplitude, from GJWr to H, is 0.986 – 0.890 = 0.096. This range is less than half of the 0.210 range of variation among spectra obtained from H that was treated as being insignificant within the overall experimental margin of error, the spectra at issue being judged to be "essentially identical" (see above, § 27 and § 29 point 4). It appears to me that the only warranted conclusion is that all four sides of GJW and H were written with ink, of the "carbon black" type, that is so similar from one side to another as to be effectively (or: "essentially") identical, in so far as this can be determined by Raman spectroscopy, and within the overall experimental margin of error. While this conclusion does not absolutely exclude the possibility that one or more of the four sides was written with a "different" ink that just happens to have the same (or nearly the

[61] I note that my necessarily approximate measurement of the difference in fig. 8.3 between the peak amplitude for GJWr and for GJWv as 0.040 seems to contrast rather poorly with the difference of 0.059 that can be calculated from the precise values for these amplitudes given on p. 25.

same) properties as the ink(s) used on the other side(s)—such as, for example, a "different but similar batch" of a single ink—it also does not exclude the possibility that all four sides were written with a single ink, or with two different batches of a single ink. If I am right in my critique, then one may cite the results of the Raman spectroscopy in support of (but not as proof of) the hypothesis that both H and GJW were created by a single copyist, using a single ink (or possibly two batches of a single ink). But one may *not* cite the results of the Raman spectroscopy in support of the hypothesis that GJW—in distinction from H—was written in antiquity. That the Raman spectroscopy does not *disprove* the latter hypothesis follows from the fact that the *absence* of any spectroscopically detectable *significant difference* between two specimens does *not prove* them to be *identical*,[62] just as the *presence* of a detectable but *insignificant difference* does *not prove* two specimens to be *distinct*.[63]

34. It is for these reasons that I want to challenge as unwarranted the following conclusions that have been published as results of the Raman spectroscopy of GJW and H (I have added italics, and sometimes also removed them, in order to mark the precise parts of the following statements that seem to me to be unwarranted):

(1) "The ink or inks used in GJW are similar to, *but distinct from*, the ink used for the Gospel of John manuscript" (Yardley & Hagadorn, *HThR* 107, p. 164 point 3; see also "Report," p. 25, and the third bullet under "Gospel of Jesus[’] Wife" on pp. 1 and 26).

(2) "The Raman spectra obtained from the recto side and from the verso side [of GJW] are very similar within experimental error, although the data admit the possibility that the recto and verso sides for this manuscript [GJW] could be derived from *different but similar batches of ink*" (ibid., the fifth bullet under "Gospel of Jesus[’] Wife").[64]

(3) "Current testing thus supports the conclusion that the papyrus *and ink* of GJW are ancient" (King, p. 135).

(4) "The scientific testing completed thus far consistently provides positive evidence of the antiquity of the papyrus *and ink*, including radiocarbon, spectroscopic, and oxidation characteristics, with no evidence of modern fabrication" (King, p. 154).

In fact, it seems to me that there is as yet no physical evidence for any significant difference between H and GJW.[65] If, as had been assumed for the purposes of the physical analyses that have been made, H were a genuinely ancient document in all respects, then the absence of physical evidence for any significant difference between H and GJW could be adduced in support of the hypothesis that GJW too is a genuinely ancient document in all respects. But knowing, as we now know, that H is a case of modern writing on ancient papyrus, the absence of physical evidence for any significant difference between H and GJW supports rather the hypothesis that GJW too is a case of ancient papyrus with modern writing on it. Put the other

[62] Dr. Ira Rabin (Berlin) has commented to me (2014-06-05) that in her experience, good-quality carbon black inks, whether antique or modern, may show "identical" Raman spectra.

[63] Cf. Aceto et al., p. 290: "it is not possible to think of ink production in old ages as an industrial-level production in terms of reproducible composition and quality. It is then hard to identify ink compositions typical of a certain *scriptorium* or a certain age," meaning that even detectable differences between inks do not necessarily mean that the inks originated in different places or at different times.

[64] It seems that the authors tacitly acknowledged this part of their conclusion to be unwarranted in that they omitted it from their printed summary, where they wrote instead only that "the Raman spectra obtained from the ‘recto’ side and from the ‘verso’ side [of GJW] are *indistinguishable* within our experimental error" (*HThR* 107, p. 164 point 5, italics added).

[65] If one discounts, that is, one radiometric dating of the papyrus of GJW to the fourth–third centuries BCE (Gregory Hodgins, "Accelerated Mass Spectrometry Radiocarbon Determination of Papyrus Samples," *Harvard Theological Review* 107 [2014] 166–169; cf. Noreen Tuross, "Accelerated Mass Spectrometry Radiocarbon Determination of Papyrus Samples," *Harvard Theological Review* 107 [2014] 170–171; and King, p. 135).

way around, if the texts of both H and GJW were inscribed at about the same time, by the same person, with the same ink (or with effectively identical inks, such as different batches of a single ink), then it is only to be expected that an analysis such as Raman spectroscopy (and probably other possible analyses as well) will show the two fragments to be effectively identical, as it seems to me to have been shown.

35. Finally, Prof. King has mentioned that "Columbia researchers are studying details in Raman spectra that may indicate aging of carbon black pigments. Their research to date shows that details of the Raman spectra of carbon-based pigments in *GJW* match closely those of several manuscripts from the Columbia collection of papyri dated between 1 B.C.E. and 800 C.E., while they deviate significantly from modern commercial lamp black pigments.[66] The implication is that the *GJW* fragment belongs within the ancient group" (p. 135). The Columbia investigators themselves mentioned "a parallel study" in which they "examined Raman spectra from over fifteen papyrus manuscripts from the Columbia [University Rare Book and Manuscript Library's papyrus] collection covering the time period from 500 B.C.E. to +1000 C.E." (*HThR* 107, p. 164; not mentioned in their full report), on which they based their statement that "the observed Raman spectra [from GJW] are very similar to those of the carbon-based inks studied for a wide variety of manuscripts including many dating from the early centuries of the Christian era" (ibid.; cf. their "Report," pp. 1 and 26, first bullet under both "Gospel of John" and "Gospel of Jesus['] Wife"). A publication concerning this parallel study will surely be of interest, for it ought to be useful to know how the spectra of the carbon-based black inks of dated papyri compare with one another, and how they compare with the inks of GJW, H, and other modern specimens. But from what I know at present of Raman spectroscopic analysis of inks, and being confident that H was written with modern ink, I cannot help but be sceptical about the idea that Raman spectroscopy can be used to detect indications of aging in carbon black inks (much as I might hope to discover that I am wrong about this).

36. In any case, even if it is correct that GJW "belongs within the ancient group" of 15+ papyri investigated so far at Columbia, it is not clear to me that to "belong" here means anything more than a typological assignment of GJW's ink, without necessarily entailing the implied chronological conclusion that the ink of GJW is therefore ancient as well. The practical usefulness of Raman spectroscopy (and similar techniques) in the study of ancient manuscripts—for example, in order to determine that two fragments derive from one and the same manuscript or from a single scribe, because they were written with one and the same ink—depends on whether or not any given ink (or batch of ink) has a unique physical "signature" that can be detected by this technique. My impression from the data reported by Yardley and Hagadorn, especially their figs. 7.1 and 8.1, graphing together spectra "obtained at various regions" on a single surface, that is, spectra obtained at various locations on each of Hr, Hv, GJWr, and GJWv as individual surfaces, is that the variation even among samples of what one may assume is certainly a batch of one single ink is too great for such data to be useful for associating one ink sample definitely with another, except as belonging to a certain chemical type, without specific reference to either time or place. And while "type" here certainly means, for example, carbon black vs. iron-gall black, and perhaps also lamp black vs. vine black, it is not clear to me that it can mean, for example, one copyist's lamp black ink vs. another copyist's lamp black ink.

37. In another recent study, using Raman spectroscopy to attempt to "discriminate between carbon-based black pigments from different origins by [means of] spectral analysis," reference spectra were obtained from eight different modern carbon black inks, including a

[66] I assume that instead of "lamp black pigments," Prof. King meant "carbon black pigments," for the Columbia scientists themselves specifically reported using only one modern lamp black ink, and also only one modern vine black ink, for their reference spectra (Yardley & Hagadorn, "Report," pp. 16–17 and 28 n. 19).

commercial lamp black ink and an ink made from wood charcoal.[67] Judging by the position of the peak in the 1350 cm^{-1} band (here called the "D[isorder] band"[68]), three inks from this study are similar to the ink(s) of H and GJW: charcoal ("CWC"), 1345 ±2 cm^{-1}; graphite ("GRZ"), 1351 ±3 cm^{-1}; and lamp black ("LBZ"), 1357 ±2 cm^{-1} (p. 1673 table 2).[69] In particular, the spectra of the charcoal and graphite inks fall between the spectra of the inks of H and GJWv. The authors of this study claimed to have demonstrated that "despite the similar appearance of Raman spectra of reference carbon-based [black] pigments, the combined analysis of spectral parameters determined by curve fitting allowed the discrimination of the pigments" (p. 1675). But it is difficult (for a layman, at least) to judge how clearly the Raman spectra differentiate the eight reference inks used in this study, because for each type of ink, only one sample was used (like the two single samples that were used for the Columbia lamp black and vine black reference inks). One would like to see a study in which a good number of samples of the various types of carbon-based black ink are analyzed and compared with one another.[70] Certainly this line of research appears to be potentially useful in the study of ancient manuscripts. But the scientific need, as I see it, goes beyond the "unambiguous identification of pigments in works of art" (and manuscripts) simply because this information is "important for understanding the technology used in the manufacture of the artwork [and manuscripts] as well as the available resources [at the time of manufacture]" (p. 1675). We need a forensic science to help us to match up the many clues from the scene of a crime, by which I mean the near obliteration of written records from antiquity. I fear that "an unambiguous identification of carbon-based pigments used in art and archaeology [i.e., in works of art and in some archeological artefacts, inlcuding manuscripts] *still remains a challenge* owing to the variety of sources [from which carbon black ink can be made] and manufacturing processes used in their preparation" (p. 1671, italics added).

P.S. Yet More Nails for the Coffin?

38. At H recto line 5 (John 5:29), ⲛⲉⲛⲧⲁⲩⲉⲓⲣⲉ ⲙ̄ⲡⲉⲑ̣[ⲩ is odd. In the Sahidic version of this passage, we find, as expected from the Greek οἱ τὰ φαῦλα πράξαντες (P^{66c} B *pc*), ⲛⲉⲛⲧⲁⲩⲉⲓⲣⲉ ⲛ̄ⲙ̄ⲡⲉⲑⲟⲟⲩ,[71] "those who have done the evil(deed)s." In H, either the direct object

[67] Eugenia P. Tomasini et al., "Micro-Raman Spectroscopy of Carbon-based Black Pigments," *Journal of Raman Spectroscopy* 43 (2012 = *Raman Spectroscopy in Art and Archaeology*, edited by Juan Manuel Madariaga and Danilo Bersani; Hoboken etc.) 1671–75 (referred to by Yardley & Hagadorn, "Report," p. 27 n. 7): "a clear difference in position [wavenumber], width [of the peak in the 1350 cm^{-1} band], and relative intensity [amplitude] could be observed [in the Raman spectra] for most of the[ir] samples. Micro-Raman spectroscopy allowed the discrimination of most of the reference pigments." Cf. Aceto et al., p. 291.

[68] So called because it indicates the presence of "disordered [amorphous] or microcrystalline graphite, also known as glassy carbon" (p. 1671).

[69] The data recording the intensity of the peaks may not be directly comparable with the data from the Columbia study because Tomasini et al. used a different scale, with a baseline drawn between wavenumbers 1000 and 1900 (as opposed to Columbia's use of 800 and 1800). As noted by Tomasini et al.: "It must be stressed that spectra acquisition conditions and fitting procedure are decisive [in order to be able] to compare results. Equivalent methods are required, in both the development of a database and the measurement of the unknown samples, for the sake of comparison" (p. 1675).

[70] A part of such a study should also be to analyze a number of samples whose identities are known, but kept secret from the investigators until they have made an attempt to assign each of them to a type, so that one could see to what extent the analysis had provided data that lead to an accurate identification. Among the unknowns there should be inks "similar" to the known samples, "different batches" of the known samples, and also further samples written with exactly the same inks as the known samples. Similarly, for the radiocarbon dating of ancient manuscripts, we need a set of controlled studies based on analyzing manuscripts whose dates are already securely known.

[71] In one manuscript (sa^9) we find ⲛⲉⲛⲧⲁⲩⲉⲓⲣⲉ ⲛ̄ϩⲉⲛⲡⲉⲑⲟⲟⲩ (Hans Quecke, *Das Johannesevangelium saïdisch* [Barcelona 1984], 105 n. on a 7). On the Sahidic manuscripts of John, see Christian Askeland, *John's Gospel:*

marker ⲛ̄- is missing, or else ⲙ̄- is the direct object marker. If ⲙ̄- is the direct object marker, then either ⲡⲉⲑⲁⲩ is constructed with zero-article, or ⲡⲉⲑⲁⲩ is construed as a definitely-determinated noun phrase, or else ⲡⲉⲑⲁⲩ stands for ⲡⲡⲉⲑⲁⲩ. Apart from the question of the likelihood of any of these possibilities, and leaving aside the general question of the relationship of Lycopolitan John's text to the Sahidic version,[72] in any case none of these explanations gives a likely Coptic rendering of the Greek definitely-determinated plural article phrase τὰ φαῦλα, "the bad(deed)s." Therefore, it must be that H is missing the direct object marker, which is to be counted as a scribal mistake (because here the letter ⲛ—expressed as ⲙ because of assimilation to the following ⲡ—is morphemic, that is, it has a meaning and cannot "be dropped . . . except by actual mistake"), even if such cases of graphic "n-dropping" as this might have a phonological explanation.[73] In the preceding line of H, although the letter between ⲉⲓⲣⲉ and ⲙ is not clearly legible because of damage to the papyrus (and also the first three letters of the phrase in question are written in a peculiar manner[74]), it is apparent enough that the copyist intended to write ⲛⲉⲛⲧⲁⲩⲉⲓⲣⲉ ⲛⲙ[ⲡⲉⲧⲛⲁⲛⲟⲩ], i.e., ⲛ̄ⲙ̄[ⲡⲉⲧⲛⲁⲛⲟⲩϥ] (or ⲛ̄ⲙ̄-[ⲡⲉⲧⲛⲁⲛⲟⲩⲟⲩ), as is expected from the Greek οἱ τὰ ἀγαθὰ ποιήσαντες, "those who have done the good(deed)s." And so, in line 4 we have correct ⲉⲓⲣⲉ ⲛ̄ⲙ̄ⲡⲉⲧ-, but in line 5 we have erroneous ⲉⲓⲣⲉ ⲙ̄ⲡⲉⲧ-.[75]

39. Orthographic variation of this sort—whether it is erroneous or not—can occur in any manuscript. But in this case, it is telling that we have exactly the same variation in the corresponding passage (John 5:29) in Thompson's edition of T (p. 7), Coptic p. 21 lines 13–15: ⲛⲉⲛⲧⲁⲩ[ⲉⲓⲣⲉ ⲛ̄ⲙ̄ⲡⲉ]|ⲧⲛⲁⲛⲟⲩ (*sic*) ⲁⲩⲁⲛⲁⲥⲧⲁ[ⲥⲓⲥ ⲛⲱⲱⲛϩ] | ⲛⲉⲛⲧⲁⲩⲉⲓⲣⲉ ⲙ̄ⲡⲉⲑⲁⲩ etc. The phrase "who does evil" occurs in John 3:20 as well, T 10:28: ⲟⲩⲁⲛ ⲅⲁⲣ ⲛⲓⲙ̀ ⲉϯⲣⲉ ⲙ̄ⲡⲉⲑⲁⲩ[76] (Thompson, p. 2), πᾶς γὰρ ὁ φαῦλα πράσσων, "For everyone who does evil . . ." Here the absence of the plural definite article τά with φαῦλα might seem to warrant interpreting ⲙ̄ⲡⲉⲑⲁⲩ to be ⲙ̄-∅-ⲡⲉⲑⲁⲩ. But then, as a rule, we expect not ⲉⲓⲣⲉ ⲙ̄ⲡⲉⲑⲁⲩ, but rather ⲣ̄-ⲡⲉⲑⲁⲩ, as in John 18:30, T 87:8–9: ⲉⲛⲉⲙ̄ⲡⲉ|[ⲡ]ⲉⲉⲓ ⲣ̄ⲡⲉⲑⲁⲩ (Thompson, p. 39), εἰ μὴ ἦν οὗτος κακὸν ποιήσας (ℵ*), "If this (man) had not done evil . . ." Furthermore, the plurality of φαῦλα in John 3:20, even without an article, would likely be rendered in Coptic by means of a plural article, as in the Sahidic version of the verse: ⲟⲩⲟⲛ ⲅⲁⲣ ⲛⲓⲙ ⲉⲧⲉⲓⲣⲉ ⲛ̄-ⲙ̄-ⲡⲉⲑⲟⲟⲩ[77] (cf. John 5:29 above, § 38). And so here in John 3:20 too, the direct object marker is missing (in T).

40. Note that in the first part of John 5:29, Thompson had to restore the phrase [ⲉⲓⲣⲉ ⲛ̄ⲙ̄-ⲡⲉ]ⲧ- in a lacuna, grammatically correctly. But it is perfectly possible that here too the copyist of T in fact wrote ⲉⲓⲣⲉ ⲙ̄ⲡⲉⲧ- instead, as he wrote in John 3:20 and in the second phrase in 5:29. Because of damage to the ends of lines 13–16 of T 21, we will never know exactly what the copyist wrote there. But it is as good as certain that what the copyist of H wrote came from the printed edition of T, including the grammatically correct ⲉⲓⲣⲉ ⲛ̄ⲙ̄[ⲡⲉⲧ]- from the modern editor's restoration, and the grammatically incorrect ⲉⲓⲣⲉ ⲙ̄ⲡⲉⲑ̣[ⲩ] from the ancient copyist who produced codex T itself.

The Coptic Translations of Its Greek Text (Arbeiten zur neutestamentlichen Textforschung 44; Berlin and Boston 2012), 83–94.

[72] See Askeland, *John's Gospel*, 195–208.

[73] See Wolf-Peter Funk and Richard Smith, "John 10:7–13:38 in Subachmimic," in: *The Chester Beatty Codex Ac. 1390: Mathematical School Exercises in Greek and John 10:7–13:38 in Subachmimic*, by William Brashear et al. (Chester Beatty Monographs 13; Louvain 1990), 57–137, pp. 68–71 on "omission of morphemic initial syllabic nasal," including "cases where the lacking ⲛ̄- is the object marker." But the Chester Beatty Lycopolitan ("Subachmimic") John manuscript, with its plethora of missing initial syllabic nasals, differs from T (and H) in this respect.

[74] See Hagen (n. 4 above), pp. [3]–[4].

[75] ⲡⲉⲑⲁⲩ stands for ⲡⲉⲧ-ϩⲁⲩ.

[76] ⲉϯⲣⲉ stands for ⲉⲧ-ⲉⲓⲣⲉ.

[77] In two manuscripts (sa[5] and sa[9]) we find ⲉⲧⲉⲓⲣⲉ ⲙ̄-ⲡ̄-ⲡⲉⲑⲟⲟⲩ (singular definite article).

41. Moving up another line on H recto, to line 3, we find the phrase “in the tombs” (John 5:28) written as ϩⲛⲛ̅, with a single long superlinear stroke over ϩⲛⲛ “in the.” Long superlinear strokes such as this are not rare in Coptic manuscripts written in Upper Egypt, including Lycopolitan manuscripts, including T. But properly speaking, ϩⲛⲛ here is not to be so marked with a single long stroke, because it consists of two syllables [hṇ.ṇ] (not [hṇn], which is what the spelling ϩⲛⲛ̅ implies), and so it should be marked ϩⲛ̄ⲛ̄. If one looks at the photograph of T p. 21 printed by Thompson (left-hand part of the plate facing p. 7), one sees that in T, this is just how “in the tombs” is marked: ϩⲛ̄ⲛ̄ⲧⲁⲫⲟⲥ (T 21, end of line 11). But in the printed edition on the facing page, it appears at first sight that Thompson transcribed ϩⲛ̄ⲛ̄ as ϩⲛⲛ̅. However, this appearance results from the fact that the superlinear strokes in the Coptic typeface that was used for Thompson’s edition of T are all very long, even slightly longer than the width of the letters that they surmount. When two such strokes occur right next to each other, as in ϩⲛⲛ̅ⲛ̄, it can easily appear that they are a single long stroke (so that ϩⲛⲛ̅ⲛ̄ looks like ϩⲛⲛ̅ⲛ). Surely, here the copyist of H simply misread his exemplar, which was the printed edition of T.

42. In sum, then, here are two further pieces of evidence of a hoax that has brought us a new, but completely worthless witness to the dialect-*L5* Coptic version of the Gospel of John. It is worthless because it is demonstrably a copy of the 1924 printed edition of the *L5* Qau codex, and the only variants that it has to offer are clearly nothing other than careless copying errors (or perhaps, in the case of ⲉⲃⲟⲗ, arbitrary and possibly even purposefully obfuscating alterations of the Qau codex’s text). But worse than that: unless it was initially created as a harmless joke (which went seriously awry, however), it is an insult to scholarship, and potentially harmful to science.

P.P.S. Was the New Gospel of John Fragment Meant to Be a Joke?

Fig. 7: Cf. Thompson, pl. facing p. 7,[78] which is the page on which the Qau codex’s text of John 5:26–31 occurs, smile, and then read John 5:27 ff., with which the new John fragment begins (except for the last two letters of 5:26, ⲧϥ̅, at the beginning of Hr line 1). It might help us to answer the question posed in this P.P.S. if we could learn something specific about four additional Coptic papyrus fragments that are reported to have been purchased along with the GJW and H fragments in 1999, the six papyri together being documented as having existed as a group already in 1963.[79]

[78] I owe this reference to Dr. Askeland.
[79] King, p. 153.