The Poetics of Physics (Appendix)

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Abstract

The foundations of physics are always established using philosophical ideas. But physics has been thought to truly represent reality since at least Galileo. In particular, the elegant naming of physical entities usually determines the acceptability of physical theories. We here demonstrate (using current developments in thermodynamics as an example) that both the epistemology and the ontology of physics ultimately rests on poetic language. What we understand depends essentially on the language we use. Ultimately, knowledge is necessarily subjective; that is, although the world is really there, and although we can indeed know it truly, yet ultimately this knowledge is necessarily intuited. We wish to establish our knowledge securely, but strictly speaking this is impossible using only analytical language. Poetic language is primary.

Summary

In this Appendix we justify the text of the main paper as it relates to the Figures.

We are interested in the characteristically human ways of speaking about things, which are irreducibly poetic. This assertion leads us to the most ancient witnesses we can find that are still in daily use, which are in Hebrew. We can interpret ancient Hebrew texts through the gloss on them found on an artefact whose original may date back to the first century CE or earlier, and which is written in a form of Hebrew ("paleo-Hebrew") that predates the modern Hebrew script, but that fell entirely out of use after the second destruction of Jerusalem in 135 CE.

We therefore have to explain not only the artefact itself,   but also the paleo-Hebrew which appears on it. We apologise for the inescapable intricacy. We will conclude that the artefact is an independent witness of a Hebrew tradition (possibly an early Jewish Christian one) that may (or may not) be independent of the present version of the Hebrew Scriptures.

The way that the validity of this gloss can be demonstrated turns out to be highly indicative support of our assertion of the essentially poetic nature of language,   which is why it is worth going to so much trouble to make the point.

The lead book Menorah page

Recently, some extraordinary artefacts have emerged from Jordan. These are "books" (that is, codices) made from several cast lead pages (typically about six) and bound together with leaden "cord". These pages typically have more or less intricate patterns, cast in relief (see Figure A1).

A lead page from such a codex was analysed by PIXE (particle-induced X-ray emission, using a 2.5 MeV proton ion beam, see 2012 Report[1]). This showed a rather impure lead (98.7 wt% Pb) with a very inhomogeneous composition, but including large regions with

0.2 wt% of both Sb and Sn, and 0.4 wt% of both Fe and Cu. This composition suggests that antimony was introduced deliberately to harden the lead for robustness of the cast image. (The supposed presence of trace quantities of Hg mentioned in the Report is not real: it was shown subsequently to be a measurement artefact introduced by poor modelling of the low energy tailing behaviour of the X-ray detector.)

There has been a question as to whether such artefacts were made in modern times for the antiquities market. There is no doubt that such "forgeries" do exist; however, there is also no doubt that many such artefacts are certainly not modern. We have checked these artefacts using the method of alpha-counting to determine the presence of ^{210}Pb (with a half-life of 22 years: see Keisch, 1968[2]). We obtained a null result (see 2016 Report[3]), indicating that the measured artefacts were certainly older than about 1950 and almost certainly predate 1900. This definitely excludes forgery using new lead for the antiquities market, which itself only became established later in the 20th century (after the discovery of the Dead Sea Scrolls). This by itself is not sufficient to exclude the possibility that old lead was used to forge an "antiquity", but we show here that the design of the Page uses authentic palaeo-Hebrew as a sophisticated mnemonic. The writing on the Page is not "gibberish" as has been alleged, quite the contrary: both the images and the lettering have been shown to carry substantial meaning of which we here show only a very small part. It seems incredible to ascribe such effort to a forger: where is the market pressure for such a sophisticated artefact in palaeo-Hebrew?

Figure A1: *A lead book still bound as a codex*

The pages have relief designs on them: an example is shown in Figure A1. These designs are intricate, detailed, and complex; they may include letters as well as pictures. For example, in Figure A2 there are three horizontal lines of 6 letters each, two vertical lines of seven letters each, and two further isolated letters (34 altogether). These letters are in a paleo-Hebrew script, and the page uses only 17 of the 22 letters of that alphabet. There are 7 letters that are not in the regular paleo-Hebrew alphabet but which are read as compounds. A further 3 letters are Hellenised forms.

The details of this design are beyond the scope of the present work: we will concentrate only on some isolated extracts. But these extracts are themselves the result of a highly sophisticated reading, the particulars of which cannot be justified except at some length.

It is fairly clear that these artefacts do continue to be made using traditional methods: they are used as cultic objects – now considered as good luck charms to "protect" the dwelling. But what is their origin? The presence of paleo-Hebrew points to an early origin of the *design*, perhaps 1st century CE, since paleo-Hebrew is not otherwise attested after 135 CE.

Figure A2: *Lead book "Menorah" page, with sketch of the design*
680mm x 560mm. Purchased from a registered dealer in Shobak, S Jordan. Original provenance not known. Image (left) courtesy of Jean-Paul Bragard. Sketch (right) by Margaret Barker.

The artefacts have come to us as "books": pages with lead wire hinges, and bound shut with lead wire. The codex was a Christian innovation (or at least popularised by them) in the 1st century CE, and it is known that in the 1st century both Christians and Jews gave great weight to the book of Daniel, which ends with the injunction to "*seal the words*" (Dan.12:4). The Christians looked to the Risen Christ to "*open the book*" in the last times (Rev.5:2), so the fact that these lead books are sealed shut perhaps indicates Christians looking to the last times ("*Come, Lord Jesus*", Rev.22:20). The fact that they are codices probably points to their being used by Christians even if not manufactured by them.

This page was originally treated as a separate tablet since the holes necessary to bind it as a codex have damaged the pattern and some letters are lost. The original letters have been restored by comparing other examples. The page shares a Christian understanding of Hebrew temple tradition, but the direction of influence cannot be independently determined. The original of this artefact is probably pre-Christian since its symbology is exceptionally intricate and displays an intimate knowledge and appreciation of First Temple theology and liturgy. (The First Temple was built by Solomon c.1000 BCE and destroyed by the Babylonians 586 BCE.) Examination of a number of these artefacts suggests that this page is typical, although it is unusually detailed and well-preserved.

Palaeo-Hebrew

It is undisputed that the modern Hebrew script (the *ketav Ashurit*, the "Assyrian script"), is supposed to have been introduced c.5th century BCE by "*Ezra the scribe*" shortly after the Babylonian exile – hence the name "Assyrian". This was preceded by another script, the *ketav Ivri* (now called "palaeo-Hebrew"). Both scripts were known and used at least up to the final destruction of Jerusalem in 135 CE, as the coins minted by Bar Kochba witness.

Accounts of the history are recorded in the Babylonian Talmud (*B.Sanhedrin* 21b, 22a): this undoubtedly records ancient witnesses, but was put in its present written form only in the 5th century CE. This written form is known to have modified the original oral witness in at least some respects, and it is now notoriously difficult to obtain agreement about all details of the ancient versions.

We propose an account that seems reasonable to us, and is consistent with the evidence we now have. Other accounts are possible (and not excluded), but we wish to give at least some account to allow readers to form some coherent picture of a complex and deeply puzzling story.

In our account we assume the uniform tradition of the ancient witnesses that Moses engraved the second tablets of the Torah on the mountain (Ex.34:4; this account is of course hotly disputed) since we believe that use of Ockham's Razor should lead one to deprecate the setting aside of ancient witness without good reason. For example, we believe that the view that makes the Creation Accounts late, on the grounds that no adequate parallels are to be found in contemporary cultures, has been refuted by Korpel & de Moor's 2014 demonstration[4] of exactly such parallels in the Ugaritic tablets (reliably dated c.1290 BCE).

The ancient witnesses do not agree on what script Moses used: the Babylonian Talmud (*Sanhedrin* 21, 22) suggests both *Ashurit* and *Ivri*. "*Ashurit*" can also be translated "beautiful" and of course the writing on the tablets must have been beautiful. However, although it seems plain that the *ketav Ivri* script is more cursive inviting the thought that it is more suitable to a graphical technique (with pen and ink on scrolls) than a glyphic one (carving on stone), this may be misleading since, as is common with ancient scripts, both scripts can be graphic and either can be glyphic. Note that both scripts are read right-to-left.

The ancient witnesses do agree that the *ketav Ivri* script itself had a previous history,   even if they do not agree what that history was. However, it may be that *Ivri* refers to what we might now call the "*Vulgate*": the script of the common people, since until the Babylonian exile the Jews were referred to as "Hebrews" (*Ivri'im*). For example, the Talmud suggests in one place that perhaps the reason the scroll found by Hilkiah (*II Kings* 22:10, c.641 BCE) had to be given to "*Shapan the scribe*" to read was because it was written in the generally unfamiliar older script, the *ketav Ashurit* (in other words, on this account Ezra the Scribe _re_-introduced the *ketav Ashurit*).   It is known that the *ketav Ivri* script was effectively a variation of the Proto-Canaanite script used throughout Canaan in the Late Bronze Age, and a reason given by the Talmud that none of Belshazzar's court could read the "writing on the wall" (except Daniel, *Daniel* 5:8) was because it was written in the *ketav Ashurit* (*Sanhedrin* 22). It is curious that in the second century CE, Simon bar Kochba used the *ketav Ivri* script on his coins. Was this a deliberate archaism?

Features of the Menorah Page

Table A1 shows how to transliterate the letters on this Menorah Page into the *ketav Ashurit* script. Note that five letters of the *Ashurit* script are missing: these are *zayin* as in [זהר] (*zohar*, "brightness", see Ezekiel 8:2; Daniel 12:3); *teth* as in [טהר] (*ṭohar*, "clearness", that is, ritual purity, see Exodus 24:10; Psalm.89:44); *kaph* as in [כבוד] (*kabhôdh*, "glory", see Isaiah 6:3); *samekh* as in [סנה] (*sə·neh*, "bush", see the burning bush of Deuteronomy 33:16; Ex.3:2,3,4); and *pe* as in [פאר] (*pā'ar*, "glorify or beautify", see Isaiah 60:7). Note that Hebrew is read right-to-left.

Haggai 1:8 has a word for "glorify" ([ואכבדה], *wə·'ek·kā·ḇə·ḏāh*) with different written ([כתיב], *ketiv*) and spoken ([קרי], *qere*) texts (*ketiv* and *qere* are Aramaic words). This text is given as "[כ= ואכבד] [ק= ואכבדה]". The written (*ketiv*) text omits the final *heh* [ה].

Ancient witnesses gloss this missing *heh* (also used as the Hebrew numeral 5) in Hag.1:8 by saying that in the Second Temple *five* items were missing: this list of five (the list is given variously) might be the ark, the menorah, the fire, the Spirit of God and the cherubim. Ezekiel saw the Glory leave Solomon's Temple (destroyed in 586 BCE: Ezek.10:18), and the Temple to which he saw it return (Ezek.44:4) was *not* the Temple that Ezra built in about 515 BCE (Ezra 6:14) under Haggai's prophecy. The *ketiv* of Hag.1:8 is held by ancient commentators to be an explicit acknowledgement that the Glory has departed. Thus, "five" is the number of the *missing Glory*, and in this Menorah Page each missing letter represents one aspect of this missing Glory.

Table A1: *Transliteration between Ashurit and Ivri scripts*

All these *ketav Ivri* script characters appear on the Menorah Page (Figure A2). Note that multiple *Ivri* characters have two possible transliterations, and the *Ashurit* "kof" character is the transliteration of three different *Ivri* characters. The *Ashurit* "dalet" character is also the transliteration of three *Ivri* characters, one of which can be written two ways, both appearing on this Page (which also includes the Greek letter *omega* Ω).

Reading the Menorah page as mnemonic

The Hebrew script is unpointed ("unvocalised"), meaning that most vowels are not written and there are no word dividers, so that it is intrinsically ambiguous. We start to show here how to read this "Menorah page", how we demonstrate a coherent decoding of just one aspect of it, and how we rule out the possibility that this reading is arbitrary.

Figure A4 indicates at least nine different ways that *dᵉmûth* can be read from the letters d-m-t (using the usual transliteration). This in itself would be of no significance, but the triangles formed by the three letters can be read in three different ways: d-m-t; m-t-d; t-m-d (selecting only half of the six possible permutations). Moreover, the mirror image of the d-m-t triangle (shown as the dotted lines in Figure A4) can also similarly be read. Table A2 shows that this

is coherent, and is therefore a plausible reading of this part of the Menorah page. We can also justify this use of the mirror image by citing the influential Jesus ben Sirach, writing in Jerusalem about 200 BCE (Ecclesiaticus 33.15): '*So look upon all the works of the most High; and there are two and two, one against another* (και ουτως εμβλεψον εις παντα τα εργα του υψιστου δυο δυο εν κατεναντι του ενος)'.

Summarising, we can read Table A2 as a double gloss on the text referred to by *dᵉmûth*, which occurs at the centrally important text, "*let us make man in our image, <u>after our likeness</u>*" (*Genesis* 1:26). This is the first statement in the Bible about how the human being relates to God, and the patterns on the Menorah page show how this was expressed in the traditions and rituals of the temple in Jerusalem, Solomon's temple. First,   the Menorah page invites us to permute the three letters of the word three ways, to read: *be clothed continually in the garment of His likeness*, as the High Priest was when he went in to sacrifice in the Holy of Holies (see *Exodus* 28:29f; *Psalm* 34:1 etc).

Then secondly, the mirror image of each of the nine cases (with the corresponding permutations) can also be read: see Table A2, which makes one proposal for speaking the "poem". The letters may be transliterated into "modern" Hebrew (the *ketav Ashurit*) a number of ways (our choice is shown in Table A3), and this text can be vocalised a number of ways (our choice is shown in Table A3 and summarised in Table A2).

We underline that this Page is a very sophisticated mnemonic design, of which we show only a very small and simple part (as can be seen in Figure A4). Such designs are intrinsically ambiguous, so that different people can see different things. In particular, the artefact appears to be a sophisticated Second Temple Jewish design remembering First Temple theology, but taken over (and doubtless reinterpreted) by a Christian community, as is witnessed by the Page being subsequently incorporated into a codex. Its interpretation as a Jewish artefact is rather esoteric, and certainly beyond our present scope,   but we interpret it here more simply as an artefact used by Christians. However, we believe that both our transliteration and our vocalisation choices work for either interpretation, perhaps with some small changes for the vocalisation.

To modern ears the Hebrew poem will sound strongly archaic (even in modern pronunciation): this is because it is stylistically similar to Ugaritic materials, which were already very ancient in the 1st century CE (see [ref.4]: Ps.114 has similar stylistic features[5], and so does Ps.29 [6]).
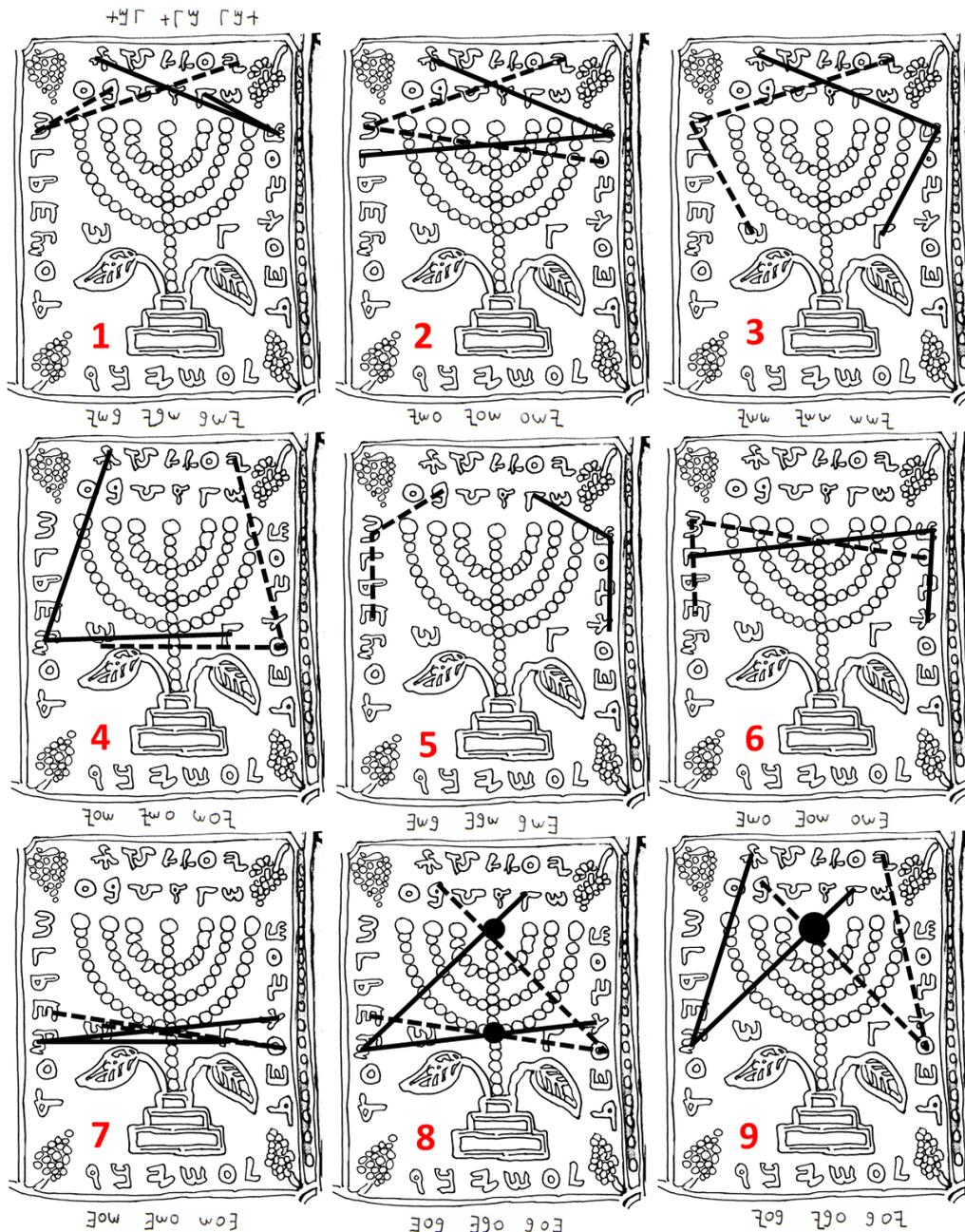
Figure A4: *Interpreting "dᵉmûth" in the Menorah page (see Table A1)*

In each case the solid line reads *tāmîdh* (or *dᵉmûth* reading the other way), and the dotted line (the mirror image) interprets: see text. Note: Hebrew reads right-to-left. The solid line triangle is read three ways: first starting with the top left character, and then the two ways of ending with it. This reading (three words) heads the Figure. For each of the nine ways this word appears, the mirror triangle is read the same way: with the reading given below the corresponding image. For ##8,9 the black circles indicate where the reading and its mirror intersect the Menorah (the significance of which is outside our present scope).

The images ##1-9 are ordered by row: so image #1 involves rows {1,3,2}, image #2 {1,3,4} etc. We consider the isolated characters above the Menorah leaves to be in row #6*. Then images ##1-9 involve in turn rows {1,3,2}; {1,3,4}; {1,3,6*}; {1,7,6*}; {6,3,2}; {6,3,4}; {6,7,6*}; {6,7,2}; {1,7,2}

#	abc / bca / cba	abc / bca / cba (vocalised)	English (abbreviated)
0	**tmd / mdt / dmt**	*tāmîdh / middōth / dᵉmûth*	**continually / in the garments / of the likeness**
1	asb / sba / bsa	*yōšēbh / bᵉṣābhā' / buṣî*	enthroned / amidst the angel host / in fine linen
2	asa / saa / asa	*yōšēa' / šāʿay / 'ēṣî*	the Victor (Saviour) / gazes / on my tree
3	ass / ssa / ssa	*yiṣṣaṣ / ṣiṣṣê / ṣiṣay*	he will make bloom / the flowers of / my blossoms
4	aas / asa / saa	*yōʿēṣ / 'ēṣî / šōʿᵃʿî*	the Counsellor / of my tree / is glad
5	hsb / sbh / bsh	*haššōbh / šābhaḥ / beṣṣāḥîḥ*	he who returns / praises / in the shining place
6	hsa / sah / ash	*haššōʿēa' / šāʿāh / 'ēṣāh*	he who delights / gazed / upon her tree
7	has / sah / ash	*hāʿēṣ / 'āṣāh / šāʿāh*	the tree / gave counsel / and looked with favour
8	hab / abh / bah	*hāʿābh / ʿābhâ / bōʿeh*	with the cloud / she overshadows / the enquirer
9	aab / aba / baa	*'āʿûbh / ʿābhî / bōʿî*	I will overshadow / with my cloud / he who seeks me

Table A2: *Decoding "dᵉmûth" in the Menorah page (see Figure A4)*

This whole Table is read left-to-right. In column 2 "*a*" is used to "transliterate" both *aleph* and *ayin*;
"*s*" for *shin*/*sin*/*tsadi*; "*h*" for *heh*/*chet*; "*t*" for *tav*; "*m*" for *mem*; "*d*" for *dalet*; "*b*" for *beth*.
Vocalisation (like transliteration) is ambiguous: this version does not exclude other possibilities.

Table A3 indicates some resonances of the mnemonic in the Hebrew Scriptures (using only the Masoretic Text): these in turn have Christian resonances, also indicated.

line	#	Hebrew			English		Reference		
		Text	+ML	Root	Trans-lation	Trans-literation	MT	LXX	NT
0	1	תמד	תמיד	מוד	continually	tāmîdh	Ex.27:20	δια παντος	Heb.13:15
	2	מדת	מדת	מד	garments	middōth	Ps.133:2	ενδυμα	Matt.22:11*f*; 28:3
	3	דמת	דמות	דמה	of the likeness	demûth	Is.40:18	ομοιωμα	Phil.2:7; Rom.1:23; 6:5;
1	1	ישב	ישב	ישב	enthroned	yōšēbh	2Sam.6:2; 1Ki.22:19	καθημενος	Matt.24:3; Rev.4:10
	2	צבא	בצבא	צבא	angel host	beṣābhā'	1Ki.22:19	στρατια ουρανου	Lk.2:13; Rev.19:14
	3	בצי	בצי	--	in fine linen	buṣî	1Chron.15:27	βυσσινος	Rev.19:8
2	1	ישע	יושע	ישע	Saviour	yōšēa'	Is.61:10	σωτηρ	Lk.2:11 etc.
	2	שעי	שעי	שעה	gazes on	šā'ay	Is.17:7	πεποιθως	2Cor.2:3; Phil.1:6,25;
	3	עצי	עצי	עץ	my tree	'ēṣî	Gen.2:9	ξυλος	Rev.22:2
3	1	יצץ	יצץ	ציץ	he will make to bloom	yiṣṣaṣ	Num.17:8 Is.40:6ff	ανθος ανθιζω	Jas.1:10f 1Pet.1:24
	2	צצי	צצי	ציץ	flowers of	ṣiṣṣê			
	3	צצי	צצי	ציץ	my blossoms	ṣiṣay			
4	1	יעץ	יעץ	יעץ	the Counsellor	yō'ēṣ	2Sam.16:23 (2Sam.15:12)	συμβουλος (βουλη)	Rom.11:34 (Eph.1:11)
	2	עצי	עצי	עץ	my tree	'ēṣî	(as 2:3)		
	3	שעי	שעעי	שעע	is glad	šō'ᵃî	Ps.94:19	αγαπαω	Rev.12:11
5	1	חשב	חשב	שוב	the one who returns	haššōbh	Gen.3:19 Jer.31:18	αποστρεψω επιστρεψω	Acts 3:26 Matt.13:15
	2	שבח	שבח	שבח	praises	šābhaḥ	Pss.145:4; 117:1	επαινει	Rom.15:11
	3	בצה	בצחיה	צח	shining place	beṣṣāḥîḥ	Cant.5:10	[λευκος]	[Matt.17:2; 28:3]
6	1	השע	השעע	שעע	he who takes delight	haššō'ēa'	(as 4.3)		
	2	שעה	שעה	שעה	gazed	šā'āh	(as 2:2)		
	3	עצה	עצה	עץ	upon her tree	'ēṣāh	(as 2:3)		
7	1	העץ	העץ	עץ	the tree	hā'ēṣ			
	2	עצה	עצה	יעץ	counsels	'āṣāh	(as 4.1)		
	3	שעה	שעה	שעה	looked with favour	šā'āh	(as 2:2)		
8	1	העב	העב	עב	with the cloud	hā'ābh	Ex.19:9	νεφελη	Matt.17:5
	2	עבה	עבה	עוב	she overshadows	'ābhâ	(as 9:1)		
	3	בעה	בעה	בעה	the seeker	bō'eh	Is.21:12	ζητων	Matt.6:33
9	1	אעב	אעוב	עוב	I will overshadow	'ā'ûbh	Lam.2:1	εγνοφωσεν	Heb.12:18
	2	עבי	עבי	עב	with my cloud	'ābhî	(as 8:1)		
	3	בעי	בעי	בעה	he who seeks me	bō'î	(as 8:3)		

Table A3: *Intepreting "dᵉmûth" in the Menorah page (see Table A2)*

This Table gives the roots of the Hebrew words, together with a suggested vocalisation for this reading (including the *matres lectionis*, "ML", and an occasional grammatical prefix or suffix) and an indication of the translation. Representative allusions to the canonical text are given, using the LXX as a Hebrew-Greek lexicon. See text for discussion of Table.

The Hebrew text is highly suggestive and heavily allusive, and reading it with a Christian gloss (explicitly adding the vocalisation) we tentatively interpret it in English as:

0.	Clothed perpetually in His likeness	תָּמִיד מִדֹּת דְּמוּתוֹ
1.	he is enthroned among the heavenly host in shining linen	יֹשֵׁב בְּצָבָא לָבוּשׁ בֵּצִי
2.	delighting that I know he saves	יוֹשֵׁעַ שָׁעִי עֵצִי
3.	he establishes the flowering of my blooms	יָצֵץ צִצֵי צִצִי
4.	my Counsellor delights in me	יָעֵץ עֵצִי שֹׁעֵעִי
5.	He returns in glory to praises	הֵשֹׁב שֶׁבַח בַּצָּחִיח
6.	he delights who gazed upon Wisdom's tree	**הֵשֹׁעֵעַ שָׁעָה עֵצָה**
7.	she blesses him with wisdom	הָעֵץ עָצָה שָׁעָה
8.	She overshadows the seeker	הָעָב עָבָה בֹּעֶה
9.	My cloud will overshadow him who enquires of me	אָעוּב עָבִי בֹּעִי
0.	Clothing him perpetually in the likeness	תָּמִיד מִדֹּת הַדְּמוּת

Glossing the Poem

It is not possible to give a literal reading of the Hebrew poem implied in Table A3 in any English version that would be accessible to modern ears, since the allusiveness of the text requires a deep familiarity with the canonical (and extra-canonical) texts very rare today. (The extra-canonical texts are far out of our scope and we do not here consider them.)

However, the book of *Revelation* (which is full of heavily Hebrew imagery) features prominently in a Christian gloss of the poem. So the "**shining linen**" in line#1 is the clothing of the saints (Rev.7:9) as already suggested by Jesus (Matt.22:11) and modelled by David dancing before the Ark (1Chron.15:27). There are "garments" in line#0 and "linen" in line#1, implicit in both is the word "clothed" ([לבוש], *lābhûš*) which we have added to line#1.

In line#2 "**I know**" refers to the Tree, which is the Tree of Knowledge and the Tree of Life. After all, it is "*by his knowledge [that] my righteous servant [shall] justify many*" (Is.53:11). It is textually arguable that in Eden there was only one Tree, which was of both Knowledge and Life. Comparison with the Ugaritic Creation story [ref.4] would support this argument.

The Tree also refers to Aaron's rod, which budded, blossomed, gave almond fruits, and was kept "*before the Ark*" (Num.17:8ff). Looking at the rod silenced the grumblers, just as looking ([והביט], *wə·hib·bît*) at the brass serpent gave life (Num.21:9). "**Gazing**" is a reference to this holy looking: "*they shall look ([והביטו], wə·hib·bî·ṭū) upon me whom they have pierced*" (Zech.12:10) echoed by "*and every eye shall see him, and they also which pierced him*" (Rev.1:7). In Table A3, Is.17:7 (a prophecy against Damascus) seems rather obscure, and uses a different Hebrew word: "*At that day shall a man look ([ישעה], πεποιθως) to his Maker …*", but both the LXX and the NT use the Greek word to mean "*confidence*" (this is part of the connotation of *looking* also in English: we *look for comfort*; we *look up* to people). Matt.27:43 also uses the same word (rendered "*trusted*" in English) clearly referring to Ps.22:8 (but changing the LXX ηλπισεν). The root of πεποιθως is πειθω, which is also related to πιστις (faith).

"**The tree**" [ξυλος] also refers to the Cross [σταυρος]: "*The God of our fathers raised up Jesus, whom ye slew and hanged on a tree*" (Acts 5:30). This is because the Jews heard the Torah here: "*Cursed is every one that hangeth on a tree*" (Gal.3:13; Deut.21:23). But of

course, in the end the Tree is the tree of life, "*and the leaves of the tree were for the healing of the nations*" (Rev.22:2).

In line#3, we have already seen that the "**flowering of my blooms**" alludes to Aaron's staff. It also alludes to Is.40:6, the fading glory of the flowers of the field, echoed many times in the New Testament including Jesus: "*Consider the lilies …*" (Lk.12:27) who is also alluding to the Song of Songs: "*I am my beloved's, and my beloved is mine: he feedeth among the lilies*" (Cant.6:3). This in turn is the context of Jeremiah's central prophesy: "*I have loved thee with an everlasting love*" (Jer.31:3) which he expands in the same place saying "*Behold, the days come, saith the LORD, that I will make a new covenant with the house of Israel, and with the house of Judah*" (Jer.31:31). And it was this *new covenant* that Jesus picked up and made into the central Christian symbol (Lk.22:20; 1Cor.11:25; Heb.8:8).

The "**return**" in line#5 is speaking about "*the consolation of Israel*" (Lk.2:25), where of course Israel is looking for the *Return of the King* (as Tolkien put it in *The Lord of the Rings*). Jesus referred to this obliquely in the parable (Lk.19:15) but the Jews knew that although they had "returned" from Babylon they were not yet fully returned from exile: not while the Glory was still absent from the Temple. (Ezra c.500 BCE and Nehemiah c.440 BCE had both confessed this: "*we are still slaves*", Ezra 9:9; "*we are slaves today*", Neh.9:36.) And earlier (c.720 BCE) Hezekiah had urged the people: "*turn again unto … God … and he will return to … you*" (2Chron.30:6). Then c.600 BCE Jeremiah sees Ephraim, who is dead and gone a century since, "*bemoaning himself*" and saying to God: "*turn thou me, and I shall be turned*" (Jer.31:18). And John himself must *turn* in his vision to see Jesus (Rev.1:12).

In line#8 the "**cloud**" refers to the Glory of God (as in the *cloudy pillar*, Ex.13:21f; 33:9f etc). For us this is an obscure allusion, but it would have been crystal clear to both 1ˢᵗ century Jews and 1ˢᵗ century Christians who all had exactly the same understanding. This is plain in the New Testament as is shown by Table A3: the Greek word for "cloud" [νεφελη] used at the account of Jesus' Transfiguration is the same as the Greek word in the LXX used for the cloud on Mount Sinai.

Also, in the book of *Revelation* the Cloud (Rev.1:7; 10:1; 14:14) explicitly references the Cloud in Daniel's vision of the Son of Man (Dan.7:13) that was demonstrably influential in the 1ˢᵗ century CE. It also explicitly references the Cloud as the promise of God in the Rainbow (Rev.10:1). This word [νεφελη] is still standard Greek, but the word used for "overshadow" in the reference in the New Testament to Mount Sinai (Hebrews 12:18) is a cognate word (γνοφω, "blackness") no longer common, and which was already archaic in the 1ˢᵗ century, as shown since the New Testament uses a different word [επισκιαζω] to render "overshadow" literally (Lk.1:35; 9:34). But the Hebrew word [עוב] here rendered "overshadow" is, literally, "overcloud" with all the connotations of the Cloud[1].

Of course, the Cloud symbolises the Presence of God as well as the Glory and the Promise: first century CE Jews were looking for the Return of God, and for the Hope and Salvation of

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[1] Connotations of the Cloud: the rainbow Covenant, Gen.9:13ff; protection in the wilderness by day, Ex.13:21 *passim*; the Glory of the LORD, Ex.16:10; Mount Sinai, Ex.19:9 *passim*, Ex.24:15 *passim*; the second Tablets, Ex.34:5; the Glory in the tabernacle, Ex.33:9 *passim*, Ex.40:34ff, Lev.16:2,13, Num.9:15 etc. "Overcloud" [עוב] is an *hapax legomenon* at Lam.2:1.

Israel – prominent symbols in this poem which all reinforce each other: see on this the extensive historical survey of N.T.Wright (1992, ch.10 "*The Hope of Israel*")[7]. Wright says:

> ... the "salvation" spoken of in the Jewish sources of this period has to do with rescue from national enemies, restoration of the national symbols, and a state of *shalom* in which every man will sit under his vine or fig-tree [cf. Jn.1:48; Mic.4:4 etc.]. "Salvation" encapsulates the entire future hope. If there are Christian redefinitions of the word later on, that is another question. ... "salvation" [is not] an easy and univocal term   Wright, 1992, p.300

Of course, first century Christians were convinced that these things were a present reality: this is why the same poem works for both Jews and Christians.

In line #5 the **radiance** is an idea that permeates the whole poem (shining linen, the cloud) but the Hebrew Scriptures and the NT are not closely linked in this case by the LXX: the equivalent of [צח] (*ṣaḥ*) is καυματος (see Is.18:4), but this has a somewhat different connotation in the NT (see e.g. Rev.16:9).

We now need only some final comments about line#0, of which all the other lines are a mirror. We have repeated the line at the end of the poem: this is because Figure A4 clearly shows a circular progression, ending where it starts. But we have interpreted a different pronoun referent at the start and at the end: this may be a specifically Christian gloss (the raw ancient Hebrew remains ambiguous). Who is "clothed"? At the start it is clearly the Son of Man (as in Dan.7:13), but at the end it is he who may enter the Cloud. For the Jews this would include the High Priest, but for the Christians it would include every Christian (we have already pointed out Rev.7:9).

We have underlined the importance of *clothing*: in the Temple liturgy many things were *continually* required, not only the sacrifices (see Rev.5:6) but also the continual incense (which is the "*prayers of the saints*", Rev.8:3f), and also "*the lamps*" which are "*to burn continually*" (Lev.24:2; cp. Ex.27:20; see Rev.4:5). However, in line#0 the "*garments*" have a different connotation from the "*fine linen*" of line#1. The word is used most frequently in Ezekiel, of his visionary *measurements* of the Temple: the idea in line#0 is that our clothing measures our *extent* or delimits our *boundary*. (*Garment* and *measurement* are the same word in Hebrew.)

The **likeness** is a seminally important idea that is the basis of both Jewish and Christian ontology. Who are we? Made in the *image* and *likeness* of God (Gen.1:26)! The *image* is the physical representation: for the ancient peoples *idols* were *images* in this sense – the ideas are synonymous. But the *likeness* is that underlying reality which is represented: the closest idea in European philosophy is the *Platonic form*. Of course, Plato was later than any of the Hebrew canonical text, and it may well be that the "Platonic form" is an idea dependent on this Hebrew idea of *likeness*.

"*Likeness*" was also deeply important for 1st century Jews, being central in Ezekiel's visions (occurring 10 times in Ez.1; and 4 times in Ez.10) and in the powerful and influential Isaiah passage (Is.40:18). It was also crucial for Christians: the early Christian hymn recorded in Paul's letter to the Philippians declared that "*Christ Jesus ... was made in <u>human likeness</u>* [ομοιωματι ανθρωπων]" (Phil.2:7). Then "*continually in the garments of the likeness*" makes explicit the High Priest compassing the likeness of God in *time* and *space* (see Jer.31:22).

In any case, for the whole poem the subject ("he") is masculine, indicating Wisdom's son. Both faithful Jews and Christians would identify with this. It is Wisdom who is displayed in

many theophanies of the Hebrew Scriptures, and the *New Testament* is clear that Jesus is the Wisdom of God (explicit at 1Cor.1:30; Col.2:2).

How Stable is this Interpretation?

The reader is entitled to wonder how compelling the interpretation of this Menorah Page actually is. Could not a determined interpreter read almost anything into it? However, apart from the essential ambiguity of the transliteration from the *ketav Ivri* script to the *ketav Ashurit*, and also the essential ambiguity of choosing a vocalisation for the unpointed text,   once the triangular word of interest is chosen the 10-line "poem" in *ketav Ivri* follows unambiguously. The steps are as follows:

1. We found the triangular (3-letter) word [דמת] (*dᵉmûth*: *likeness*) multiple times in the Page. Of course, this in itself has little or no significance.
2. A set of 3 ("abc") has 3! (=6) permutations: abc, acb, bca, bac, cab, cba. We choose half of these: abc, bca, cba. Applying these to [דמת] we obtain the line [תמד מדת דמת] as given (remember,   Hebrew reads right-to-left). Clearly, this can be considered an arbitrary move.
3. For each of the nine occurrences of the triangular word [דמת] in the Page we take the mirror image triangle, and apply the permutations in #2 in the same order (see Figure A4). This move is *not* arbitrary. Given line#0, lines ##1-9 follow unambiguously.
4. The order of the lines ##1-9 is given by the patterns made on the Page. Figure A4 has a logical order independent of any meaning that might be assigned to the result.

The question now is, does the resulting 10-line text have any significance? We have found a reading that not only makes sense, but makes rather powerful sense in the context of the deep interest in Temple theology that we know both Jews and Christians had in the first century (20 centuries ago).

We can also comment that there is a precedent for considering as an enigma a line of three words with three letters each. The writing that appeared on the wall before Belshazzer was:

<div dir="rtl">מנא תקל פרס</div>

("MENE TEKEL PERES") which was interpreted by Daniel (Dan.5:25ff) as:

<div dir="rtl">מנא מנא תקל ופרסין</div>

("MENE MENE TEKEL PERES UPHARSIN"). Ancient witnesses (*B.Sanhedrin* 22a) proposed that the reason the Babylonians could not read this was precisely because it was written in the *ketav Ashurit* script which was unknown to all but the Jewish priests.

Mirror Image: *e pluribus unum*

The crucial fact that has not been emphasised so far (except in step #3 above) is the importance of the mirror image. The idea that runs through the modern physics in the paper is of "holomorphism": the integrity (unity) that results from binding two together into one. This is only a modern physics gloss on what is an ancient idea, but it is this same idea that tacitly pervades the reading given here from the Page.

We (and all mammals) are made with mirror symmetry: two eyes, two ears, two arms, two legs etc. The canonical Biblical text acknowledges this in many places, as does all Wisdom literature: a representative quote might be the Psalm of David (from 30 centuries ago):

> One thing God has spoken; two things have I heard
>
> > that strength is but God's; and yours, Master, is kindness   Ps.62:11f (Alter, 2007[8])

God (being One) speaks univocally, but we (having two ears) hear multiple aspects of the same thing. The same thing is heard in the *New Testament*, which metaleptically refers to the seminal Hebrew Scripture (Gen.2:24):

> [Jesus said] For this cause shall a man leave father and mother, and shall cleave to his wife: and they twain shall be one flesh   Matt.19:5f; see also Mk.10:8; 1Cor.6:16; Eph.5:31

Mankind, made in the image of God, is dual: man and woman. And the idea of *two-becoming-one* in the sense of *reconciliation* is sharpest in the Christian (Greek) Scriptures: the word "*atonement*" was introduced by William Tyndale in 1526 specifically as an Englished synonym of the Latinist word "reconciliation": atonement is, properly, "*at-one-ment*". Tyndale even uses "*atone*", meaning "at one":

> Therfore yff eny man be in Chriſt / he is a newe creature. ... Neverthelesse all thyngʳ are of god / whych hath reconciled vs vnto hym ſylfe by Jeſus Chriſt / and hath geven vnto vs the office to preache the atonement. For god was in Chriſt / and made agrement bitwene the worlde and hym ſylfe / and imputed not their ſynnes vnto them: and hath committed to vs the preachynge of the atonment. ... So praye we you in Chriſtes ſtede / that ye be atone with God.
>
> > 2Cor.5:17-20 (Tyndale 1526[9])

In the Mosaic Law, Yom Kippur ([יום הכפרים]) is known in English as the "Day of Atonement" (Lev.23:27f), following Tyndale's 1530 translation. Tyndale understood that God's purpose for the sacrifices was specifically *reconciliation* (although the Hebrew word [כפר] refers to the idea of "coverings": see Gen.6:14, Noah had to *pitch* the inside and the outside of the Ark).

The Menorah Page as a Mnemonic

The artefact shown in Figure A2 is one of dozens of similar types of pages we have seen. It is only one of several we have analysed in depth. The analysis here, using a single 3-letter word that can be read nine times in this Page, shows how a powerful mnemonic can be constructed using the property of reflection (the mirror image). This is a general method: we have already found over a hundred other words with similar mirror-mnemonic properties on just this Page.

It has become clear that this Page is a very sophisticated artefact that depends on (and has stimulated) a much wider lexical knowledge of ancient Hebrew than remains extant in the Masoretic Text (see on this David Clines[10,11]). It may well prove to be a powerful research tool in its own right.

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