9. "ein Teil der Pferdeausrüstung ; vom Kontext her ist *ṭq* offenbar ein Bestandteil des Kumt, also mit hebr. *śq* und akk. *šaqqu* "grobes, härenes Geweder" zusammenzubringen", Dietrich - Loretz, *Die Elfenbeininschriften*, 15. For other proposals see Vita, *El ejercito de Ugarit*, 82 n. 8.

10. In the formula *hlm ytq nhš*, "then (let him) bind the snake" (lines 6, 11, 17, 22, 28, 33, 38, 43, 48, and 54) ; see N. Wyatt, *RTU*, 380 and n. 12. It may also be the root of *yttqt*, the name of a birth-goddess (*KTU* 1.24 : 48 : "she who ties [the umbilical cord]?").

11. C. Virolleaud, *Ugaritica V*, p. 569 : "On pourrait songer rapprocher *ytq* de arabe *wtq* ligoter", although he was uncertain.

12. One could also tentatively compare Eg. *jškn*, "Binde, Gurtel", a loanword in Egyptian, for which see R. Hannig, *Großes Handwörterbuch Ägyptisch-Deutsch : die Sprache der Pharaonen (2800-950 v.Chr.)* (Mainz 1995) 106b.

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40) An alternative interpretation of the seven-pointed star on CBS 1766 (Horowitz, JANES 30) – CBS 1766, recently published by W. Horowitz in *JANES* 30 (2006), is an unusual cuneiform tablet depicting a drawing and a numerical table. The drawing shows a seven-pointed star placed within two concentric circles. The seven points of the star are numbered (I-...-VII), labelled with short cuneiform inscriptions, and connected by seven straight lines (see the schematic representation below). Under the star, a large table is drawn, covering the entire width of the tablet and counting at least 10 columns and 8 rows divided by rulings. In the top row, a line of cuneiform text is written, starting with the sign IM slightly separated from the rest by a blank space. Apart from the first row, the table consists only of numbers, ranging between 1 and 7 : there are four columns of seven numbers each between the first and second vertical ruling and four single numbers between the third, fourth and fifth vertical rulings. The remaining cells of the table have been left blank.

Numbers in the table of CBS 1766 (as read by W. Horowitz)

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
2	6	1	7	5	4	7	2
6	3	5	4				
3	7	2	1				
7	4	6	5				
4	1	3	2				
1	5	7	6				
6	2	5	3				

Horowitz gives a mathematical explanation to the numbers in the table. If read in horizontal pairs, the sums of the numbers in columns A,B and C,D each yield the same results in modulo[1] 7 in ascending order (thus, in line one sums 2+6 and 1+7 both yield modulo 7 : 1, in the following line sums 6+3 and 5+4 both yield modulo 7 : 2, in the third line sums 3+7 and 1+2 both yield modulo 7 : 3, etc.). In columns E,F,G,H the same principle is at work (5+4 and 7+2 both yield modulo 7 : 2), but only the first line is written out. The star is left unexplained by Horowitz. He suspects a connection between the numbers in the table and the drawing, but does not arrive at a convincing interpretation. It is left open whether the star had its meaning in mathematics, astronomy, astrology, cosmography or even board gaming.

Modulo operations are applied mainly in modern computing, for example to calculate the name of the day 23 days after Sunday.[2] It is doubtful whether Babylonians would have known this or used it. There is another possible interpretation to CBS 1766 that we would like to propose here - an interpretation not based in mathematics but in music. This interpretation requires the emendation of Horowitz' copy in some parts, and as we did not have the occasion to collate the tablet in Philadelphia, our remarks are preliminary and merely intended to encourage further research on this fascinating tablet.
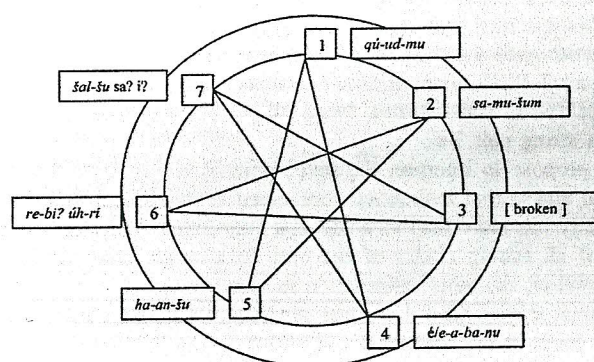
The numbers in the columns should be read vertically, instead of horizontally in pairs, and they should be connected to the corresponding points of the star. The first sequence of numbers (column A) is 2-6-3-7-4-1-6 according to the reading of Horowitz, but we propose to emendate the last number to 5. This is based on the observation that the sequence 2-6-3-7-4-1-5 is exactly the one obtained when the lines of the star are followed starting at its second point.

In column B, we find the same sequence, only now it starts at 6 instead of 2 (6-3-7-4-1-5-2). Again, this is the sequence obtained if the lines of the star are followed starting at point 6. Column C contains the same sequence, now starting from the first point of the star (1-5-2-6-3-7-4*, the last number is emendated from Horowitz₄ transcription ("5")). In column D we find the same sequence again, now starting from point 7 (7-4-1-5-2-6-3). The next four columns mention only the first number. Perhaps, the scribe thought that the principle would have been clear by now. If the number is read correctly, column E would have represented sequence 5-2-6-3-7-4-1 and column F 4-1-5-2-6-3-7. "7" in column G does not fit, we would expect "3" because this is the only sequence not yet dealt with (unless there is also a reading mistake in columns E or F; in fact, to judge from the photocopy, "5" fits better to the traces in column G; collation should be awaited).

The clue to understand the meaning of the text lies in the labels of the points of the star. In order to make sense of them, it is necessary to emendate Horowitz' transcription in some places. These emendations correspond with the general shapes of the signs copied by Horowitz, but nonetheless, it should be stressed that collation will be necessary to obtain certainty of the readings proposed. According to our reading, the labels refer to the seven first strings of the harp:

The labels of the points of the star

	reading in *JANES* 30	emendation	meaning
1	*da-mu*	*qú-ud-mu*	*qudmû* (first string of the harp)
2	*u₄-mu-šum*	*sa-mu-šum*	*samuššu* (second string)
3	[broken]		
4	*kal/lab-ba-nu*	*é/e-a-ba-nu*	ᵈ*Ea-bānû* (fourth string)
5	*ha-an-šu*	(same reading)	*hanšû* (fifth string)
6	RI-x HAR-ri	*re-biʾ úh-ri*	*rebi uhrî* (sixth string)
7	nin-x-x	*šal-šu* sa? i?	*šalši uhrî* (seventh string)

For the names of the strings of the harp, see Kilmer 1965 : 264, *id.* 1997 : 473. If our interpretation is correct, the label of the third point should have been *šalšu qatnu*. The label of the seventh point starts with *šalšu* as expected (*šalši uhrî* being the name of the seventh string of the harp), but the following sign can not be reconciled with the word *uhrû*. The sign looks like sa, "string" in Sumerian, followed perhaps by i.

The seven-pointed star of CBS 1766 depicts the seven strings of the harp. The lines between its points thus represent string distances or dichords. The dichords are repeated in the columns of the table under the star using the numbers of the strings instead of their names. This type of musical notation is well known from the corpus of theoretical music texts from Mesopotamia (i.e. Kilmer 1997 ; Dumbrill 2005 : 24). Together, the seven lines of the star represent all the possible fourths and fifths of the heptatonic scale. The function of the star becomes clear in the light of other theoretical music texts in the University Museum collection such as CBS 10996, the famous NB tablet with musical instructions from Nippur (Kilmer 1960 ; Dumbrill 2005 : 37ff.), to which CBS 1766 doubtlessly belongs. CBS 10996 contains numerical instructions for tuning the harp in seven different scales (Wulstan 1968 ; *id.* 1971). These scales derive their names from the first interval, or string pair, used to generate the tuning. For instance, the "normal" tuning (*išartu*) starts with the interval of the same name, which is the one between the 2nd and the 6th string. After this pair of strings, tuning proceeds with strings 6-3-7-4-1-5 (Kilmer 1997 : 474). This is of course the sequence we have found in column A of CBS 1766. It is the same sequence represented by the star, if one follows the lines starting at its second point. In column B we find the procedure for the *kitmu* "closed" tuning, which starts with the interval 6-3 and proceeds with 7-4-1-5-2 according to CBS 10996. Again, the star of CBS 1766 supplies a visual aid to the tuning procedure, if we simply follow the lines starting at the sixth point of the star. Column C of CBS 1766 contains the procedure to obtain the *nīš gabarî* tuning (starting with string pair 1-5) and column D the *pītu* "open" tuning (starting with string pair 7-4). Columns E, F and G must represent the *qablītu* "middle" tuning (5-2), the *nīd qabli* "fall of the middle" (4-1) and *embūbu* "reed pipe" (3-7) tunings. In column H, the *išartu* tuning supposedly starts again with string pair 2-6.

In conclusion, we propose to interpret the seven-pointed star of CBS 1766 as a visual tuning chart, supplementing the numerical and verbal instructions contained in theoretical music texts such as CBS 10996, with which CBS 1766 certainly has more than an accidental connection. The star was an ingenious discovery as it enabled a visualization of all tuning cycles of the harp in a single chart. It is moreover the first visual notation of musical (not, however, melodic) information in history.

In fact, the heptagonal star on CBS 1766 was predicted by R. Dumbrill shortly before the publication of Horowitz' article : on the basis of the numerical and verbal tuning instructions in the Babylonian theoretical texts, in combination with medieval Arabic music theory, Dumbrill reconstructed a heptagonal pattern that

looks exactly like the seven-pointed star on CBS 1766 (2005 : 74 ; we are very grateful to R. Dumbrill for this reference).

It should be stressed that the present interpretation of CBS 1766 rests on a number of emendations to the edition by W. Horowitz that could not yet be confirmed by collations. In particular, the line of cuneiform text heading the numerical columns of CBS 1766 remains unintelligible to us. It does not seem to contain the names of the seven tunings, as might have been expected from the present discussion. Further study of this tablet is strongly encouraged.

1. Modulo means with respect to a specified modulus, for example : 18 is congruent to 42 modulo 12 because both 18 and 42 leave 6 as a remainder when divided by 12.

2. The results in this example can be expressed in modulo terms as : 23 modulo 7 = 2, leaving two days to add on Sunday, resulting in Tuesday.

Bibliographic references : R.J. Dumbrill, 2005, *The Archaeomusicology of the Ancient Near East*. London ; W. Horowitz, 2006, "A Late Babylonian Tablet with Concentric Circles from the University Museum (CBS 1766)", *JANES* 30, 37-53 ; A.D. Kilmer, 1965, "The strings of musical instruments : their names, numbers and significance", in *Fs. Landsberger* (= *AS* 16), 261-268 ; A.D. Kilmer, 1997 "Musik", in *RlA* Bd. 8, 463-482 ; D. Wulstan, 1968, "The tuning of the Babylonian harp", *Iraq* 30, 215-228 ; D. Wulstan, 1971, "The earliest musical notation", *Music and Letters* 52, 365-382.

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41) Cent fois sur le métier… – Nous avons déjà abordé à plusieurs reprises l'étude de deux lettres inédites trouvées à Ugarit, de provenance hittite, RS 94.2523 et RS 94.2530 (cf. *NABU* 2005/1, 10 et 2005/4, 90 ; *SMEA* 47, 2005, 227-240). I. Singer a repris et commenté ces articles, proposant une autre hypothèse intéressante pour le paragraphe concernant une livraison à faire à l'Ahhiyawéen (*Altoriental. Forsch.* 33, 2006/2, 242-262).

Cependant, il nous semble encore utile de revenir sur une expression qui nous avait fait difficulté : SILIM-*mi-ka* ù NÍŠ? / RIM?-ka, la lecture du second élément de cet hendiadys étant douteuse. Il faut sans doute y voir l'idéogramme NAM.RIM (= *māmītu*) réduit à sa seule partie signifiante (RIM). Ce serait une évolution du "syllabaire" cunéiforme sous le calame d'un scribe hittite. Cette hypothèse permettrait d'établir une expression à deux termes, désignant un accord diplomatique, du type de celles que nous avions recherchées : à côté de l'usuel *riksu u māmītu* et de *riksu u šalāmu* (cf. RS 17.132 = *PRU* IV, 36, ll. 19-20) existerait ainsi un *šulmu u māmītu*.

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42) A propos d'un rituel mentionné dans des lettres envoyées à Ugarit – Deux lettres inédites de la « Maison d'*Urtēnu* » mentionnent le nom d'un rituel, inconnu jusqu'à présent dans l'akkadien d'Ugarit (et absent des dictionnaires d'akkadien) : SISKUR *ma-al-ha-aš-⌐ši-e⌐* (RS 94.2389, lettre dont l'en-tête a disparu) ; SISKUR.MEŠ *ma-al-ha-ši*, dans une missive adressée au *sākinu* par le prince Ta'azi (RS 94.2443). On peut rapprocher ce terme de celui qui apparaît dans un message en ougaritique, envoyé au roi par Šipṭi-Ba'al (RS 18.040[1]).

Dans les trois occurrences des textes d'Ugarit, le contexte est peu clair et il est difficile de déterminer la nature de ce rituel (ou de cette cérémonie)[2]. Il s'agit très vraisemblablement du rituel (ou de la cérémonie) dont le nom, d'origine louvite[3] (*ma-al-ha-sa*/ SISKUR(.SISKUR)-*as-sa*) apparaît dans des textes hittites sous la forme composée *malhas(s)allahi(t-)*[4], mais, là encore, il est rarement attesté et mal défini.

1. *PRU* V, no 63 = *CAT*, 2.40 donne la transcription (l. 13) w . ht . (14) mlk . syr (15) ns . w . ṯmny (16) ydbḥ (17) mlġt . ṣxx ; cependant, dans la copie publiée dans *PRU* V, p.90, seuls les 3 premiers signes de la ligne 17 sont complets. D. Pardee dans *Context of Scripture*, vol. 3, 2002, p. 104, transcrit MLĠ⌐GM⌐

2. *DUL* (HdO 67) 548 : "mlġt an Eg. celebration / feast or ceremony ("anointing (?)) : ṯmn ydbḥ mlġt "there a sacrifice will be offered (and) the *m.* (will be performed)".

3. cf. J. Puhvel, *Hittite Etymological Dictionary* t. 6 p. 26, 1984.

4. *Chicago Hittite Dictionary* 2, 1983, p. 129.

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