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AN OLD BABYLONIAN TREATISE ON THE TUNING OF THE HARP

By O. R. GURNEY

IN recent years the discovery of two Late Babylonian tablets listing the names of the nine strings of the harp, and of musical intervals, and the interpretation of these tablets in a series of articles by Mme. Duchesne-Guillemin and Mrs. Draffkorn Kilmer, have brought the subject of Babylonian music into the forefront of discussion. My own responsibility for the publication of one of the tablets and my interest in the subject led me to consult a musicologist, Mr. David Wulstan of Magdalen College, Oxford, and as a result of our discussions Mr. Wulstan decided to propose a new interpretation of the two tablets. His article was already written and had been submitted for publication, when Dr. Edmond Sollberger discovered among the tablets from Ur still awaiting publication in the British Museum an Old Babylonian fragment of a musical treatise of a rather different kind. I am greatly indebted to Dr. Sollberger for generously ceding to me the right to publish this important tablet. It provides welcome confirmation of most of the conclusions already reached by Mr. Wulstan, and his article, as published in this volume, has needed very little revision.

The fragment, numbered U.7/80, is a flake measuring 100 × 89 mm. and containing parts of two columns of text. The surface is very slightly curved, but not enough to make it certain that it is from the reverse of the tablet. The terms used for the strings and intervals are (as far as they are preserved) identical with those already known from the two tablets mentioned above.

LEFT COLUMN

1. [. x ú]b?-ri?-im
2. [.]-tum
3. [. re-b]u-tum
4. [. ni-i]d? qá-ab-li-tim
5. [.] i-šar-tim
6. [ub] - ru - um
7. [.] i-šar-tum
8. [.]-tim
9. [. muš-d]i-im

RIGHT COLUMN

1. [šum-ma ^{gis}zλ.Mí pi-i-tum-ma]
2. [e-e]m-b[u-bu-um la za-ku]
3. ša-al-š[a-am qá-at-na-am te-ni-ma]
4. e-em-bu-bu-u[m iz/š-z/ša- . .]
5. šum-ma ^{gis}z[λ.Mí e-em-bu-bu-um-ma]
6. ki-it-mu-um [la za-ku]
7. re-bi úb-ri-im [te-ni-ma]
8. ki-it-mu-um i[z/š-z/ša- . .]
9. šum-ma ^{gis}zλ.Mí k[i-it-mu-um-ma]

LEFT COLUMN	RIGHT COLUMN
10. [. <i>ki-it-m</i>] <i>u-um</i>	9. <i>i-šar-tum la za-[ka-at]</i>
11. [. Y <i>u</i>] <i>b-ri-im</i>	10. <i>ša-mu-ša-am ù úb-ri-a-a[m te-ni-ma]</i>
12. [.]	11. <i>i-šar-tum iṣ š-ṣ ša-[. .]</i>
	12. NU SU
	13. <i>šum-ma</i> ⁶¹⁸ ZΛ.MÍ <i>i-šar-t[um-ma]</i>
	14. <i>qá-ab-li-ta-am ta-al-ṣu-[ur]</i>
	15. <i>ša-mu-ša-am ù úb-ri-a-am te-[ni-ma]</i>
	16. [⁶¹⁸ ZΛ.MÍ] <i>ki-it-mu-[um-ma]</i>
	17. [<i>šum</i>]- <i>ma</i> ⁶¹⁸ ZΛ.MÍ <i>ki-it-m[u-um-ma]</i>
	18. [<i>i-ša</i>] <i>r-ta-am la za-ku-ta-am t[a-al-ṣu-ut]</i>
	19. [<i>re-bi</i>] <i>úb-ri-im te-n[i]-m[a]</i>
	20. [⁶¹⁸ ZΛ.MÍ] <i>e-em-bu-bu-um-ma]</i>

Right Column

Lines 1–11 represent the end of a chapter, in which each section consists of four lines and takes the following form:

“If the harp is (tuned as) X, and the (interval) Y is not clear; you alter the (string) N, and then Y will”

I hesitate to attempt a restoration of the verb in the fourth line. One naturally thinks of a form of *zakú*, corresponding to the second line and meaning “will be clear”, but the present tense of this verb would not be correctly formed with the doubled first radical. Perhaps therefore the word is *iṣ-ṣa-[aṣ]* “will stand”. The line would then refer not to the interval Y, which was “not clear”, but to the tuning Y, and would mean “Y will then be the way in which the harp is tuned”. In fact Y is in each case the tuning to be considered in the following section.

The restorations of the ends of the other lines are reasonably certain; *te-ni* comes from line 19, *za-ku/za-ka-at* from lines 18 and 9. I have added a reconstruction of the whole of the first line of the first preserved section. The restoration of the final word in this line and line 4 results from the interpretation, as will be shown below.

I cannot suggest any interpretation of the signs NU SU which follow in line 12.

Lines 13 ff. begin the next chapter. Here the sections take a different form, as follows:

“If the harp is (tuned as) X, and you have played(?) an (unclear) (interval) Y, you alter the (string) N, and then the harp will be (in the tuning) Z.”

These two sections are better preserved and there is no problem of restoration. The reconstruction of the last line of the second section results from the interpretation, as will be seen. The words “not clear” which qualify

the interval *išartum* in the second section, are omitted in the first section; it is difficult to see how this can be anything but a mistake on the part of the scribe. The traces in line 18 would allow the reading [*qá-ab-ſ*]i-ta-am, instead of [*i-ša*]r-ta-am, but the latter is required here by the sense, as is the word *re-bi* at the beginning of line 19.

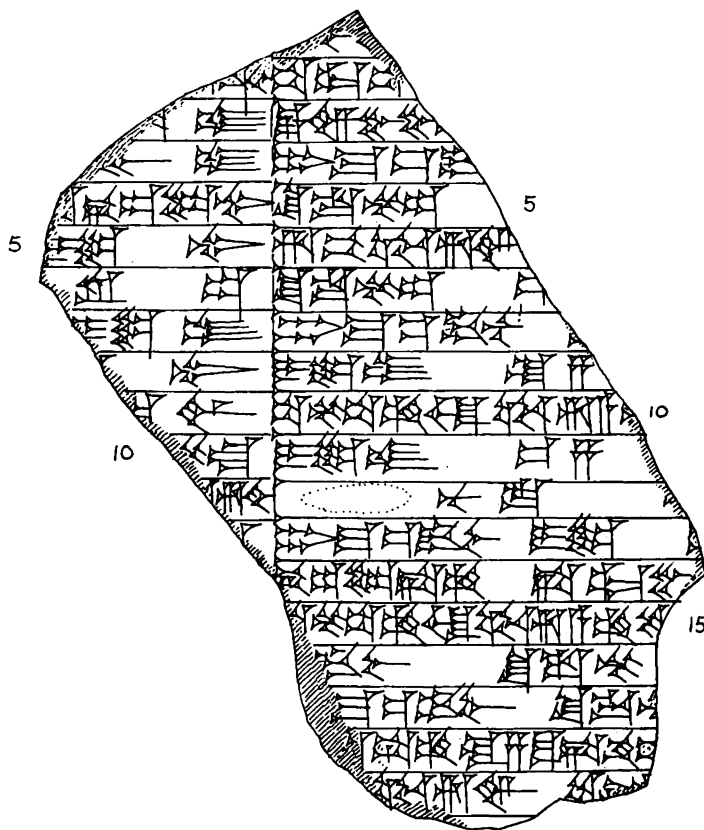
In each case Z is the tuning to be considered in the following section, since we may assume that the pattern shown by the two preserved sections was followed throughout this chapter. This fact supports the interpretation suggested above for the last line of the sections in the preceding chapter.

Left Column

Too little is preserved for any consecutive sense to be obtained from this column. Lines 1, 6 and 11 seem to contain names of strings, separated respectively by four lines containing names of intervals or tunings, sometimes in the nominative and sometimes in the genitive. I am unable to suggest any explanation for this pattern.

Interpretation

The two middle lines of each section contain a reference to an interval which is "not clear" followed by an instruction to "alter" a string. The string in question is in every case one of the strings comprising the interval as given in the tablet CBS.10996. (For this reason it is necessary to read [*i-ša*]r-ta-am rather than [*qá-ab-ſ*]i-ta-am in line 18, since the *qablītum* interval (II-V) does not involve any of the strings whose names contain the genitive *ušrim*.) As Mr. Wulstan has pointed out to me, the interval thus stigmatised is "not clear" can only be the tritone, and the operation evidently consists



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in tuning one of the strings comprising this interval either up or down a semitone, in order to obtain an interval that sounds "in tune". This operation converts one "tuning" into another, and the next section starts with the latter. These "tunings" can only be the *modes*.

The difference between the two chapters lies in the fact that each deals with the retuning of one of the two strings of the tritone, as may be seen by comparing the last section of the first chapter with the second of the second. A little experimentation will show that there is only one possible solution and that in the first chapter the string is tuned down, while in the second it is tuned up. Thus the two chapters may be reconstructed in their entirety. The following tables present the reconstruction of the text in summary form, together with the position of the semitones on the nine-stringed harp in each tuning and the mode or octave-species to which each corresponds in terms of the modern scale of C major.

FIRST CHAPTER									Starting Note
Strings: I	II	III	IV	V	VI	VII	VIII	IX	
<i>išartum</i> tuning <i>qablītum</i> (V-II) = tritone Tune down V	$\frac{1}{2}$	I	I	I	$\frac{1}{2}$	I	I	$\frac{1}{2}$	E
<i>qablītum</i> tuning <i>niš</i> GAB.RI (I-V) = tritone Tune down I and VIII	$\frac{1}{2}$	I	I	$\frac{1}{2}$	I	I	I	$\frac{1}{2}$	B
<i>niš</i> GAB.RI tuning NIM MURUB (IV-I) = tritone Tune down IV	I	I	I	$\frac{1}{2}$	I	I	$\frac{1}{2}$	I	F
<i>nid</i> MURUB tuning <i>pītum</i> (VII-IV) = tritone Tune down VII	I	I	$\frac{1}{2}$	I	I	I	$\frac{1}{2}$	I	C
<i>pītum</i> tuning <i>embūbum</i> (III-VII) = tritone Tune down III	I	I	$\frac{1}{2}$	I	I	$\frac{1}{2}$	I	I	G
<i>embūbum</i> tuning <i>kitmum</i> (VI-III) = tritone Tune down VI	I	$\frac{1}{2}$	I	I	I	$\frac{1}{2}$	I	I	D
<i>kitmum</i> tuning <i>išartum</i> (II-VI) = tritone Tune down II and IX	I	$\frac{1}{2}$	I	I	$\frac{1}{2}$	I	I	I	A
<i>išartum</i> tuning	$\frac{1}{2}$	I	I	I	$\frac{1}{2}$	I	I	$\frac{1}{2}$	E

SECOND CHAPTER

	Strings: I	II	III	IV	V	VI	VII	VIII	IX	Starting Note
<i>išartum</i> tuning <i>qablītum</i> (V-II) = tritone Tune up II and IX	$\frac{1}{2}$	I	I	I	$\frac{1}{2}$	I	I	$\frac{1}{2}$	E	
<i>kitmum</i> tuning <i>išartum</i> (II-VI) = tritone Tune up VI	I	$\frac{1}{2}$	I	I	$\frac{1}{2}$	I	I	I	A	
<i>embūbum</i> tuning <i>kitmum</i> (VI-III) = tritone Tune up III	I	$\frac{1}{2}$	I	I	I	$\frac{1}{2}$	I	I	D	
<i>pītum</i> tuning <i>embūbum</i> (III-VII) = tritone Tune up VII	I	I	$\frac{1}{2}$	I	I	$\frac{1}{2}$	I	I	G	
<i>nid</i> MURUB tuning <i>pītum</i> (VII-IV) = tritone Tune up IV	I	I	$\frac{1}{2}$	I	I	I	$\frac{1}{2}$	I	C	
<i>niš</i> GAB.RI tuning NIM MURUB (IV-I) = tritone Tune up I and VIII	I	I	I	$\frac{1}{2}$	I	I	$\frac{1}{2}$	I	F	
<i>qablītum</i> tuning <i>niš</i> GAB.RI (I-V) = tritone Tune up V	$\frac{1}{2}$	I	I	$\frac{1}{2}$	I	I	I	$\frac{1}{2}$	B	
<i>išartum</i> tuning	$\frac{1}{2}$	I	I	I	$\frac{1}{2}$	I	I	$\frac{1}{2}$	E	

It will be observed that whenever the first or second string is retuned, the eighth or ninth is retuned with it. Thus Mme. Duchesne-Guillemain's conclusion that the scale was heptatonic, already probable in itself, is conclusively proved. The tablet also provides the proof that the names of the intervals were used for the octave-species. An explanation for this will be found in Mr. Wulstan's article on p. 222.