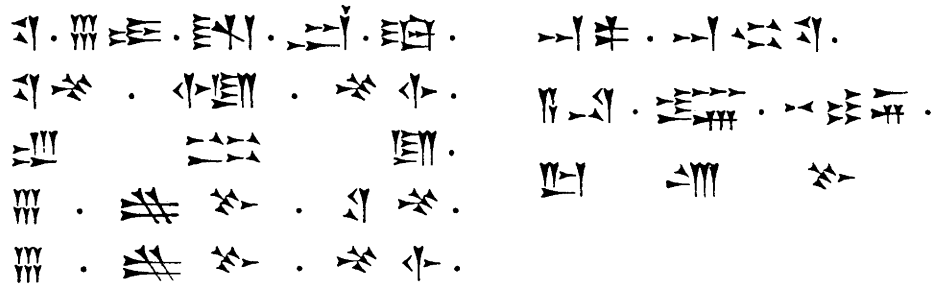


III.—*On a Tablet in the British Museum, recording, in Cuneatic Characters, an Astronomical Observation ; with incidental Remarks on the Assyrian Numerals, Divisions of Time, and Measures of Length. By the Rev. EDWARD HINCKS, D. D.*

Read November 12, 1855.

THE inscription to which I now request the attention of the Academy is a very short one; but it records a fact which possesses some interest, and which suggests some curious inferences. It is in perfect preservation; and it does not contain a single word of unknown or doubtful signification, nor a single phonograph of which the proper reading is uncertain. The only doubts connected with it respect the mode of reading four words expressed ideographically, two of which occur twice.

I will begin with giving a representation of the characters as exactly as this can be done by means of types. I merely insert points to separate the twenty-one words into which the thirty-eight characters which compose the inscription are to be resolved. It contains eight lines, three of which are on the opposite side of the Tablet from the others, and form a complete sentence. The Tablet is marked as K. 15.



As is usual in Assyrian inscriptions, the characters are partly phonetic and partly ideographic. I will first give a reading of the whole inscription, accom-

panied by an interlineary translation; remarking, that of the twenty-one words which compose it, ten are written phonetically, and in these the phonetic value of each character is given separately whenever the word consists of two or more characters. The values, or supposed values, of the other eleven words are given without division; and for distinction's sake I have placed within parentheses those of which the value is known with certainty, and within brackets those of which it is uncertain or conjectural.

(*Tumi*) [*tsidi*] *sa* (*yarakh*) [*Nitsani*] (2) *tumu* *u* [*liltu*] (3) *mus*.
On the sixth day of the month Nisan(?) the day and the night (were)

qu.lu (4) [*shish*] *kaj.bu tu.mu* (5) [*shish*] *kaj.bu* [*liltu*] (6) (*Nabiü*)
equal. Six intervals (were) the day; six intervals (were) the night. Nebo

(*Marduk*) (7) *ana* (*Sarri*) *bi.i.ili* (8) *liq.ru.bu*.
(and) Merodach, to the king the lord may they draw near.

In order to afford all possible satisfaction, I will offer a second transcription into Hebrew characters, distinguishing the ideographic words by parentheses and brackets as before.

(תומי) [סדי] ש-(רת) [ניסני] תומו ו-[לילתו] משקלו: [ישש] כזבו תומו [ישש] כזבו
[לילתו]: (נביו) (מרדוך) אנ-ש(רה) בעלי לקרבו:

I will now treat of the twenty-one words in their order.

1. The first character, which is equivalent to one formed of four wedges, in the shape of a rhombus, in the more finished styles of writing used in the great inscription at the India House, and on Lord Aberdeen's stone, represented the sun's disc. It denoted ideographically "the day, the sun." In the latter sense it was generally preceded by the determinative $\rightarrow\text{𐎗}$ "a star," or "a god." It thus corresponded to the themes *tum*, which denoted both "day" and "sun;" and *samas*, which denoted the latter only. As a phonograph it denoted *tu*, the initial character of the former word; to represent the different cases of which it was followed by the characters for *um*, *mu*, *mi*, and perhaps others. It also denoted *sam*, the initial character of the latter word, but only when preceded by the star. Thus, $\rightarrow\text{𐎗} \text{𐎗} \text{𐎗}$ should be read *sam si*, "of the sun;" but 𐎗 without the star could not represent *sam*, though it might

tu. It had, however, other common values, probably derived from other objects, which the rhombus conventionally represented.

In dates, where a day of the month was to be expressed, it is habitually used alone to express the dative *tumi*; but, except in dates, the word is regularly written at full length, as in the thirty-fourth line of BELLINO'S cylinder, where we have 𐎗𐎂𐎕𐎗𐎚 *i. na tu. mi su. wa*, "in that day."

2. The second and third characters compose the word which signifies "sixth." The former is the ideographic representative of "six," like the Roman VI; and the latter is a conventional sign, denoting that the other should be read as an ordinal, and not a cardinal number. The first three characters may be considered as corresponding to "D. VI.^{to}" for "Die sexto."

I have no doubt that this word ought to be read *tsidi*; but as this is an inference, obtained by a rather complicated process, I place this word between brackets, instead of between parentheses, as I do when the word expressing the monogram has actually been found written with phonetic characters. I proceed to explain the analogy by which I have obtained this word; and I will at the same time, and in connexion with this, state what I know of the other numerals below "ten."

The characters 𐎗𐎂 𐎗𐎚 occur on Colonel TAYLOR'S cylinder, for the ordinal "third," in connexion with "year." I have never seen this cylinder but for a moment or two, when I was not allowed to examine it. I make this statement on the authority of Colonel RAWLINSON, in the portion of the analysis of the Behistun Inscription which he published in 1851 (see p. lxxii.) In another part of the same publication (p. 15), he says that the cylinder has 𐎗𐎂𐎕 ; but I believe the former statement is correct. Colonel RAWLINSON at that time considered this to be a compound character; in my paper of November, 1852, I read the first word *shal. shi*; and I produced the numeral for "four," 𐎗𐎚𐎕𐎗𐎚 which I read *ar. ba. a'h* ("Transactions of the Royal Irish Academy," vol. xxii. p. 358).

In March, 1854, I found on a tablet in the British Museum four numerals, viz., 𐎗𐎂𐎕𐎗𐎚 𐎗𐎚𐎕𐎗𐎚 𐎗𐎚𐎕𐎗𐎚 *shal. ish. ti*, 𐎗𐎚𐎕𐎗𐎚 𐎗𐎚𐎕𐎗𐎚 𐎗𐎚𐎕𐎗𐎚 *ri. b'a. á. ti*, 𐎗𐎚𐎕𐎗𐎚 𐎗𐎚𐎕𐎗𐎚 𐎗𐎚𐎕𐎗𐎚 *kha. a'n. ish. ti*, and 𐎗𐎚𐎕𐎗𐎚 𐎗𐎚𐎕𐎗𐎚 𐎗𐎚𐎕𐎗𐎚 *is. ri. ti*; which I published in the "Literary Gazette," in the following month. I then explained these words as numeral adverbs, "thirdly," "fourthly," "fifthly," and "tenthly." On my return

home, I perceived the connexion between *shal . shi* and *shal . ish . ti* as the masculine and feminine forms of the same adjective. I inferred that the four words which I had found on the Tablet were feminine ordinals in the genitive case; I had previously recognised a fifth adjective, $\nabla \neq \neq$, *sha . nu . ti*, which occurs in the 77th line of the Nimrud Obelisk, with the meaning "second;" and that for "seventh," $\neq \neq \neq \neq \neq$, *tsi . bu . ti*, has been since observed by me in the colophon to the inscription on BELLINO's cylinder.

In Colonel RAWLINSON's "Notes on the Early History of Babylonia," published at the close of 1854, he gave, what he believed to be, the cardinal numbers representing "eight," "six," "four," and "two." These were found by him on a tablet connected with these numbers in their ordinary ideographic form. They were, $\neq \neq \neq \neq$, *tsu . ma . nu*; $\neq \neq \neq$, *tsu . du*; $\neq \neq \neq$, *ru . bu*; and $\neq \neq \neq \neq$, *shu . u'n . nu*. I have already mentioned that I had published previously a different numeral for "four," namely, *arbah*. As this occurs in various places in the inscriptions of Sargon and Sennacherib, and is also an element in the name of the city of Arbela, *Ir arba Ili*, i. e., "the city of the four deities," I could not doubt that Colonel RAWLINSON was mistaken as to *rubu* being "four;" and, if in this instance, he must have been so likewise as to the other numerals. I was confirmed in this by my observing that Colonel RAWLINSON had given from another Tablet, as an equivalent to "ten," $\neq \neq \neq \neq \neq$, *'i . si . rat*. This is of a form completely dissimilar to the forms *tsumanu*, &c., but harmonizing with *arba'*. The cardinal numbers had in Hebrew two forms, a masculine and a feminine; and, assuming the same to be the case in Assyriac, we should have *arba'*, *arba'at*, for "four;" *'isir*, *'isirat*, for "ten."

Being satisfied that this was the true view of the matter, I began to consider what the four words, produced by Colonel RAWLINSON, could be. I compared them with $\neq \neq \neq \neq \neq$, *shu . u'sh . shu*, which he gave for "sixty," and which is of exactly the same form. This word I had previously explained as "denoting 'sixty' of anything, analogous to our 'dozen' and 'score;' whence, as applied to years, the $\sigma\acute{\omega}\sigma\sigma\sigma\sigma$ of Abydenus."—"Journal Royal Asiatic Society," vol. xvi., p. 218). I inferred that the four words produced by Colonel RAWLINSON were similar collective nouns, and that they do not signify "eight," &c., but "an octad," "a hexad," "a tetrad, or quaternion," and "a pair."

I remarked that all these words had *u* for the first vowel, and that, except

as to this vowel, they agreed with the masculine ordinals, wherever these were known, and in the case of "fourth" and "second" they could be inferred from their feminines. I constructed in this manner the following Table, in which I have given the masculine and feminine forms of the ordinal numbers, and the corresponding collective nouns in the nominative singular, for eight numbers, viz., from "two" to "eight" inclusive, and for "ten." I give these forms in English and in Hebrew, and I also give the roots in Hebrew characters.

[<i>shannu</i> (for <i>shanwu</i>)	שָׁנָוּ	<i>shanutu</i>	שָׁנֹוּתוּ	<i>shunnu</i> (for <i>shunwu</i>)	שָׁנֹוּ	Root	שָׁנָו
<i>shalshu</i>	שָׁלְשָׁו	<i>shalishtu</i>	שָׁלְשֹׁתוּ	[<i>shulshu</i>	שָׁלְשָׁו]	Root	שָׁלְשָׁ
[<i>rib'u</i>	רִבְעוּ	<i>ribātu</i>	רִבְעָתוּ	<i>rub'u</i>	רִבְעוּ	Root	רִבְע
[<i>khanshu</i>	חָנְשָׁו	<i>khanishtu</i>	חָנְשֹׁתוּ	<i>khunshu</i>	חָנְשָׁו]	Root	חָנְשָׁ
[<i>tsidu</i>	סָדוּ	[<i>tsiditu</i>	סָדָתוּ	<i>tsudu</i>	סָדוּ	Root	סָדָ
[<i>tsib'u</i>	סָבְעוּ	<i>tsibutu</i>	סָבְעָתוּ	[<i>tsub'u</i>	סָבְעוּ]	Root	סָבְע
[<i>tsimanu</i>	סָמָו	[<i>tsimattu</i>	סָמָתוּ	<i>tsumanu</i>	סָמָו	Root	סָמָן
[<i>'isru</i>	עֶשְׂרֵוּ	<i>'isritu</i>	עֶשְׂרֹתוּ	[<i>'usru</i>	עֶשְׂרֵוּ]	Root	עֶשְׂרֵ

The ordinal adjective "first" is expressed by *makhru*, *makhritu*, which words also express "former;" and I believe that the distinction is this,—when the adjective precedes the noun, it should be translated "first," and when it follows it, "former." Examples of both occur on Lord ABERDEEN'S stone. We have (1, 7, 8) *ina pali sarri makhri*, "in a year of a former king;" and (3, 9, 10) *ina makhri paliya*, "in my first year." I would, therefore, translate the following passage with the word "former," although, in fact, it was his *first* campaign to which Sennacherib refers. I quote, from lines 34, 35, of the inscription on the great bulls at Kouyunjik:—*Shū Marduk-bal-iddan, sha ina halak girri-ya makhri ashkunnu shilim-su*, "That Mardukbaliddan, whom, in the course of a former campaign of mine, I had effected his defeat (or had ruined)." This root, which is very common in Assyrian, is not found in Hebrew with any similar meaning; but in Arabic it signifies "to meet the wind," which appears to have some connexion with the primary Assyrian meaning. It signifies *to come before, to meet*, and thus *to receive*; being specially applied to presents, *mandattu* or *madattu* (from נָדַת, "to give"). *Makhar*, as a noun, signifies

“presence,” and is used both alone and with the preposition *ina* or *ana* to express “before, in the presence of;” while *mikhrat* is “over against, facing.” The connexion between *be-fore*, *for-mer*, *fir-st*, *præ*, *pri-or*, *pri-mus*, &c., is well known, and need not be enlarged on.

No one, I suppose, would expect that the analogy between the ordinals and collective nouns should be carried so far as that *mukhru* should signify “a unit.” The word which has this meaning is 𐎠𐎡𐎢, *a. a'n*, pronounced, as I believe, simply *an*; the first character not adding to the phonetic value of the second, but showing that it was to be read phonetically, and not ideographically, as “a god.”* The following two examples will illustrate the use of this word. I may remark, that numerals are regularly followed by nouns in the singular number, and that *an* is in construction, and therefore without a case-ending. On the Khorsabad bulls we have (BORTA, 27, 41, &c.) 𐎠𐎡𐎢 𐎠𐎡𐎢 𐎠𐎡𐎢 𐎠𐎡𐎢 𐎠𐎡𐎢 𐎠𐎡𐎢, “three hundreds fifty units of kings,” the pretended predecessors of Sargon. Perhaps it may be read *ashla mi, khansha an malki*; but there are great doubts as to these cardinal numbers. The smaller numerals before *an* are generally, perhaps always, to be read with the feminine ending; it is doubtful whether the same rule would apply to *mi*; and it is also doubtful whether it would apply to a large numeral like *khansha*. Further doubts may exist as to whether *ashla* was the Assyrian word for “three.” My reasons for thinking that it was will be given presently. I have doubts also as to *khansha*, rather than *khan-shaya*, being the proper reading of the word 𐎠𐎡𐎢 𐎠𐎡𐎢 𐎠𐎡𐎢, which Colonel RAWLINSON has found on a Tablet as signifying “fifty.”

In the colophon to the inscription on BELLINO'S cylinder we have 𐎠𐎡𐎢 𐎠𐎡𐎢 𐎠𐎡𐎢 𐎠𐎡𐎢 𐎠𐎡𐎢, “one suss, three units,” that is, “sixty-three.” The enumeration is of the lines on the cylinder, which are said to have been “written in the seventh month of the year presided over by Nabuliah, governor of Arbela.”

The character after 𐎠𐎡𐎢, “three,” denotes the feminine gender; and I believe these two characters are equivalent to 𐎠𐎡𐎢 𐎠𐎡𐎢, *ash. la. ta*. The latter word occurs in a precisely similar connexion in Kh. 111. 2. It necessarily

* [I am now satisfied that in this combination, and similar ones, the first character had always a phonetic value. This word should not be read *an*, but *han*, *wan*, or *yan*. These were not distinguished in Assyrian writing. The second reading is to be preferred from its resemblance to *Fev*, *un-um*, &c.—July 21, 1856.]

denotes a numeral, and it has more in common with the ordinal *shalshu* than with any other. I will, however, treat of the cardinal numbers in a subsequent part of the paper; and will, therefore, say nothing more on the subject at present.

The word *an* is used in other senses, one of which I shall soon have occasion to explain.

3. The fourth character in the first line is *sha*; and it here denotes "of;" elsewhere it is a relative pronoun or particle. It corresponds exactly to the Syriac ܫ, the Chaldee ܫ or ܫ.

4. The next word is a monogram, which I have found equated to 𐎶𐎵𐎶𐎵𐎶𐎵 *ya . ra . a'kh*. It is certain that the first character in this word admitted not only the value *a*, 𐎶, as in 𐎶𐎵𐎶𐎵𐎶𐎵, *a . na . ku*, "I" (cf. 𐎶𐎵𐎶𐎵), but *ha*, as in 𐎶𐎵𐎶𐎵, *ha . lik*, "going" (cf. 𐎶𐎵𐎶𐎵), *wa*, as in 𐎶𐎵𐎶𐎵, *wa . shib*, "dwelling or sitting" (cf. 𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵, *u . shi . bu*, "I had sat," which proves that the root is 𐎶𐎵𐎶𐎵), and *ya*, for it is often interchanged with 𐎶𐎵𐎶𐎵. It should, if we can depend upon Hebrew analogy, have this last value in the present word, as well as in 𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵, *ya . a'm . ti*, "of the sea." The Assyrians used the feminine forms 𐎶𐎵𐎶𐎵 and 𐎶𐎵𐎶𐎵, where the Hebrews used 𐤀 and 𐤁.

This word is not only used before the names of months, as in the present instance, but without them. Thus, Nebuchadnezzar says he commenced his palace *ina yarakh shalmu*, &c., "in a complete (and therefore fortunate) month, on a happy day." It is elsewhere used for the new moon, or first day of the month, which was that on which the crescent was first visible. It is possible that in such a case as the present it was a mere determinative; but I am strongly of opinion that it was pronounced as a distinct word. This would be in conformity with Hebrew usage.

5. The last character in the first line is a monogram for the first month. I have no clue to its pronunciation from any Assyrian source. I, therefore, read it provisionally by the word which has the like meaning in Hebrew and Syriac.

6. The next word, which begins the second line, is *tu . mu*, "the day," which has been already explained.

7. Then follows *u*, "and."

8. The word at the end of the second line occurs in the forty-seventh line of BELLINO's cylinder, where we have "(in the course of) a night." Here the

word is in the genitive, and it would be natural to read it *mu.shi*. The present text is, however, a proof that the last character did not include a case-ending. Here, and again as the fifteenth word of the inscription, it is a nominative. I, therefore, consider it to be a compound ideograph, the component characters possibly signifying, "closing of the eyes."* The pronunciation can only be conjectured until an equation for these two characters in phonographs shall be found. In the mean time, I read it provisionally *liltu*, considering this to be the form which the Hebrew לִלְתֵּי would probably assume in Assyriac. The root from which this word appears to have been derived occurs in Assyriac, namely לִל, to which I assign the meaning "to be at rest." From this root we have the verb in the third conjugation *ulil*, לִלְלִי, "I put to rest," applied to arrows put up in their quiver; the derived noun *lil*, "a quiver," and another derived noun, *lulim*, which occurs in the great inscription at the India House, and which, it appears to me, can only signify "repositories."

9. The next word, which occupies the third line, is *mushqulu*, an adjective which signifies "equal," and with which the substantive verb must be supplied. The root is שָׁקַל. In Hebrew it signifies "to compare by weight," and the primary meaning has been supposed to be "to suspend;" but in Assyriac it signifies "to compare with respect to quantity of any kind, to bring to an equality in respect to quantity;" or briefly, to "measure or weigh." Here it is applied to equality in respect to duration, and on BELLINO's cylinder the *suqlim rabti* is a measure of length. This is literally "the great measure," or, as the Assyrians used the positive for the comparative, "the greater measure." I believe this to be "the cubit," the same which is elsewhere called the 𐎶𐎵𐎶 𐎶𐎵𐎶 , *am.ma.a't*, and which is also denoted by the monogram 𐎶𐎵𐎶 (India House Inscription, VIII. 45, and VI. 25; Bel. 44, &c., compared with 50, &c.) The lesser measure was, I take it, the *gar*, 𐎶 . This character is so explained in one of the syllabaries that I discovered. I conjectured some time ago that this measure was three-fifths of the cubit; and the grounds of my

* [Ideographically, the former character signifies "to give," and not "to close," which is a strong objection to the statement here made. I am now, therefore, decidedly of opinion that this word should be read *mushi*, this being a foreign word for "night," which the Assyrians adopted without declining it. Or, as Sir H. RAWLINSON supposes, they wrote "*mushi*," but read this by the Assyrian word for "night," which may have been what I have here given.—July 21, 1856.]

conjecture were this. The colophon to BELLINO's inscription proves that the monogram 𐎶𐎠𐎵 denoted a *suss*, or sixty. As a measure of length it should accordingly be sixty cubits, the cubit being notoriously the principal measure of length. Now the palace mentioned on MICHAUX's stone is said to have been "three *suss*" long, and "one *suss*, fifty *gars*" broad. I conjectured that this palace was twice as long as it was broad; which gave fifty *gars*, equal to thirty cubits; or the *gar* equal to three-fifths of a cubit. A discovery which Dr. OPPERT made at Babylon verified this conjecture of mine, and, at the same time, led me to see the origin of the name *gar*; verifying in fact the reading of the name of this measure, as well as its value. Dr. OPPERT's discovery was that the length of the side of the Babylonian brick was always three-fifths of a cubit. Now I had previously discovered that the word *gar* signifies, in the Assyrio-Babylonian language, "the side of a square." In the passages above quoted from the great inscription mention is made of two squares, which were respectively 4000 and 490 *ammāt garri* "cubits to the side," as I rendered it. Dr. OPPERT read the last word *gagari*. It is written 𐎶𐎠𐎵𐎶𐎠𐎵𐎶𐎠𐎵 , the first and second characters in the word being alike; but the character admits the two values *ga* and *ar*, as appears from the word *palar*; which terminates with *it* in VIII. 39, R. 1, 12, and 2, 9, but with 𐎶𐎠𐎵 , the ordinary character for *ar*, in Gr. 2, 6; while in VI. 28 we have *palri* in the genitive. The word *gagari* would be of a very strange form; whereas *garri* is the regular genitive of *gar*. Dr. OPPERT imagined that he had here the linear dimensions of the wall of Babylon; and by comparing them with what had been stated by Herodotus (and reading 480 for 490) he inferred that the "*ammāt-gagar*" was 360 cubits, and that this was the length of a stadium.

I believe that no such measure as an "*ammāt-gagar*" existed, and that Nebuchadnezzar does not give the dimensions of Babylon at all. What Dr. OPPERT has really discovered, in relation to measures, is that the *gar* was three-fifths of the cubit, and that the lengths of these two measures were 525 and 315 millimetres, or about 20,675 and 12,405 inches. The reading of the name *gar*, and its signification as "a side," viz., of a square brick, are now made known for the first time.

Two other words denoting small measures of length are used in the Khorsabad inscriptions. It is stated (BOTTA, 151, 19, and 111, 2) that Merodach

Baladan commenced the trench which he caused to be made for the defence of his city *ashlata an*, "three units," as I suppose, from the city. Here *an*, which properly signifies a unit, is used for a measure of length; and, as the *suss* is sixty cubits, the correlative *an* must be one cubit. The depth of this trench is stated to be \Uparrow \Uparrow \Uparrow "one-*gar*," with an unknown character interposed. On the Tablet K. 98 this character is used to designate a day of the month, which appears from the eleventh line to be after the 29th.* Of course, it denotes 30, being equivalent to \lll . I rather think that it properly denotes "one-half;" but, on the same principle that units were used for sixties, as I explained in my paper on "Assyrian Mythology," § 9, "one-half" might be used for "thirty." Confusion between the two, in such a case as this, was impossible. The above characters then signify "one measure of thirty *gars*, or eighteen cubits," $\text{3}\bar{\text{l}}$ of our feet. It would appear that this was the only measure that the Assyrians used between the *suss* and the cubit; for, in BOTTA, 47, 79, the dimensions of the mound at Khorsabad are given; and they conclude with "one *suss*, one measure of thirty *gars*, and two cubits," that is eighty cubits; to which must be added a larger number, to the value of which I have no clue, but which must be a multiple of 120 cubits, and is probably one of 360.

10. The tenth word in the inscription is the cardinal number for "six." I have ventured to transcribe it by *shish*; but I consider this a very doubtful reading. It is very possible that the feminine form might be the correct one to be used; and if the masculine be *shish*, that would probably be *shishat*. I question much, however, whether the change of *both* radicals from what they are in the ordinal *tsid* would be likely. I consider the form *shid* almost as probable a one as *shish*. It is certain that the cardinal and ordinal numbers of the Assyrians had different themes, which, according to the ordinary laws of derivation, could not spring from the same root; and for this reason the forms of these numbers are peculiarly interesting. They contain indications of processes, anterior to those that were in use among the Assyrians, and carrying back the thoughts to a yet more ancient language. I will put down here what I have observed as to the different numbers, and what occur to me as their probable values, when I cannot give them with certainty:—

* [This is a mistake. The character occurs in other lines on this Tablet, and in some of them can only signify "a half." This, however, does not affect the subsequent reasoning.—July 21, 1856.]

“One” is represented by 𐎠𐎡𐎢 𐎠𐎡 *ish . din*, both in the inscriptions at Persepolis and at Khorsabad. The form more commonly used, 𐎠𐎡 , is interchanged with the foregoing word at both places in different copies of the same text. I am, therefore, bound to suppose that this word signifies “one,” but I can compare it with nothing else either in Assyriac or in any other language. The second part of the other word, which I have stated to be more common, is used for 𐎠𐎡𐎢 *a . di* “together with,” which I believe to be the genitive of 𐎠𐎡𐎢 . I therefore, suppose that *adu* (for *akhdu*), or in construction *ad* (for *akhd*), may represent “one” also, but only in the masculine; the feminine is represented at Behistun by 𐎠𐎡𐎢 , that is, *id* (for *ikhid*). The same change of the initial vowel occurs in Arabic.

I cannot offer any conjecture as to the number expressing “two.”

I have already given my reasons for thinking that *ashlata* = 𐎠𐎡𐎢 𐎠𐎡𐎢 , that is “three,” in the feminine. The context in which it occurs proves that it is a numeral, and not a very large one. It has some resemblance to the Hebrew root for “three.” The masculine form would be *ashla* or *ashal*, 𐎠𐎡𐎢 , which contains what Gesenius considered the essential or original part of the Hebrew root; that which connects it with the Irish Celtic *tri*, with the Polynesian *talu*, and with hundreds of intermediate languages and dialects. The prefix 𐎠 is the same that we have in the following numeral. I feel, on the whole, great confidence in this being the genuine Assyriac numeral for “three,” and, at the same time, an interesting relic of a language anterior to Assyriac. I have already given *arba'* and *arba'at* for “four”—as to these forms I think there can be no doubt.

Colonel RAWLINSON has given from an Assyrian Tablet 𐎠𐎡𐎢 𐎠𐎡𐎢 𐎠𐎡𐎢 , with the transcription *khamisti* (“Early History of Babylonia,” pages 5, 6); but there seems to be a mistake. The three characters given would be read *kha . is . ti*, without an *m*. Possibly the printer has omitted 𐎠 *mi*. If the word be printed as it stands in the Tablet, it must be read *kha . mil . ti*; the second character having the value *mil*, as well as *is*. I incline to think that this is the correct reading; for *l* is often used for *s* before a dental. Whichever be the true reading, the form does not harmonize with *'isirat*, “ten,” which precedes it. From the loose way in which Colonel RAWLINSON speaks, it is impossible to tell whether the numerals that he gives on page 5 are from the same, or from different Assyrian

vocabularies. I think, however, that it is pretty obvious that the forms for "five" are in construction *khamish* and *khamishat*; *khamishti* or *khamitti* being the genitive of the latter. The difference between the ordinal and the cardinal is here that the former has 𐎠, and the latter 𐎡, for the second radical.

The themes of the three ordinals answering to "sixth," "seventh," and "eighth," begin with *ts*, 𐎢, while in all the cognate languages these numerals begin with *w*. I feel confident that the cardinals in Assyrian would begin with this latter, and that this was one distinction between them and the ordinals; whether or not it was the only distinction, I cannot say; I have never met with any of these forms; and for "nine" I have met neither cardinal nor ordinal.

"Ten" is expressed by *'isir . 'isirat*, as I have already stated.

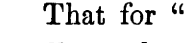
Of the combinations requiring the numbers between "ten" and "twenty" I know no more than that Colonel RAWLINSON gives 𐎶𐎠𐎢𐎡𐎢𐎡𐎢 from a syllabary as "fifteen." He reads this *khamis sirat*, so divided; but I question the correctness of the division. I consider the above to be one word, a contraction for *khamish 'isirat*. So, the Chaldee form ܩܪܝܫܪܐ replaces ܩܪܝܫܪܐ.



"Twenty" is, according to Colonel RAWLINSON'S Tablet, 𐎶𐎠𐎢𐎡𐎢𐎡𐎢, which he, most unaccountably, reads *sinra* (with a dot under the *s*), and connects with 𐎶𐎠 "two," as if "two tens." Surely the true reading is *is . ra . ya*, or *is . r' a . a*, the plural of *isir*, "ten." The Assyrians had no dual; and the derivation of "twenty" from "ten," and not from "two," is in accordance with the usage of all the cognate languages.


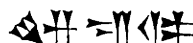
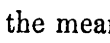
Colonel RAWLINSON gives *silasa*, *irbaya* (or *irba*), and *khansa*, as the cardinals corresponding to "thirty," "forty," and "fifty." In the second of these we have the final 𐎶 interchanged with 𐎶𐎠, which leads me to suspect that it should be pronounced *ya* in every instance at the close of these numerals; unless, indeed, a *u* should precede it. If this view be correct, these forms should be read—*shilashaya . irba'ya*, and *khanshaya*. At any rate, it will be observed that there is great inconsistency in their derivation. The last of them is plainly connected with the ordinal theme. The second would seem to be connected with the cardinal theme, having, like it, a prefixed 𐎢; but the change of the first vowel is not in accordance with the ordinary rules of derivation. *Shilashaya* deviates still further from the ordinal theme *shalish*; while, if the cardinal theme be

a *shal*, it has no relation with it at all. It would seem as if the Assyrians had three themes, one for the cardinals, one for the ordinals and collectives, and one for the decads; and that no general law existed as to the connexion of any two of these.

The cardinal number for "sixty" is unknown to me. Colonel RAWLINSON has given *sussu*, which is a collective noun.

That for "seventy" is, I believe,  *shi. b'u. u. a.* I do not recollect where this word occurs; but I feel pretty certain that I have met with it. "Eighty" and "ninety" remain to be discovered.

 *mi* is "a hundred;" but whether it be properly a cardinal number, or a collective noun, may be questioned. It is always preceded by a number.  "a thousand," is a compound ideograph, "a ten hundred." Like the preceding, it must have another number before it. Its phonetic equivalent is unknown to me.

11. The next word, *kajbu*, must, from the context, signify intervals, each of them of the length of two of our hours. I think it clearly intimates that these intervals were marked by the *running out* of sand or water from a vessel. The root  signifies "to fail or disappoint," and it is applied to the waters of a fountain which ceases to flow—(Is. lviii. 11). The inference from this use of the word is that the Assyrians marked time by the running out of water from a vessel which emptied itself in two of our hours. The entire day from noon to noon contained twelve *kajabs*; and it seems certain that the day must have commenced at noon, as this was the only fixed point that was capable of being observed. Sunrise and sunset were variable, and midnight could not be determined by observation. On the day noted in the inscription the sun would set at the end of the third *kajab*, and would rise at the end of the ninth. Midnight was always at the end of the sixth *kajab*; and this was probably the reason why *tsidi*, "of the sixth," was used to express the north, where the Assyrians must have well known that the sun was at midnight.  "the wind (or quarter) of the sixth (*kajab*)" was "the north." I announced this in the "Proceedings of the Royal Irish Academy," so long ago as March, 1853; but I could not then offer any conjecture as to the origin of the word. The opposite quarter, or south, was the quarter , on the meaning of which I will not speculate. The east and west are represented in connexion

with these terms by $\text{𒍪} \text{𒍪}$ *satra?* and $\text{𒍪} \text{𒍪}$ *martu*, the meanings of which are equally uncertain. The connexion of the latter with the root מרר "bitter," and thus with "the salt (sea)," appears to me very dubious. The word is applied to Syria, but I believe as "the western country;" so that this proves nothing as to the origin of the name. In the Babylonian inscriptions, and generally on astronomical tablets, these two last words are replaced by $\text{𒍪} \text{𒍪}$ *sun-rising* and $\text{𒍪} \text{𒍪}$ *sun-setting*. The monogram for "sun" has been explained under 1; the two other words are explained on the Tablet K. 64,* by $\text{𒍪} \text{𒍪}$ *wa.chu.u*, corresponding to the Hebrew נצח. This is connected with $\text{𒍪} \text{𒍪}$ *chi.it*, נצח, which occurs repeatedly for "the rising of (the sun.)" In fact, all the words in the compartment of the Tablet where the former of these occurs are derivatives from the root נצח = Hebrew נצח. As these two monograms are plainly opposed to one another, the meaning of the other word must be "setting;" and it appears to be from the root ערב, which is one of those applied to the sun setting. The word is *na.rim.bu.u*. The *m* is a nasal, inserted euphonically to strengthen the accented syllable. This is more frequently done by doubling the letter. It is the participle of the second conjugation, and would be in Hebrew characters (dropping the case-ending and the nasal connected with it) נערב.

The next four words, concluding the first portion of the inscription, have been already explained, being the same with the 6th, 10th, 11th, and 8th.

The two words in the sixth line are monograms for the names of the gods *Nabiû* and *Marduk*, as I have explained in my paper on "Assyrian Mythology," §§ 31 and 26.

* [A closer examination of this Tablet, and other similar ones, than I was enabled to give them, has led Sir HENRY RAWLINSON to the conclusion that they were bilingual; explaining, not the meaning of monograms or ideographs, but that of words in a language which he calls Accadian, and which he considers to be Scythic or Turanian. To this language the three words here occurring must be referred. *Ud.du* was the Accadian word for "coming forth," and *shu.wa* that for departing; 𒍪 had the four values *ud*, *tu*, *par*, and *likh*; one of which, as yet unascertained (probably *tu*), must have been the Accadian word for "sun." It is probable that *mushi*, "night," was also an Accadian word; and perhaps *ishdin*, "one," and even others of the numerals that I have given above may be so too. *Ishdin* is, perhaps, a corruption of *ikhdin*, and thus connected with the Assyriac root (see p. 41). The Accadian language has much affinity to the Assyriac in its roots, though wholly different in its grammatical construction.—July 21, 1852.]

18. These names are followed by *ana*, a preposition signifying “to, for,” &c.; equivalent to the Hebrew לָ or לְ.

19. This preposition is followed by one of the monograms for “king,” which is in construction *sar*; but it is here to be read in the genitive, as governed by the preposition.

20. The next word appears at first sight to have a superfluous character. The first > is *ba'* or *bi'*; i. e. בַּעַ, with a vowel between the consonants, which the Assyrians seem to have pronounced as *i*, though analogy might require it to be *a*. The next character is *i*, and the last is valued *ili* in the Tablet K. 144, as Dr. OPPERT pointed out to me. It would appear, then, that the second character was superfluous, and it is, in fact, omitted before an affix. Thus >^ >^ >^ expresses *bi' . ili . ya*, “to my lord.” I think, however, that the Assyrians would pronounce this *bili-ya*, for they scarcely sounded the *u*, and often confounded it with *i*; while the second character in the word before us intimated that the word without the affix should be pronounced with three distinct syllables *bi' . ili*. The root is בַּעַל; and in the Book of Daniel we have always בַּל, which was the Assyrian pronunciation of this word.

21. The inscription concludes with the word *liqrubu*, which is the regular optative of קָרַב, “to draw near.” This is the verb used always in benedictions of this sort; and it may be translated, in a metaphorical sense, “be gracious or favourable.”

Having now explained every word in the inscription, I will say something respecting the information which it affords. On the sixth day of a lunar month, the first day being that on which the crescent was first visible (see my paper on “Assyrian Mythology,” § 9) and the day commencing at noon, the vernal equinox took place. It is obvious that this could only happen in one year out a cycle of nineteen; and in many such cycles it would not occur at all. There is, then, a great defect in the inscription. It only records the month and day, and not the year of the observation. I must, in the first instance, endeavour to explain this circumstance.

I connect it with what has given rise to some strange conjectures,—the state in which the Tablets have been found. They were found lying in confusion on the floor of a chamber, most of them being broken as by a fall. I suppose that this chamber contained a number of compartments divided by sheets of

wood laid both horizontally and vertically; that these compartments were numbered, and that the records belonging to each year were placed together in one compartment. When the wood decayed, as it must needs have done in the course of twenty-four centuries, the tablets would all fall to the ground, and be broken and mixed together, as they were found to be. Although, therefore, there is no date at present attached to the Tablet, it is highly probable that it was placed with other Tablets of the same year in a compartment, the wood of which bore the date of the year.

It is an interesting question what this year was. It appears from several Tablets that the king, to whom this record-chamber belonged, was the son of Esarhaddon. His reign commenced, according to Ptolemy's Canon, in 667, B. C., and lasted twenty years. Before looking further, it is first to be considered whether any of these twenty years can be that referred to. Now, I find by the Tables in the third volume of VINCE'S Astronomy, that in the day which commenced at noon of the proleptic Julian, 27th March, 652 B. C., the sun's longitude was $359^{\circ} 31' 12''$ at $3^{\text{h}} 4' 15''$ P. M., mean Greenwich time, which was about the time of sunset at Babylon. Twelve hours after, at Babylonian sunrise, the sun's longitude was $0^{\circ} 0' 16''$. This, then, was the day when the day and night were equal; and if it were the sixth day of the month, the first would be that which began at noon of the 22nd March. I have calculated by the aforesaid Tables the places of the sun and moon at Greenwich noon of the 21st March; and I found that the moon was then $30' 40''$ before the sun. The conjunction would have taken place about $54'$ sooner, that is, about two hours after Babylonian noon. It would have been impossible for the new moon to be seen that evening; and, of course, the following day, the 22nd, would have been the first of the month. In this year, therefore, 652 B. C., the phenomenon recorded would have occurred.

It may be supposed, however, that as it might have occurred in other years, there is no certainty that it was to this year that the inscription refers. In answer to this, I remark that no year within nineteen of this can be thought of; and that, in 671 B. C., it is not probable that the event occurred as recorded. In that year the conjunction of the sun and moon occurred on the 21st March $18^{\text{h}} 15' 26''$ after Babylonian noon, as I have calculated from VINCE'S Tables. I believe that more accurate Tables are in existence, especially for the moon,

but I have not access to them, and the error cannot amount to many minutes, which, in a matter like this, is of no moment. It appears to me probable that the day commencing at the following noon would be reckoned as the first of the month. I should think that the moon might be seen twelve hours after conjunction. I have calculated, too, that in that year the sun would be at the equinoctial point $3^{\text{h}} 31'$ after the Babylonian noon of the 28th. I should think it probable that the day which had then lately commenced, rather than that which had expired, would have been considered the day of the equinox. If these two suppositions be adopted, the equinox would in this year be the seventh, and not the sixth of the month. I cannot think it at all probable that a Tablet of a more early date than 671 B. C. would have been found in this collection, or that one of so late a date as 633 B. C. could have been there. Each Assyrian king had generally a palace of his own, in which he seems to have preserved his own records, but those only. On this account, supposing that the calculation was equally favourable to both years, I should consider 652 B. C. much the more probable; and, as matters stand, I think it may be regarded as a settled point that the day which commenced at noon of the proleptic Julian 22nd March, 652 B. C., was the first day of an Assyrian year.*

It does not appear from this record whether the year began with the new moon before the equinox, or with that which was nearest to the equinox, whether before or after. Another Tablet, recording an observation of a different nature, has led me to the conclusion that the 7th April, 667 B. C., was the first day of an Assyrian year; and of course to the adoption of the latter hypothesis.

31st October, 1855.

* [I had hoped that the astronomical calculations for this paper would have been made by a friend. When disappointed as to this, I had to make them myself; and, not being a practical astronomer, I neglected to allow for the effect of refraction. This might cause the equinox to be a day earlier, and would render 671 B. C. more likely to have been the year of the observation than I have above supposed it to be. As to the main point, however, that, both in this year and in 652 B. C., the Assyrian year began at noon of the proleptic Julian 22nd March, I entertain no doubt whatever.—July 21, 1856.]