

**Relevance of Ancient Knowledge to the present century:**

**De-coding Aryabhatiya Cryptic Numerals, and its application to Modified Tamizh Script to find (1) the number of revolutions of Geo-centric planets in a Mahayuga (43,20,000 Years), comparison of their sidereal periods with their present day values.**

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[Note: - This article is prepared using 'Baraha Unicode' software.]

**ABOUT THIS ARTICLE:** - As a faculty of 'International Academy for Creative Teaching (under Jain Group of Institutions, Bengaluru)' conducting workshops for Teachers of a few schools in Coimbatore during 2003 – 2009, I faced difficulty in sharing the contributions of Indian mathematicians, specially of Aryabhata-I (5<sup>th</sup> c. AD) with those teachers (who are not familiar with Devnagari Script).

'Tamizh is one of the longest surviving [classical languages](#) in the world' and it has been described as *the only language of contemporary India which is recognizably continuous with a classical past. The variety and quality of classical Tamil literature has led to its being described as "one of the great classical traditions and literatures of the world".* [Ref. Wikipedia]. But, 'Tamizh has fewer scripts than in Devnagari'.

Scripts of any language are *cryptic symbols* for the sounds needed in writing them to communicate with the public.

*Tamizh Grantham Scripts* are akin to *Malayalam scripts*, and it is difficult to adapt it to *Devnagari*'. That is the reason for attempting to this venture.

**Modified Tamizh scripts equivalent to Devnagari Scripts** (shown within brackets): -

Vowels: உயிரெழுத்து (swara)

அ(அ, a), ஆ(ஆ, A), இ(இ, i), ஈ(ஈ, I), உ(உ, u), ஊ(ஊ, U),

[஠(஠,Ru)], எ(எ,e), ஏ(ஏ,E), ஐ(ஐ,ai), ஓ(ஓ,o), ஔ(ஔ,O), ஔள(ஔ,au).

Vyanjana, Consonants: மெய் எழுத்து (வரிக்கர)

க் = க் (க், k), க்<sub>1</sub> (க், K), க்<sub>2</sub> (க், g), க்<sub>3</sub> (க், G), ங் (ங், ~g)

ச் = ச் (ச், c), ச்<sub>1</sub> (ச், C), [ச்<sub>2</sub>, ஞ் (ஞ், j)], ச்<sub>3</sub> (ச், J), ஞ் (ஞ், ~j)

ட் = ட் (ட், T), ட்<sub>1</sub> (ட், Th), ட்<sub>2</sub> (ட், D), ட்<sub>3</sub> (ட், Dh), ண் (ண், N)

த் = த் (த், t), த்<sub>1</sub> (த், th), த்<sub>2</sub> (த், d), த்<sub>3</sub> (த், dh), ன் (ன், n)

ப் = ப் (ப், p), ப்<sub>1</sub> (ப், P), ப்<sub>2</sub> (ப், b), ப்<sub>3</sub> (ப், B), ம் (ம், m)

Vyanjana, Consonants: உயிர்-மெய்எழுத்து (अवर्गाक्षर)  
ய் (य, y), ர் (र, r), ல் (ल, l), வ் (व, v),  
ஶ் (श, S), ஷ் (ष, Sh), ஸ் (स, s), ஹ் (ह, h) ள் (ळ, L).  
[ழ் (zh), ழ் and ள் (न)] are special scripts for Tamizh only.  
[क़ and लृ] are gunitakshara (गुणिताक्षर) in Devnagari.

### **Introduction:** -

Base ten place-value system having ten digits from 1 to 9 and 0 for number reckoning is the universally acclaimed invention by the visionaries of ancient India. Since then, numerals of numbers were written using the rule

“अङ्कानाम् वामतो गतिः”

Purport: - **The digits** (*in the numeral of a number*) **move** ‘(increase) **towards left** (*in multiples of the base*)’.

*Cryptic numerals* using words and alphabets were popular in Sanskrit texts to denote numbers in rhythmic *slokas* for easy memorization.

*Aryabhata-I* (5<sup>th</sup> c. AD) has named the names of nine place values, thus;

एकं च दशं च शतं च सहस्रमयुतानियुते तथा प्रयुतं ।  
कोट्यर्बुदं च वृन्दम् स्थानात् स्थानं दशगुणं भवेत् ॥

Purport: - The ten names in the multiples of 10 are; एकं( $10^0$ ), दशं( $10^1$ ), शतं( $10^2$ ), सहस्रं( $10^3$ ) अयुतं( $10^4$ ), नियुतं( $10^5$ ), प्रयुतं( $10^6$ ), कोटि( $10^7$ ), अर्बुदं( $10^8$ ), वृन्दं( $10^9$ ).

*Aryabhata-I* invented a unique *cryptic numerical system* adapting *Devnagari alphabets* to denote the astronomical numbers for the *number of revolutions of Geo-centric planets in a Mahayuga* (43,20,000 yrs). It is really surprising that these *Aryabhatiya Cryptic numerals* on conversion into *their sidereal periods* (time taken to go round ones in their orbits) almost agree with their present-day values.

## A. De-coding *Aryabhatiya Cryptic Numerals*, and its application to Modified Tamizh Script.

### 1. Rule for Aryabhatiya Devanagari Varnamala Cryptic Numerals : -

वर्गाक्षराणि वर्गेऽवर्गेऽवर्गाक्षराणी कात् इमौ यः ।

खद्विनवके स्वरा नव वर्गेऽवर्गे नवान्त्यवर्गे वा ॥

வர்கா<sub>2</sub>க்ஷராணி வர்கே<sub>2</sub>வர்கே<sub>2</sub>வர்கா<sub>2</sub>க்ஷராணி காத் நங்மௌ யஃ  
|க<sub>1</sub>த்<sub>2</sub>விநவகே ஸ்வரா நவ வர்கே<sub>2</sub>வர்கே<sub>2</sub> நவாந்த்ய வர்கே<sub>2</sub> வா ॥

#### Purport: -

(1) Consonant, व्यञ्जन (மெய் எழுத்து) (a) वर्गाक्षर (மெய்எழுத்து) from क् (க்) [(to म् (ம்)] has numerical value from 1 (to 25) and (b)अवर्गाक्षर, (உயிர்மைஎழுத்து) from यं [(to (ஹ்))] has numerical value from 3 (to 10) to denote numbers.

(2) Vowels, स्वराक्षर अ, इ, उ, ऋ, लृ, ए, ओ, ऐ, औ; (உயிர் எழுத்து ; अ, इ, ए, ओ, ऐ, औ) specify two sets of nine zeros (in multiples of 10), (i) One set of nine even number of ten-zeros to follow वर्गाक्षर (மெய்எழுத்து) and (ii) Another set of nine odd number of ten-zeros to follow मूल-अवर्गाक्षर ((உயிர் மெய்எழுத்து)).

#### The meaning of the rule could be explained thus with Tables: -

A 1 (1) Consonant, व्यञ्जन (a) वर्गाक्षर (மெய்எழுத்து) from क् (க்) [(to म् (ம்)] has numerical value from 1 (to 25) and (b)अवर्गाक्षर, (உயிர்மைஎழுத்து) from यं [(to (ஹ்))] has numerical value from 3 (to 10) to denote numbers.

वर्गाक्षराणि वर्गे कात् इमौ यः ।

वर्गाक्षराणि वर्गे कात् । means क = 1 = (क् . अ) = (1 . अ); क् = 1 , [अ = 1]

Hence the numerical value of वर्गाक्षर क् = 1, [अ = 1].

अवर्गाक्षराणि अवर्गे झ्नौ यः ।

अवर्गाक्षराणि अवर्गे झ्नौ यः । means झ्न = य

झ्न = [(ङ् + म्) x अ] = [(5+25) x 1] = [30] = (3x10)

= य = (य् x अ) = (3 x 10) = 30 ; [अ = 10].

Hence the numerical value of अवर्गाक्षर य् = 3, [अ = 10].

A 1 (1) (a) वर्गाक्षर (மெய்எழுத்து) from क् (க்) has numerical value from 1 (to 25);

Numerical values of वर्गाक्षर , (மெய்-எழுத்து) starts with क् = 1 (க் = 1).

(1) (a). (i) वर्गाक्षर (மெய்எழுத்து) from क् (க்) to ञ् (ஞ்) denotes numbers from 1 to 10 in order.

**Table (1) (a) (i)**

Cryptic Numeral for வர்காஶர (மெய்யெழுத்து) from க் (க்) to ஞ் (ஞ்)										
<b>Time New Roman Numerals</b>	1	2	3	4	5	6	7	8	9	10
<b>Time New Roman Cryptic Numerals</b>	k	K	g	G	~g	c	C	j	J	~j
<b>வர்காஶர (Nirmala UI)</b>	க்	க்	க்	க்	க்	க்	க்	க்	க்	க்
<b>மெய்யெழுத்து</b>	க்	க் <sub>1</sub>	க் <sub>2</sub>	க் <sub>3</sub>	ங்	க்	க் <sub>1</sub>	க் <sub>2</sub>	க் <sub>3</sub>	ஞ்

(1) (a) (ii). வர்காஶர (மெய்யெழுத்து) from ட் (ட்) to ம் (ம்) denote numbers from 11 to 25 in order.

**Table (1) (a) (ii)**

Cryptic Numeral from ட் = 11 to ம் = 25															
<b>Numbers</b>	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>Cryptic Numerals</b>	T	Th	D	Dh	N	t	th	d	dh	n	p	P	b	B	m
<b>வர்காஶர (Nirmala UI)</b>	ட்	ட்	ட்	ட்	ட்	ட்	ட்	ட்	ட்	ட்	ட்	ட்	ட்	ட்	ட்
<b>மெய்யெழுத்து</b>	ட்	ட் <sub>1</sub>	ட் <sub>2</sub>	ட் <sub>3</sub>	ண்	த்	த் <sub>1</sub>	த் <sub>2</sub>	த் <sub>3</sub>	ன்	ப்	ப் <sub>1</sub>	ப் <sub>2</sub>	ப் <sub>3</sub>	ம்

(1) (b) அவர்காஶர, (உயிர்மைஎழுத்து) from ய் [(to (ஹ்))] denote numbers from 3 (to 10) in order.

மூல அவர்காஶர (உயிர் மைஎழுத்து) from ய் (ய்) to ஹ் (ஹ்) denote numbers from 3 to 10 sequentially.

**Table I (b)**

Cryptic Numeral for அவர்காஶர (உயிர்மைஎழுத்து) from ய் to ஹ் (from ய் to ஹ்)								
<b>Numbers</b>	3	4	5	6	7	8	9	10
<b>Cryptic Numerals</b>	y	r	l	v	S	Sh	s	h
<b>வர்காஶர (Mangal)</b>	ய்	ர்	ல்	வ்	ஸ்	ஷ்	ஸ்	ஹ்
<b>உயிர்மைஎழுத்து</b>	ய்	ர்	ல்	வ்	ஸ்	ஷ்	ஸ்	ஹ்

Numerical value for vowel ஶ்வரா அ = 1 regarding வர்காஶர (மெய்யெழுத்து),

Numerical value for vowel ஶ்வரா அ = 10 regarding அவர்காஶர (உயிர் மெய்யெழுத்து).

Hence, the rule (2).

(2) Vowels, स्वरा अ, इ, उ, ऋ, लृ, ए, ओ, ऐ, औ; (உயிர் எழுத்து; அ, இ, உ, று. ல்று, ஏ, ஓ, ஐ, ஔ) specify two sets of nine zeros (in multiples of 10).

(i) One set of nine *even numbers of ten zeros* to follow वर्गाक्षर (மெய்எழுத்து).

(ii) Another set of nine *odd numbers of ten zeros* to follow अवर्गाक्षर (உயிர் மெய்எழுத்து)

**Table (2) (i) & (ii)**

Number of zeros to follow (மெய்யெழுத்து உயிர்மெய்யெழுத்து)									
Vowels of Devnagari	a	i	u	Ru	IRu	E	O	ai	au
स्वराक्षर	अ	इ	उ	ऋ	लृ	ए	ओ	ऐ	औ
உயிரெழுத்து	அ	இ	உ	று	ல்று	ஏ	ஓ	ஐ	ஔ
Number of zeros to follow மெய்யெழுத்து	0	2	4	6	8	10	12	14	16
Number of zeros to follow உயிர்மெய்யெழுத்து	1	3	5	7	9	11	13	15	17

**Modified Rule (2) (i) & (ii): -**

(i) Place-values in powers of ten of the numerals of वर्गाक्षर from क् to म् (மெய்யெழுத்து) with vowels स्वरा (உயிரெழுத்து) अ is 0 and with स्वरा (इ, उ, ऋ, लृ, ए, ओ, ऐ, औ; इ, उ, று, ல்று, ஏ, ஓ, ஐ, ஔ) are denoted with one group of nine sets of *even powers of ten* (starting from the index 2 to 16).

(ii) Place-values in powers of ten of the numerals of अवर्गाक्षर from यू to ह् (உயிர்மெய்யெழுத்து) with vowels with स्वरा (अ, इ, उ, ऋ, लृ, ए, ओ, ऐ, औ; अ, இ, உ, று, ல்று, ஏ, ஓ, ஐ, ஔ) are denoted with one group of nine sets of *odd powers of ten* (starting from the index 1 to 17).

**Table for Modified Rule (2) (i) & (ii)**

Place-values in powers of ten to each of व्यन् (மெய்யெழுத்து, உயிர்மெய்யெழுத்து)									
Vowels for Devnagari & Tamizh	a	i	u	Ru	IRu	E	O	ai	au
Vowel, स्वरा	अ	इ	उ	ऋ	लृ	ए	ओ	ऐ	औ
Vowel, உயிரெழுத்து	அ	இ	உ	று	ல்று	ஏ	ஓ	ஐ	ஔ
Place-values in powers of ten to each of மெய்யெழுத்து	10 <sup>0</sup>	10 <sup>2</sup>	10 <sup>4</sup>	10 <sup>6</sup>	10 <sup>8</sup>	10 <sup>10</sup>	10 <sup>12</sup>	10 <sup>14</sup>	10 <sup>16</sup>
Place-values in powers of ten to each of உயிர்மெய்யெழுத்து	10 <sup>1</sup>	10 <sup>3</sup>	10 <sup>5</sup>	10 <sup>7</sup>	10 <sup>9</sup>	10 <sup>11</sup>	10 <sup>13</sup>	10 <sup>15</sup>	10 <sup>17</sup>

लृ is मूलस्वराक्षर in Devnagari. But, it is a गुणिताक्षर too.

$$[लृ = (लृ \times ऋ) = (5 \times 10^7) = 5,00,00,000].$$

See शशि चयगियिडुशुछ्ल (Ref. page 6 in this paper)

## A. 2 Two important Rules illustrated;

**Rule 1:** When a व्यञ्जन (மை எழுத்து) is connected with a स्वर (உயிர் எழுத்து), it forms a गुणिताक्षर, (உயிர் மைஎழுத்து) and their numerical values are to be multiplied. [Note: गुणित = multiply]

Example: वि = (व् x इ) = (व् x इ) = (6 x 1000) = (6 x 10<sup>3</sup>) = 6000.

**Rule 2:** When a व्यञ्जन (மை எழுத்து) is connected with another व्यञ्जन (மை எழுத்து), it forms a संयुक्ताक्षर (உயிர் மை எழுத்து), and their numerical values are to be added. [Note: संयुक्त = add]

Example: सूक्त = [(स् x ऊ) + (क् x अ) + (त् x अ)]

ஸூக்த = [(ஸ்xஊ) + (க்xஅ) + (த்xஅ)]  
= [(9 x 10<sup>5</sup>) + (1 x 1) + (16 x 1)]  
= 900000 + 1 + 16 = 900017

*Number of revolutions made by (Geo-centric) Planets in a Yuga (= 43,20,000 years) mentioned in Aryabhatiya through the Devanagari script are only Cryptic.*

The same Cryptic words may be Adapted to other language scripts, (*for example; in Kannada, Tamizh etc.*), and describe the values of Geo-centric Planers stated in Aryabhatiya of Aryabhata-I (499 AD).

## B. 1. Cryptic Devnagari Alphabetical Numerals denoting the Number of revolutions of Geo-centric planets in Aryabhatiya of Aryabhata-I (5<sup>th</sup> c. AD).

युगरविभगणाः ख्युघृ शशि चयगियिडुशुछृलृ ,

शनि दुड्विघ्व, गुरु खिच्युभ, कुज भद्लिङ्गनुखृ,

बुध सुगुशितृन, भृगु जषबिखुछृ ॥ [(2) p.18]

*Number of revolutions made by (Geo-centric) Planets in a Yuga (= 43,20,000 years) stated above are in the Devanagari script. They are only Cryptic words having no meaning in reality. They could be written in any language script. Now, the above statement in Devanagari script is written in Modified Tamizh Scripts.*

**Modified Tamizh Script: -**

யுக<sub>2</sub>ரவிப<sub>3</sub>க<sub>2</sub>ணா: க்<sub>1</sub>யுக்<sub>3</sub>று, ஸஸி சயகி<sub>2</sub>யிங்கு<sub>2</sub>ஸாச்<sub>1</sub>றுல்று  
ஸனி டு<sub>3</sub>ங்க்<sub>2</sub>விக்<sub>3</sub>வ, கு<sub>2</sub>ரு க்<sub>1</sub>ரிச்யுப<sub>3</sub>, குஜ ப<sub>3</sub>த்<sub>2</sub>லிஜுனுக்<sub>1</sub>று,  
பு<sub>2</sub>த<sub>3</sub> ஸுகு<sub>2</sub>ஸித்<sub>1</sub>றுன, ப்<sub>று</sub><sub>3</sub>கு<sub>2</sub> ஜஷபி<sub>2</sub>கு<sub>1</sub>ச்<sub>று</sub> ॥

**Purport: -**

*Sun;* रवि, ख्युघृ, क्<sub>1</sub>युक्<sub>3</sub>று; = 43,20,000,

*Moon;* शशि, चयगियिडुशुछृलृ, , சயகி<sub>2</sub>யிங்<sub>று</sub>ஸாச்<sub>1</sub>றுல்று; = 5,77,53,336,

*Saturn;* शनि दुड्विघ्व; டு<sub>3</sub>ங்க்<sub>2</sub>விக்<sub>3</sub>வ = 1, 46,564,

Jupiter; गुरु, खिच्युभ, क<sub>1</sub>रीस्युप<sub>3</sub> = 3,64,224,

Mars; कुज (मङ्गळ), भद्लिङ्गुनुक्क, प<sub>3</sub>त्<sub>2</sub>लिक्<sub>3</sub>नुक<sub>1</sub>नु = 22, 96,824,

Mercury; बुध, सुगुशित्थन, णुकु<sub>2</sub>पीत्<sub>1</sub>नुण = 1,79,37,020,

Venus; भृगु, जषिखुछ, ज्जु<sub>2</sub>पी<sub>2</sub>कु<sub>1</sub>स<sub>1</sub>नु = 70,22,388.

These numerical values could be verified by the application of Tables I, and II based on Aryabhatiya Devanagari Varnamala Cryptic Numerals, and these could be adapted to Modified Tamizh Scripts;

## B. 2. Expansion of Aryabhatiya Cryptic Numerical in Devanagari & Tamizh: -

Sun; रवि, ख्युघ, क<sub>1</sub>युक्<sub>3</sub>नु,

$$\begin{aligned} \text{ख्युघ} &= (\text{ख्} \times \text{उ}) + (\text{य्} \times \text{उ}) + (\text{घ्} \times \text{ऋ}) \\ \text{क<sub>1</sub>युक्<sub>3</sub>नु} &= (\text{क<sub>1</sub>} \times \text{उ}) + (\text{य्} \times \text{उ}) + (\text{क<sub>3</sub>} \times \text{नु}) \\ &= (2 \times 10^4) + (3 \times 10^5) + (4 \times 10^6) = 4320000 \end{aligned}$$

Moon; शशि, चयगियिडुशुछुल, सयकि<sub>2</sub>यीङ्गुणुस<sub>1</sub>नुलनु;  
चयगियिडुशुछुल,

$$\begin{aligned} &= (\text{च्} \times \text{अ}) + (\text{य्} \times \text{अ}) + (\text{ग्} \times \text{इ}) + (\text{य्} \times \text{इ}) + (\text{ङ्} \times \text{उ}) + (\text{श्} \times \text{उ}) + (\text{छ्} \times \text{ऋ}) \\ &+ (\text{ल्} \times \text{ऋ}) \end{aligned}$$

सयकि<sub>2</sub>यीङ्गुणुस<sub>1</sub>नुलनु

$$\begin{aligned} &= (\text{सं. अ}) + (\text{य्. अ}) + (\text{क<sub>2</sub>. इ}) + (\text{य्. इ}) + (\text{ङ्. उ}) + (\text{शु. उ}) + (\text{सं. नु}) \\ &+ (\text{ल्. नु}) \\ &= (6 \times 10^0) + (3 \times 10^1) + (3 \times 10^2) + (3 \times 10^3) + (5 \times 10^4) + (7 \times 10^5) + (7 \times 10^6) \\ &+ (5 \times 10^7) \\ &= 57753336 \end{aligned}$$

Saturn ; शनि, ढुडिवघ, ढु<sub>3</sub>ङ्क<sub>2</sub>विक<sub>3</sub>व

$$\begin{aligned} \text{ढुडिवघ} &= (\text{ङ्} \times \text{उ}) + (\text{ङ्} \times \text{इ}) + (\text{व्} \times \text{इ}) + (\text{घ्} \times \text{अ}) + (\text{व्} \times \text{अ}) \\ \text{ढु<sub>3</sub>ङ्क<sub>2</sub>विक<sub>3</sub>व} &= (\text{ढु<sub>3</sub>. उ}) + (\text{ङ्. इ}) + (\text{व्. इ}) + (\text{क<sub>3</sub>. अ}) + (\text{व्. अ}) \\ &= (14 \times 10^4) + (5 \times 10^2) + (6 \times 10^3) + (4 \times 1) + (6 \times 10) \\ &= 1,46,564. \end{aligned}$$

Jupiter ; गुरु ; खिच्युभ, क<sub>2</sub>रीस्युप<sub>3</sub>

$$\begin{aligned} \text{खिच्युभ} &= (\text{ख्} \times \text{इ}) + (\text{र्} \times \text{इ}) + (\text{च्} \times \text{उ}) + (\text{य्} \times \text{उ}) + (\text{भ्} \times \text{अ}) \\ \text{क<sub>2</sub>रीस्युप<sub>3</sub>} &= (\text{क<sub>1</sub>. इ}) + (\text{र्. इ}) + (\text{सं. उ}) + (\text{य्. उ}) + (\text{प<sub>3</sub>. अ}) \\ &= (2 \times 10^2) + (4 \times 10^3) + (6 \times 10^4) + (3 \times 10^5) + (24 \times 1) = 3,64,224. \end{aligned}$$

Mars ; कुज, मङ्गल , भद्रिलङ्गुनुख् , प<sub>3</sub>त्<sub>2</sub>लिङ्ग<sub>3</sub>नुक्<sub>1</sub>नु

$$\text{भद्रिलङ्गुनुख्} = (\text{भ्. अ}) + (\text{द्. इ}) + (\text{ल्. इ}) + (\text{ङ्. उ}) + (\text{न्. उ}) + (\text{ख्. ऋ})$$

$$\begin{aligned} \text{प<sub>3</sub>त्<sub>2</sub>लिङ्ग<sub>3</sub>नुक्<sub>1</sub>नु} &= (\text{पं<sub>3</sub>. अ}) + (\text{त्<sub>2</sub>. इ}) + (\text{ल्. इ}) + (\text{सं<sub>3</sub>. उ}) + (\text{न्. उ}) + (\text{क्<sub>1</sub>. ऋ}) \\ &= (24 \times 1) + (18 \times 10^2) + (5 \times 10^3) + (9 \times 10^4) + (20 \times 10^4) + (2 \times 10^6) \\ &= 22,96,824. \end{aligned}$$

Mercury ; बुध , सुगुशिथन, णुकु<sub>2</sub>प<sub>1</sub>त्<sub>1</sub>नु

$$\text{सुगुशिथन} = (\text{स्. उ}) + (\text{ग्. उ}) + (\text{श्. इ}) + (\text{थ्. ऋ}) + (\text{न्. अ})$$

$$\begin{aligned} \text{णुकु<sub>2</sub>प<sub>1</sub>त्<sub>1</sub>नु} &= (\text{स्. उ}) + (\text{क्<sub>2</sub>. उ}) + (\text{ष्. इ}) + (\text{त्<sub>1</sub>. ऋ}) + (\text{न्. अ}) \\ &= (9 \times 10^5) + (3 \times 10^4) + (7 \times 10^3) + (17 \times 10^6) + (20 \times 1) \\ &= 1,79,37,020 \end{aligned}$$

Venus ; भृगु, शुक्रः , जषबिखुछ्, जषपि<sub>2</sub>कु<sub>1</sub>सं<sub>1</sub>नु

$$\text{जषबिखुछ्} = (\text{ज्. अ}) + (\text{ष्. अ}) + (\text{भ्. इ}) + (\text{ख्. उ}) + (\text{छ्. ऋ})$$

$$\begin{aligned} \text{जषपि<sub>2</sub>कु<sub>1</sub>सं<sub>1</sub>नु} &= (\text{जं. अ}) + (\text{ष्. अ}) + (\text{पं<sub>2</sub>. इ}) + (\text{क्<sub>1</sub>. अ}) + (\text{सं<sub>1</sub>. ऋ}) \\ &= (8 \times 1) + (8 \times 10) + (23 \times 10^2) + (2 \times 10^4) + (7 \times 10^6) \\ &= 70,22,388 \end{aligned}$$

**C. 1. Table showing The number of Revolutions (velocity) of (Geo-centric) Planets in a Yuga (43,20,000 yrs.) arranged in the increasing order in Aryabhatiya Cryptic Numerals and in International Numerals.**

**Table C. 1**

Names of Geo-centric planets		Number of of Revolutions in a Mahayuga (43,20,000 yrs)		
English	Devnagari	Devnagari	Modified Tamizh	International
Saturn	शनि	दुङ्गिघ्व	दुङ्गिक् <sub>2</sub> विक् <sub>3</sub> व	1,46,564
Jupiter	गुरु	खिच्युभ	क् <sub>1</sub> रिष्यप <sub>3</sub>	3,64,224
Mars	कुज, मङ्गळ	भद्रिलङ्गुनुख्	प <sub>3</sub> त् <sub>2</sub> लिङ्ग <sub>3</sub> नुक् <sub>1</sub> नु	22, 96,824
Sun (Earth)	रवि [भुवि]	ख्युघ्	क् <sub>1</sub> य् क् <sub>3</sub> नु	43,20,000
Venus	शुक्र	जषबिखुछ्	जषपि <sub>2</sub> कु <sub>1</sub> सं <sub>1</sub> नु	70,22,388
Mercury	बुध	सुगुशिथन	णुकु <sub>2</sub> प <sub>1</sub> त् <sub>1</sub> नु	1,79,37,020
Moon	सोम	चयगियिङ्गुशुछ्ल्	स्यक् <sub>1</sub> यिङ्गुसं <sub>1</sub> नु	5,77,53,336



C. 2. Comparison of *Sidereal periods based on Aryabhatiya values of number of revolutions of Geo-centric planets in a Mahayuga (43,20,000 yrs) (5th c AD), with the Present-day Recorded Sidereal periods*: -

**Table C. 2**

Comparison: <i>Cryptic Aryabhatiya Numerals for the number of Revolutions of Geo-centric planets in a Mahayuga (43,20,000 yrs) And Aryabhatiya Sidereal periods with Their Present-day Sidereal periods.</i>					
Names of Geo-centric planets	<i>Cryptic Numerals in Devanagari &amp; Tamizh Scripts And in International Numerals for the number of Revolutions of Geo-centric planets in a Mahayuga (43,20,000 yrs)</i>			Comparison: <i>Aryabhatiya Sidereal periods with Their Present-day Sidereal periods</i>	
English	Devnagari	Modified Tamizh	International	Aryabhatiya values	Present-day values
Saturn	ढुङ्गिवध्व	ढुङ्ங்க <sub>2</sub> விக <sub>3</sub> வ	1,46,564	29.48 yrs	29.46 yrs
Jupiter	खिच्युभ	க <sub>2</sub> ரிச்ய <sub>3</sub> ப <sub>3</sub>	3,64,224	11.86 yrs	11.86 yrs
Mars	भदलिङ्गुनुख	ப <sub>3</sub> த <sub>2</sub> லிஜ <sub>1</sub> ந <sub>3</sub> க <sub>1</sub> று	22,96,824	687 days	687 days
Sun (Earth)	ख्युघ	க <sub>1</sub> ய <sub>3</sub> க <sub>3</sub> று	43,20,000	365.26 days	365.26 days
Venus	जषबिखुङ्	ஜஷபி <sub>2</sub> க <sub>3</sub> ச <sub>2</sub> று	70,22,388	224.69 days	224.69 days
Mercury	सुगुशिथन	ஸ <sub>1</sub> கு <sub>2</sub> சி <sub>3</sub> த <sub>1</sub> று <sub>3</sub>	1,79,37,020	87.97 days	87.97 days
Moon	चयगियिङ्गुशुङ्	சயகி <sub>2</sub> யிங் <sub>3</sub> ஸ <sub>1</sub> ச <sub>1</sub> று <sub>3</sub> ல் <sub>3</sub>	5,77,53,336	27.32 days	27.32 days

Formulae to convert *Aryabhatiya cryptic numerals of the number of revolutions of Geo-centric planets to their sidereal periods* are;

$$\text{Sidereal period} = \frac{43,20,000}{\text{number of revolutions of the planet}} \text{ years}$$

$$\text{Sidereal period} = \frac{43,20,000}{\text{number of revolutions of the planet}} \times 365.26 \text{ days}$$

Comparison of *Sidereal periods based on Aryabhatiya values of number of revolutions of Geo-centric planets in a Mahayuga (43,20,000 yrs) (5th c AD), with the Present-day Recorded Sidereal periods* is really, an astonishing eye-opener about our rich heritage.

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