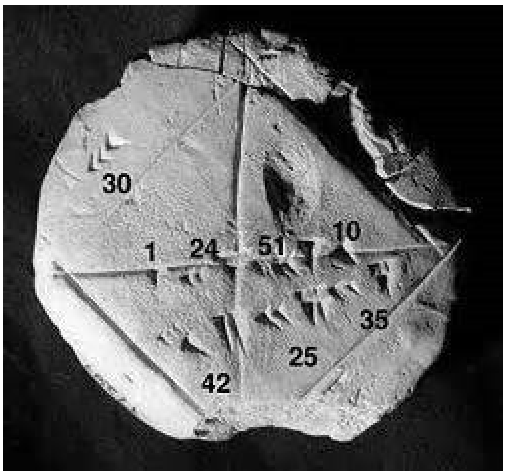
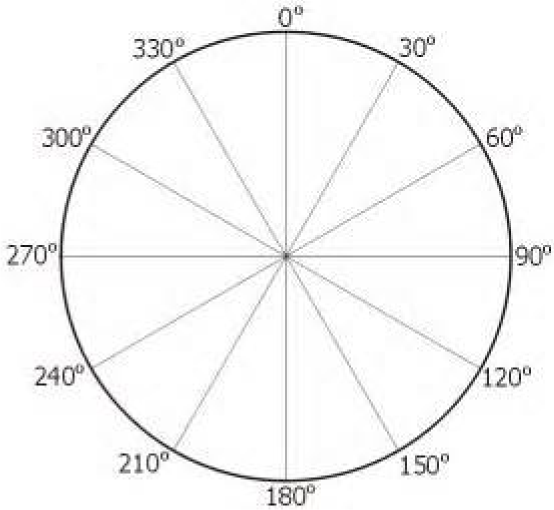
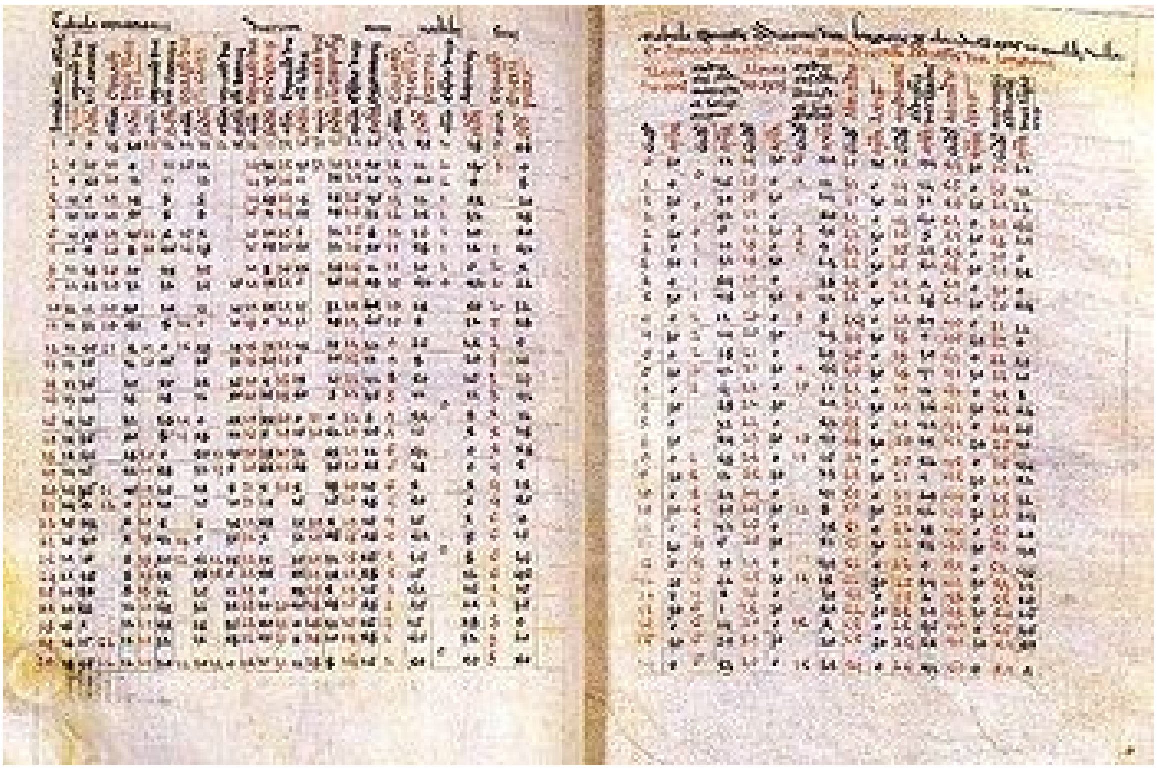
Why Base 60

By John Frederic Sweeney







Abstract

Base 60 mathematics offers convenience for life on a spherical globe, yet why has humanity continued to use a time system based on the sexagesmial system? In our combinatorial universe, Time is controlled by the number 60, which is the reason why the ancients based time – keeping systems on this number. Goodbye, Minkowski Time!

Table of Contents

Introduction 3

Wikipedia on Base 60 Math 5

Vedic Physics on Base 60 Math 12

Conclusion 13

Bibliography 15

Introduction

The author moved to China more than a decade ago and soon began to live by the traditional calendar, in place of the western calendar. The Chinese calendar has been in use for millennia and has been supremely adapted to life in that part of the world, especially for agricultural purposes. Chinese peasants can generally tell the whether by the date within the year, to a surprising degree of accuracy. The traditional Chinese calendar has helped to sustain the most stable, longest - lived society that humanity has known in recent history.

The traditional Chinese calendar is useful for planting and harvesting crops, yet has many other useful applications. Doctors of Chinese medicine once knew that disease is generally seasonal, that is that different seasons generally bring certain types of disease. The Chinese have built an elaborate theory of Chrono - Biology based on this knowledge. Developing the applications even further, the Chinese (or Egyptians) have developed elaborate and highly accurate divination systems to predict the future, all based on Base 60.

The little – known mathematical obscurity called Pisano Periodicity helps to explain the power of Base 60 Math. That is, nature has a law that living things develop to the fullest to the number sixty. The Chinese have long considered this the natural age of humans, while their Yellow Emperor’s Internal Canon considers 120 as the fullest extent of human longetivity. This paper explains the combinatorial basis for Fibonacci (Pisano) Periodicity.

As time progresses, our concept of time diverges from the true standard, just as Earth's orbit grows more eccentric. Western civilization moved from the Julian to the Gregorian, which in fact took us further from true time, until the absurdities of “Minkowski Time” specially developed to support an imaginary theory. Perhaps one of the leading causes of alienation in modern society is the forcing of humans to live and to work according to the dictates of a clock that diverges widely from natural time.

Modern man has almost apparently forgotten the rhythms and geography of natural time, assuming that our modern notion of time is THE standard, scientific concept of time. When the author taught a course on Chinese metaphysics, western students encountered great difficulty in intellectually grasping the intricacies of the traditional Chinese calendar, assuming that a date such as November 3 must always fall at the same time. The students failed to realize that the Chinese adjusted time each year, so that an event which took place on November 3 in one year, would have its anniversary on 5 November the next, according to the western calendar.

This inability of westerners to think of time as NOT a fixed, stable scientific constant led to the absurdity of a book published about the Tai Xuan Jing, which gives fixed dates for fluid times, based on the western calendar. The author and publisher realized that western readers could never understand the concept of Chinese time, with its calculations and geography. The authors even went so far as to not describe the discrepancy within the book, since that probably would have confused readers even further.

In summary, this book provides the scientific reason why we base time on the number sixty, based on combinatorial Vedic Physics. The paper gives the Wiki version of Base 60 and information about Babylon, before moving on to the Vedic Physics explanation. The paper concludes by advocating that the world return to the traditional Chinese calendar or the Indian pachanga in order to re – establish a sense of time for humanity, which stands in accord with the flux of temporal waves.

Wikipedia on Base 60 Math

Sexagesimal (**base 60**) is a numeral system with sixty as its base. It originated with the ancient Sumerians in the 3rd millennium BC, it was passed down to the ancient Babylonians, and it is still used — in a modified form — for measuring time, angles, and geographic coordinates.

The number 60, a superior highly composite number, has twelve factors, namely {1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60}, of which 2, 3, and 5 are prime numbers. With so many factors, many fractions involving sexagesimal numbers are simplified. For example, one hour can be divided evenly into sections of 30 minutes, 20 minutes, 15 minutes, 12 minutes, 10 minutes, 6 minutes, 5 minutes, 4 minutes, 3 minutes, 2 minutes, and 1 minute. 60 is the smallest number that is divisible by every number from 1 to 6; that is, it is the lowest common multiple of 1, 2, 3, 4, 5, and 6.

In this article, all sexagesimal digits are represented as decimal numbers, except where otherwise noted. [For example, **10** *means ten and* **60** *means sixty.]*

It is possible for people to count on their fingers to 12 using one hand only, with the thumb pointing to each finger bone on the four fingers in turn. A traditional counting system still in use in many regions of Asia works in this way, and could help to explain the occurrence of numeral systems based on 12 and 60 besides those based on 10, 20 and 5. In this system, the one (usually right) hand counts repeatedly to 12, displaying the number of iterations on the other (usually left), until five dozens, i. e. the 60, are full.[1][2]

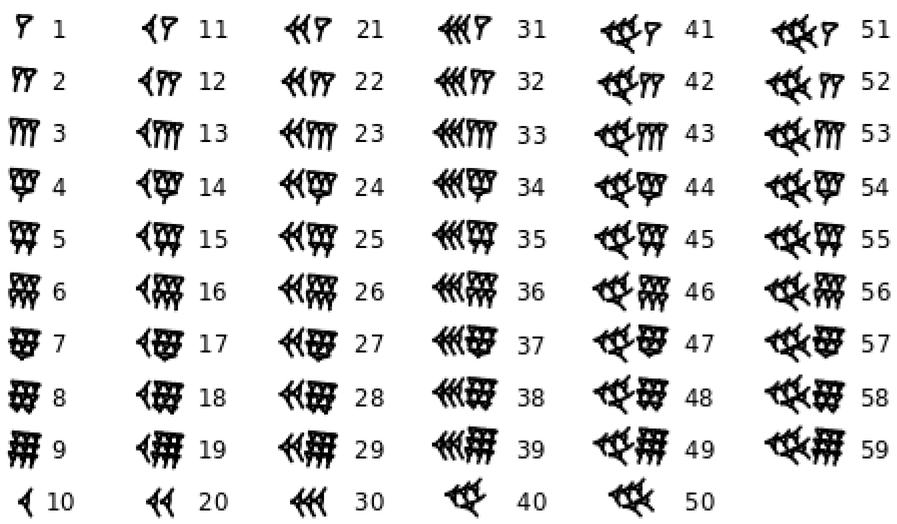
According to Otto Neugebauer, the origins of the sixty-count was through a count of three twenties. The precursor to the later six-ten alternation was through symbols for the sixths, (i.e. 1/6, 2/6, 3/6, 4/6, 5/6), coupled with decimal numbers, led to the same three-score count, and also to the division-system that the Sumerians were famous for.

In normal use, numbers were a haphazard collection of units, tens, sixties, and hundreds. A number like 192, would be expressed uniformly in the tables as 3A2 (with A as the symbol for the '10') but would in the surrounding text be given as XIxxxii i.e., hundred (big 10), sixty (big 1), three tens (little 10's), two (little 1's). [3]

Usage[edit]

Babylonian mathematics[edit]

The sexagesimal system as used in ancient Mesopotamia was not a pure base-60 system, in the sense that it did not use 60 distinct symbols for its digits. Instead, the cuneiform digits used ten as a **sub-base** in the fashion of a sign-value notation: a sexagesimal digit was composed of a group of narrow, wedge-shaped marks representing units up to nine (Y, YY, YYY, YYYY, ... YYYYYYYYY) and a group of wide, wedge-shaped marks representing up to five tens (<, <<, <<<, <<<<, <<<<<). The value of the digit was the sum of the values of its component parts:



Numbers larger than 59 were indicated by multiple symbol blocks of this form in place value notation.

Because there was no symbol for zero in Sumerian or early Babylonian numbering systems, it is not always immediately obvious how a number should be interpreted, and its true value must sometimes have been determined by its context. Without context, this system was fairly ambiguous. For example, the symbols for 1 and 60 are identical[citation needed]. Later Babylonian texts used a placeholder () to represent zero, but only in the medial positions, and not on the right-hand side of the number, as we do in numbers like 13,200.

Other historical usages[edit]

In the Chinese calendar, a sexagenary cycle is commonly used, in which days or years are named by positions in a sequence of ten stems and in another sequence of 12 branches. The same stem and branch repeat every 60 steps through this cycle.

Book VIII of Plato's Republic involves an allegory of marriage centered on the number $60^4 = 12,960,000$ and its divisors. This number has the particularly simple sexagesimal representation 1,0,0,0,0. Later scholars have invoked both Babylonian mathematics and music theory in an attempt to explain this passage.[4]

Ptolemy's *Almagest*, a treatise on mathematical astronomy written in the second century AD, uses base 60 to express the fractional parts of numbers. In particular, his table of chords, which was essentially the only extensive trigonometric table for more than a millennium, has fractional parts in base 60.

In the late eighteenth and early nineteenth century Tamil astronomers were found to make astronomical calculations, reckoning with shells using a mixture of decimal and sexagesimal notations developed by Hellenistic astronomers.[5]

Base-60 number systems have also been used in some other cultures that are unrelated to the Sumerians, for by example the Ekagi people of Western New Guinea.[6][7]

Notation[edit]

In Hellenistic Greek astronomical texts, such as the writings of Ptolemy, sexagesimal numbers were written using the Greek alphabetic numerals, with each sexagesimal digit being treated as a distinct number. The Greeks limited their use of sexagesimal numbers to the fractional part of a number and employed a variety of markers to indicate a zero.[8]

In medieval Latin texts, sexagesimal numbers were written using Hindu Arabic numerals; the different levels of fractions were denoted *minuta* (i.e., fraction), *minuta secunda*, *minuta tertia*, etc. By the seventeenth century it became common to denote the integer part of sexagesimal numbers by a superscripted zero, and the various fractional parts by one or more accent marks.

John Wallis, in his *Mathesis universalis*, generalized this notation to include higher multiples of 60; giving as an example the number 49````,36```,25``,15`,1° ,15',25'',36''',49''''; where the numbers to the left are multiplied by higher powers of 60, the numbers to the right are divided by powers of 60, and the number marked with the superscripted zero is multiplied by 1.[9]

This notation leads to the modern signs for degrees, minutes, and seconds. The same minute and second nomenclature is also used for units of time, and the modern notation for time with hours, minutes, and seconds written in decimal and separated from each other by colons may be interpreted as a form of sexagesimal notation.

In modern studies of ancient mathematics and astronomy it is customary to write sexagesimal numbers with each sexagesimal digit represented in standard decimal notation as a number from 0 to 59, and with each digit separated by a comma. When appropriate, the fractional part of the sexagesimal number is separated from the whole number part by a semicolon rather than a comma, although in many cases this distinction may not appear in the original historical document and must be taken as an interpretation of the text.[10]

Using this notation the square root of two, which in decimal notation appears as 1.41421... appears in modern sexagesimal notation as 1;24,51,10....[11] This notation is used in this article.

Modern usage[edit]

Unlike most other numeral systems, sexagesimal is not used so much in modern times as a means for general computations, or in logic, but rather, it is used in measuring angles, geographic coordinates, and time.

One hour of time is divided into 60 minutes, and one minute is divided into 60 seconds. Thus, a measurement of time such as "3:23:17" (three hours, 23 minutes, and 17 seconds) can be interpreted as a sexagesimal number, meaning $3\times60^2 + 23\times60^1 + 17\times60^0$. As with the ancient Babylonian sexagesimal system, however, each of the three sexagesimal digits in this number (3, 23, and 17) is written using the decimal system.

Similarly, the practical unit of angular measure is the degree, of which there are 360 in a circle. There are 60 minutes of arc in a degree, and 60 arcseconds in a minute.

In some usage systems, each position past the sexagesimal point was numbered, using Latin or French roots: *prime* or *primus*, *seconde* or *secundus*, *tierce*, *quatre*, *quinte*, etc. To this day we call the second-order part of an hour or of a degree a "second". Until at least the 18th century, 1/60 of a second was called a "tierce" or "third".[12][13]

Fractions[edit]

In the sexagesimal system, any fraction in which the denominator is a regular number (having only 2, 3, and 5 in its prime factorization) may be expressed exactly.[14] The table below shows the sexagesimal representation of all fractions of this type in which the denominator is less than 60. The sexagesimal values in this table may be interpreted as giving the number of minutes and seconds in a given fraction of an hour; for instance, 1/9 of an hour is 6 minutes and 40 seconds.

However, the representation of these fractions as sexagesimal numbers does not depend on such an interpretation.

Fraction:	1/2	1/3	1/4	1/5	1/6	1/8	1/9	1/10
Sexagesimal:	30	20	15	12	10	7,30	6,40	6

Fraction:	1/12	1/15	1/16	1/18	1/20	1/24	1/25	1/27
Sexagesimal:	5	4	3,45	3,20	3	2,30	2,24	2,13,20

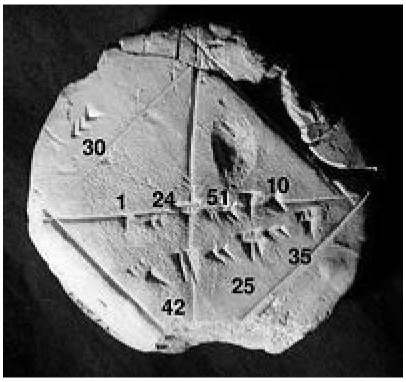
Fraction:	1/30	1/32	1/36	1/40	1/45	1/48	1/50	1/54
Sexagesimal:	2	1,52,30	1,40	1,30	1,20	1,15	1,12	1,6,40

However numbers that are not regular form more complicated repeating fractions. For example:

> 1/7 = 0;8,34,17,8,34,17 ... (with the sequence of sexagesimal digits 8,34,17 repeating infinitely often).

The fact in arithmetic that the two numbers that are adjacent to **60**, namely **59** and **61**, are both prime numbers implies that simple repeating fractions that repeat with a period of one or two sexagesimal digits can only have 59 or 61 as their denominators, and that other non-regular primes have fractions that repeat with a longer period.

Examples[edit]



Babylonian tablet YBC 7289 showing the sexagesimal number 1;24,51,10 approximating √2

The square root of 2, the length of the diagonal of a unit square, was approximated by the Babylonians of the Old Babylonian Period (1900 BC – 1650 BC) as

$$1;24,51,10 = 1 + \frac{24}{60} + \frac{51}{60^2} + \frac{10}{60^3} = \frac{30547}{21600} \approx 1.414212\ldots$$ [15]

Because $\sqrt{2}$ is an irrational number, it cannot be expressed exactly in sexagesimal numbers, but its sexagesimal expansion does begin 1;24,51,10,7,46,6,4,44 ...

The length of the tropical year in Neo-Babylonian astronomy (see Hipparchus), 365.24579... days, can be expressed in sexagesimal as 6,5;14,44,51 ($6\times60 + 5 + 14/60 + 44/60^2 + 51/60^3$) days. The average length of a year in the Gregorian calendar is exactly 6,5;14,33 in the same notation because the values 14 and 33 were the first two values for the tropical year from the Alfonsine tables, which were in sexagesimal notation.

The value of π as used by the Greek mathematician and scientist Claudius Ptolemaeus (Ptolemy) was 3;8,30 = $3 + 8/60 + 30/60^2 = 377/120 \approx 3.141666\ldots$.[16] Jamshīd al-Kāshī, a 15th-century Persian mathematician, calculated π in sexagesimal numbers to an accuracy of nine sexagesimal digits; his value for 2π was 6;16,59,28,1,34,51,46,14,50.[17][18]

Alfonso X assembled a team of scholars, known as the Toledo School of Translators, who among other translating tasks, were commanded to produce new tables that updated the *Tables of Toledo*. The new tables were based on earlier astronomical works and observations by Islamic astronomers, adding observations by astronomers Alfonso had gathered in Toledo, among them several Jewish scholars, like Yehuda ben Moshe and Isaac ibn Sid.[1] He brought Aben Raghel y Alquibicio and Aben Musio y Mohamat, from Seville, Joseph Aben Alí and Jacobo Abenvena, from Córdoba, and fifty more from Gascony and Paris.[2]

The instructions for the *Alfonsine tables* were originally written in Castilian Spanish. The first printed edition of the *Alfonsine tables* appeared in 1483, and a second edition in 1491.[3]

Georg Purbach used the *Alfonsine tables* for his book, *Theoricae novae planetarum* (*New Theory of the Planets*). Nicolaus Copernicus used the second edition in his work. One use of these and similar astronomical tables was to calculate ephemerides, which were in turn used by astrologers to cast horoscopes.[4]

Babylonian Math

The region had been the centre of the Sumerian civilisation which flourished before 3500 BC. This was an advanced civilisation building cities and supporting the people with irrigation systems, a legal system, administration, and even a postal service. Writing developed and counting was based on a sexagesimal system, that is to say base 60. Around 2300 BC the Akkadians invaded the area and for some time the more backward culture of the Akkadians mixed with the more advanced culture of the Sumerians.

The Akkadians invented the abacus as a tool for counting and they developed somewhat clumsy methods of arithmetic with addition, subtraction, multiplication and division all playing a part. The Sumerians, however, revolted against Akkadian rule and by 2100 BC they were back in control.

However the Babylonian civilisation, whose mathematics is the subject of this article, replaced that of the Sumerians from around 2000 BC The Babylonians were a Semitic people who invaded Mesopotamia defeating the Sumerians and by about 1900 BC establishing their capital at Babylon.

The Sumerians had developed an abstract form of writing based on cuneiform (i.e. wedge-shaped) symbols. Their symbols were written on wet clay tablets which were baked in the hot sun and many thousands of these tablets have survived to this day. It was the use of a stylus on a clay medium that led to the use of cuneiform symbols since curved lines could not be drawn. The later Babylonians adopted the same style of cuneiform writing on clay tablets.

Here is **one of their tablets**

Many of the tablets concern topics which, although not containing deep mathematics, nevertheless are fascinating. For example we mentioned above the irrigation systems of the early civilisations in Mesopotamia. These are discussed in [40] where Muroi writes:-

It was an important task for the rulers of Mesopotamia to dig canals and to maintain them, because canals were not only necessary for irrigation but also useful for the transport of goods and armies. The rulers or high government officials must have ordered Babylonian mathematicians to calculate the number of workers and days necessary for the building of a canal, and to calculate the total expenses of wages of the workers.

There are several Old Babylonian mathematical texts in which various quantities concerning the digging of a canal are asked for. They are YBC 4666, 7164, and VAT 7528, all of which are written in Sumerian ..., and YBC 9874 and BM 85196, No. 15, which are written in Akkadian ... . From the mathematical point of view these problems are comparatively simple ...

The Babylonians had an advanced number system, in some ways more advanced than our present systems. It was a positional system with a base of 60 rather than the system with base 10 in widespread use today. For more details of the Babylonian numerals, and also a discussion as to the theories why they used base 60, see our article on Babylonian numerals.

The Babylonians divided the day into 24 hours, each hour into 60 minutes, each minute into 60 seconds. This form of counting has survived for 4000 years. To write 5h 25' 30", i.e. 5 hours, 25 minutes, 30 seconds, is just to write the sexagesimal fraction, 5 $^{25}/_{60}$ $^{30}/_{3600}$. We adopt the notation 5; 25, 30 for this sexagesimal number, for more details regarding this notation see our article on Babylonian numerals. As a base 10 fraction the sexagesimal number 5; 25, 30 is 5 $^{4}/_{10}$ $^{2}/_{100}$ $^{5}/_{1000}$ which is written as 5.425 in decimal notation.

Perhaps the most amazing aspect of the Babylonian's calculating skills was their construction of tables to aid calculation. Two tablets found at Senkerah on the Euphrates in 1854 date from 2000 BC. They give squares of the numbers up to 59 and cubes of the numbers up to 32. The table gives 8^2 = 1,4 which stands for

8^2 = 1, 4 = 1 × 60 + 4 = 64

and so on up to 59^2 = 58, 1 (= 58 × 60 +1 = 3481).

The Babylonians used the formula

$ab = [(a + b)^2 - a^2 - b^2]/2$

to make multiplication easier. Even better is their formula

$ab = [(a + b)^2 - (a - b)^2]/4$

which shows that a table of squares is all that is necessary to multiply numbers, simply taking the difference of the two squares that were looked up in the table then taking a quarter of the answer.

Division is a harder process. The Babylonians did not have an algorithm for long division. Instead they based their method on the fact that

$a/b = a \times (1/b)$

so all that was necessary was a table of reciprocals. We still have their reciprocal tables going up to the reciprocals of numbers up to several billion. Of course these tables are written in their numerals, but using the sexagesimal notation we introduced above, the beginning of one of their tables would look like:

2	0; 30
3	0; 20
4	0; 15
5	0; 12
6	0; 10
8	0; 7, 30
9	0; 6, 40
10	0; 6
12	0; 5
15	0; 4
16	0; 3, 45
18	0; 3, 20
20	0; 3
24	0; 2, 30
25	0; 2, 24
27	0; 2, 13, 20

Now the table had gaps in it since $^1/_7$, $^1/_{11}$, $^1/_{13}$, etc. are not finite base 60 fractions. This did not mean that the Babylonians could not compute $^1/_{13}$, say. They would write

$^1/_{13} = {^7/_{91}} = 7 \times ({^1/_{91}}) =$ (approx) $7 \times ({^1/_{90}})$

and these values, for example $^1/_{90}$, were given in their tables. In fact there are fascinating glimpses of the Babylonians coming to terms with the fact that division by 7 would lead to an infinite sexagesimal fraction. A scribe would give a number close to $^1/_7$ and then write statements such as (see for example [5]):-

... an approximation is given since 7 does not divide.

Babylonian mathematics went far beyond arithmetical calculations. In our article on [Pythagoras's theorem in Babylonian mathematics] we examine some of their geometrical ideas and also some basic ideas in number theory. In this article we now examine some algebra which the Babylonians developed, particularly problems which led to equations and their solution.

We noted above that the Babylonians were famed as constructors of tables. Now these could be used to solve equations. For example they constructed tables for $n^3 + n^2$ then, with the aid of these tables, certain cubic equations could be solved. For example, consider the equation

$$ax^3 + bx^2 = c.$$

Let us stress at once that we are using modern notation and nothing like a symbolic representation existed in Babylonian times. Nevertheless the Babylonians could handle numerical examples of such equations by using rules which indicate that they did have the concept of a typical problem of a given type and a typical method to solve it. For example in the above case they would (in our notation) multiply the equation by a^2 and divide it by b^3 to get

$$(ax/b)^3 + (ax/b)^2 = ca^2/b^3.$$

Putting $y = ax/b$ this gives the equation

$$y^3 + y^2 = ca^2/b^3$$

which could now be solved by looking up the $n^3 + n^2$ table for the value of n satisfying $n^3 + n^2 = ca^2/b^3$. When a solution was found for y then x was found by $x = by/a$. We stress again that all this was done without algebraic notation and showed a remarkable depth of understanding.

Again a table would have been looked up to solve the linear equation $ax = b$. They would consult the $^1/_n$ table to find $^1/_a$ and then multiply the sexagesimal number given in the table by b. An example of a problem of this type is the following.
Suppose, writes a scribe, $^2/_3$ of $^2/_3$ of a certain quantity of barley is taken, 100 units of barley are added and the original quantity recovered. The problem posed by the scribe is to find the quantity of

barley. The solution given by the scribe is to compute 0; 40 times 0; 40 to get 0; 26, 40. Subtract this from 1; 00 to get 0; 33, 20. Look up the reciprocal of 0; 33, 20 in a table to get 1;48. Multiply 1;48 by 1,40 to get the answer 3,0.

It is not that easy to understand these calculations by the scribe unless we translate them into modern algebraic notation. We have to solve

$^2/_3 \times\ ^2/_3\ x + 100 = x$

which is, as the scribe knew, equivalent to solving $(1 - {}^4/_9)x = 100$. This is why the scribe computed $^2/_3 \times\ ^2/_3$ subtracted the answer from 1 to get $(1 - {}^4/_9)$, then looked up $1/(1 - {}^4/_9)$ and so x was found from $1/(1 - {}^4/_9)$ multiplied by 100 giving 180 (which is 1; 48 times 1, 40 to get 3, 0 in sexagesimal).

To solve a quadratic equation the Babylonians essentially used the standard formula. They considered two types of quadratic equation, namely

$x^2 + bx = c$ and $x^2 - bx = c$

where here b, c were positive but not necessarily integers. The form that their solutions took was, respectively

$x = \sqrt{[(b/2)^2 + c]} - (b/2)$ and $x = \sqrt{[(b/2)^2 + c]} + (b/2)$.

Notice that in each case this is the positive root from the two roots of the quadratic and the one which will make sense in solving "real" problems. For example problems which led the Babylonians to equations of this type often concerned the area of a rectangle.

For example, if the area is given and the amount by which the length exceeds the breadth is given, then the breadth satisfies a quadratic equation and then they would apply the first version of the formula above.

A problem on a tablet from Old Babylonian times states that the area of a rectangle is 1, 0 and its length exceeds its breadth by 7. The equation

$x^2 + 7x = 1,\ 0$

is, of course, not given by the scribe who finds the answer as follows. Compute half of 7, namely 3; 30, square it to get 12; 15. To this the scribe adds 1, 0 to get 1; 12, 15. Take its square root (from a table of squares) to get 8; 30. From this subtract 3; 30 to give the answer 5 for the breadth of the triangle. Notice that the scribe has effectively solved an equation of the type $x^2 + bx = c$ by using $x = \sqrt{[(b/2)^2 + c]} - (b/2)$.

In [10] Berriman gives 13 typical examples of problems leading to quadratic equations taken from Old Babylonian tablets.

If problems involving the area of rectangles lead to quadratic equations, then problems involving the volume of rectangular excavation (a "cellar") lead to cubic equations. The clay tablet BM 85200+ containing 36 problems of this type, is the earliest known attempt to set up and solve cubic equations. Hoyrup discusses this fascinating tablet in [26]. Of course the Babylonians did not reach a general formula for solving cubics. This would not be found for well over three thousand years.

Vedic Physics on Base 60 Math

G. Srinivasan has written a sentence of key importance to why we base time on sixty:

Coherence produces spherical or circular time period functions, or rings of simultaneous interactions and hides the true numbers involved.

By coherence, Srinivasan refers to a stable type of matter called Satva, so that when counts in our combinatorial universe reach 8, a unit, such as electrons in the shell of an atom, reach their maximum level and return to zero. This lies in accord with Bott Periodicity, and gives rise to Base 60 time keeping, at least in terms of 8 x 8 Satva forms of stable matter.

We can apply Base 60 to a circle, based on this discussion:

The organic spectrum is governed by a flexible Bhava disposition that retains the Linga coherent state. The angular division for a coherent state must have a ratio of ½ or 30 degrees. Axiomatically, a coherent structure with six or twelve divisions in a cycle would be required. For this reason, Carbon chemistry forms the base of organic states.

In the same way, astral stress transmigration that distort or twist this angular or hexagonal form only need to be studied, and astrological and Ayurvedic divisions are based on 12 sectors, with 10 as the summation total following Sankhyan guna principle of self - similar interactions. Thus, 120 divisions are used to empirically relate the twist due to stresses caused by planetary transits or configurations.

The Vernier Effect of 10-1=9 gives the degree of overlap of adjacent angular dispositions.

The complete context of Srinivasan's discussion lies here:

Lissajou figures below show the coherent ring when n1 n2 are equal or reflect simultaneous activity but

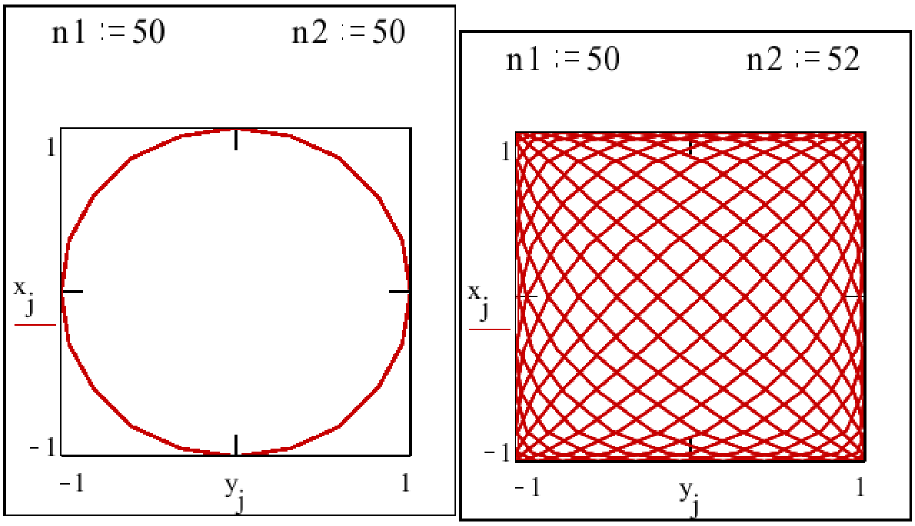


Fig: Lissajou Figures Show Coherence

when there are more than one count difference the coherent pattern breaks up and increases the interactive count. . In the same way when the count of C is identical along all three axis the the C^3 count falls into step and the value of counts reduce to C thereby hiding C^2 as a factor that increases the density and displays mass characteristics. Coherence produces spherical or circilar time period functions or rings of simultaneous interactions and hides the true numbers involved.

Conclusion

This paper has provided the Wikipedia explanation for time and for Babylonian Math in order to describe how humanity has come to rely upon Base 60 for Time, as well as for geography. In Vedic Physics, combinatorial aspects of our universe dictate that

Coherence produces spherical or circular time period functions, or rings of simultaneous interactions and hides the true numbers involved.

For this reason, as a result of the very character of our universe, Time occurs in cycles, although we may not possess the ability to distinguish the different layers of time. Much of our reality consists of stable 8 x 8 Satva matter, and follows Bott Periodicity, as well as Fibonacci Periodicity. Therefore, Time itself follows such patterns naturally.

The Chinese followed this pattern for millenia and have thus produced the longest – lived, most stable society known to humanity. The I Ching, based on 8 x 8 = 64 hexagrams, with commentary by Confucius, provides the philosophical basis for Chinese culture and society. Despite 140 years of the world's greatest and longest revolution, the Chinese still fail to quit themselves of this compelling way of life, with Spring Festival (Chinese New Year) still dictating the annual rhythms of life under a communist government. It is also for this reason that Chinese culture rejected the 9 x 9 Rajic Tai Xuan Jing, perhaps viewing it as merely a useless import from India which Chinese philosophy ultimately failed to comprehend.

One might argue that the Chinese chose the stability of the 8 x 8 I Ching while rejecting the dynamism of the 9 x 9 Tai Xuan Jing, which reflects the inherent conservative and cowardly aspects of Chinese culture. Berkeley historian David Johnson once asked the question, “Why didn't Chinese go further” to advance their supposed discoveries of gunpowder, for example, in the way that westerners have developed such discoveries. The answer lies in their historical embrace of the 8 x 8 Satva model and philosophy. Chinese are afraid of things that explode.

Bibliography

Wikipedia

http://www-groups.dcs.st-and.ac.uk/~history/HistTopics/Babylonian_mathematics.html

Secrets of Sankhya v. II, by G. Srinivasan, 2005.

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Some men see things as they are and say *why?* I dream things that never were and say *why not?*

Let's dedicate ourselves to what the Greeks wrote so many years ago:

to tame the savageness of man and make gentle the life of this world.

Robert Francis Kennedy