Süryasiddhänta

Upon reading the text of the Surya Siddhanta it has become evident that practically each and every verse of the text has some relevance according to the stated guidelines for research of the Pramana Group. Therefore I have chosen to post the entire text, broken into chapters, with both Romanised transliteration of the original texts, as well as English translations.

For each chapter there will be a list at the start that states which of the verses apply to each of the different topic areas outlined in the research guidelines, and a brief description of the content given. Below this list will be the entire chapter of the text with translations placed following the relevant verses.

The Sanskrit transliteration was obtained from M. Yano's website, and has been prepared from the following texts:

1. The Sürya-siddhänta with its commentary the Güòhärtha-prakäçaka, edited by Fits-Edward ùall, Bibliotheca Indica ëo.79, Calcutta 1854. (reprinted as volume 25 of Bibliotehca Indica, Biblio Verlag, Osnabruck 1980).
2. Käçé saàskåta granthamälä 144, Caukhamba ñanskrit ñaàsthäna, Fourth edition, 1987.
3. The commentary of Sudhäkara òvivedé, ed. by òr. çré kåñëa Candra òvivedé, ñampurnanand ñanskrit University, 1987.

Where there is a discrepancy between the three, the alternative reading is stated in brackets at the end of the relevant line, along with a number indicating which of the above texts it is taken from.

The English translation is that given by Reverend Ebenezer Burgess, 1860, Journal of the American Oriental Society. Whilst the translation is not perfect, it is very useful. The only change to his translation is for the first verse of chapter one, which I took the liberty of amending, and I welcome any comments from the learned devotees in this regard.

Your servant,
Antardwip das

Chapter One

Madhyamadhikara - The Mean Places of Planets

1. Structure of the Universe
    a. Text 14; day and night of gods and demons stated to be mutually opposed to each other
    b. Texts 25 – 44; movements of the planets described
    c. Texts 68 – 70; deviations of the planets north and south of the ecliptic

2. Geography
    a. Texts 59 – 60; circumference of the Earth and calculating the corrected circumference for a place
    b. Text 62; position of the prime meridian
    c. Text 66; the time of the succession of weekdays according to position relative to the prime meridian

3. Creation of the living entities, etc
    a. Text 24; statement regarding amount of time spent by Lord Brahma in creation

4. Science
    a. Texts 8 – 24; description of the measurements of time
    b. Text 28 – divisions of a circle in degrees, etc
    c. Texts 35 – 40; further calculations and measurements of time
    d. Texts 45 – 50; calculation of the number of days passed since creation
    e. Texts 51 – 52; calculation of planetary Lord's of days, months and years
    f. Texts 53 – 54; calculating the mean positions of planets, etc
    g. Text 55; calculating the year of Jupiter's cycle
    h. Texts 57 – 58; mean position of planets, etc at end of previous golden age
    i. Texts 60 – 61; correcting the mean position of planets for the distance of a place from the prime meridian
    j. Texts 63 – 65; calculating the distance of a place from the prime meridian
    k. Text 67; correcting the mean position for the exact time in question relative to midnight

Text & Translation

1.01a acintyävyaktarüpäya nirguëäya guëätmane/
1.01b samastajagadädhäramürtaye brahmaëe namaù//

To him whose form is inconceivable and unmanifested, who is transcendental to material qualities, the source of the three modes of material nature and whose form is the support of the entire creation – to the Supreme Brahman be homage!

1.02a alpävaçiñöe tu kåte *mayo näma mahäsuraù/(1. mayanäma)
1.02b rahasyaà paramaà puëyaà jijï äsur jï änam uttamam//

1.03a vedäì gam agryam akhilaà jyotiñäà gatikäraëam/
1.03b ärädhayan vivasvantaà tapas tepe suduçcaram//

When but little of the Golden Age (krta yuga) was left, a great demon, named Maya, being desirous to know that mysterious, supreme, pure and exalted science, that chief auxillary of the scriptures, in its entirety – the cause, namely of the motion of the heavenly bodies, performed, in propitiation of the Sun, very severe religious austerities.

1.04a toñitas tapasä tena prétas tasmai varärthine/
1.04b grahäëäà caritaà prädän mayäya savitä svayam//

1.05a viditas te *mayä bhävas toñitas tapasä hy aham/ (3. mayäbhävas)
1.05b dadyäà käläçrayaà jï änaà grahäëäà caritaà mahat//

1.06a na me tejaùsahaù kaçcid äkhyätuà nästi me kñaëaù/
1.06b madaàçaù puruño +ayaà te niùçeñaà kathayiñyati//

Gratified by these austerities, and rendered propitious, the Sun himself delivered unto that Maya, who besought a boon, the system of the planets. The blessed Sun spoke, "Thine intent is known by me; I am gratified by thine austerities; I will give thee the science upon which time is founded, the grand system of the planets. No one is able to endure my brilliancy; for communication I have no leisure; this person, who is a part of me, shall relate to thee the whole."

1.07a ity uktvänтardadhe devaù samädiçyäàçam ätmanaù/
1.07b sa pumän mayam ähedaà praëataà präï jalisthitam//

1.08a çåëuñvaikamanäù pürvaà yad uktaà jï änam uttamam/
1.08b yuge yuge maharñéëäà svayam eva vivasvatä//

1.09a çästram ädyaà tad evedaà yat pürvaà präha bhäskaraù/
1.09b yugänäà parivartena kälabhedo +atra *kevalaù//(1. kevalam)

Thus having spoken, the god disappeared, having given directions unto the part of himself. This later person thus addressed Maya, as he stood bowed forward, his hands suppliantly joined before him. "Listen with concentrated attention to the great and exalted science, which has been spoken, in each successive age, to the great sages, by the Sun himself. This is that very same original textbook which the Sun of old promulgated: only, be reason of the revolution of the ages, there is here a difference of times.

1.10a lokänäm antakåt kälaù kälo +anyaù kalanätmakaù/
1.10b sa dvidhä sthülasükñmatvän mürtaç cämürta ucyate//

Time is the destroyer of the worlds; another Time has for its nature to bring to pass. This latter, according as it is gross or minute, is called by two names, real (murta) and unreal (amurta).

1.11a präëädiù kathito mürtas truöyädyo +amürtasaàjïakaù/
1.11b ñaòbhiù präëair vinäòé syät tatñañöyä näòikä småtä//

1.12a näòéñañöyä tu näkñatram ahorätraà prakértitam/
1.12b tattriàçatä bhaven mäsaù sävano +arkodayais tathä//

1.13a aindavas tithibhis tadvat saàkräntyä saura ucyate/
1.13b mäsair dvädaçabhir varñaà divyaà tad aha ucyate//

1.14a suräsuräëäm anyonyam ahorätraà viparyayät/
1.14b tatñañöiù ñaòguëä divyaà varñam äsuram eva ca//

That which begins with respirations (prana) is called real; that which begins with atoms (truti) is called unreal. Six respirations make a vinadi, sixty of these a nadi; and sixty nadis make a sidereal day and night. Of thirty of these sidereal days is composed a month; a civil (savana) month consists of as many sunrises; a lunar month, of as many lunar days (tithis); a solar (saura) month is determined by the entrance of the Sun into a sign of the zodiac. Twelve months make a year, this is called a day of the gods. The day and night of the gods and of the demons are mutually opposed to one another. Six times sixty of them are a year of the gods, and likewise of the demons.

1.15a taddvädaçasahasräëi caturyugam udähåtam/
1.15b süryäbdasaàkhyayä dvitrisägarair ayutähataiù//

1.16a sandhyäsandhyäàçasahitaà vijïeyaà taccaturyugam/
1.16b kåtädénäà vyavastheyaà dharmapädavyavasthayä//

1.17a yugasya daçamo bhägaç catustridvyekasaìguëaù/
1.17b kramät kåtayugädénäà ñañöhäàçaù sandhyayoù svakaù//

Twelve thousand of these divine years are denominated a Quadruple Age (caturyuga); of ten thousand times four hundred and thirty two solar years is composed that Quadruple Age, with its dawn and twilight. The difference of the Golden and the other Ages, as measured by the difference in the number of the feet of virtue in each, is as follows: The tenth part of an Age, multiplied successively by four, three, two, and one, gives the length of the Golden and the other Ages, in order: the sixth part of each belongs to its dawn and twilight.

1.18a yugänäà saptatiù saikä manvantaram ihocyate/
1.18b *kåtäbdasaàkhyäs tasyänte sandhiù prokto jalaplavaù//(1. åtäbdasaàkhyä)

1.19a sasandhayas te manavaù kalpe jïeyäs caturdaça/
1.19b kåtapramäëaù kalpädau sandhiù païcadaçaù småtaù//

1.20a ittham yugasahasreëa bhütasaà härakärakaù/
1.20b kalpo brähmam ahaù proktaà çarvaré tasya tävaté//

1.21a paramäyuù çataà tasya tayähorätrasaàkhyayä/
1.21b äyuño +ardhamitaà tasya çeñakalpo +ayam ädimaù//

1.22a kalpäd asmäc ca manavaù ñaò vyatétäù sasandhayaù/
1.22b vaivasvatasya ca *manor yugänäà trighano gataù//(1. manoyugänäà)

1.23a añöävi àçäd yugäd asmäd yätam etat kåtaà yugam/
1.23b ataù kälaà prasaàkhyäya saàkhyäm ekatra piëòayet//

One and seventy Ages are styled here a Patriarchate (manvantara); at its end is said to be a twilight which has the number of years of a Golden Age, and which is a deluge. In an Aeon (kalpa) are reckoned fourteen such Patriarchs (manu) with their twilights; at the commencement of the Aeon is a fifteenth dawn, having the length of a Golden Age. The Aeon is accordingly thus composed. The Aeon, thus composed of a thousand Ages, and which brings about the destruction of all that exists, is styled a day of Brahma; his night is of the same length. His extreme age is a hundred, according to this valuation of a day and a night. The half of his life is past; of the remainder, this is the first Aeon. And of this Aeon, six patriarchs (manu) are past, with their respective twilights; and of the Patriarch Manu son of Vivasvant, twenty-seven Ages are past. Of the present, the twenty eighth Age, this Golden Age is past; from this point, reckoning up the time, one should compute together the whole number.

1.24a graharkñadevadaityädi såjato +asya caräcaram/
1.24b kåtädrivedä divyäbdäù çataghnä vedhaso gatäù//

One hundred times four hundred and seventy four divine years passed while the all wise was employed in creating the animate and inanimate creation, plants, stars, gods, demons, and the rest.

1.25a paçcäd vrajanto +atijaväàn nakñatraiù satataà grahäù/
1.25b jéyamänäs tu lambante tulyam eva svamärgagäù//

1.26a präggatitvam atas teñäà bhagaëaiù pratyahaà gatiù/
1.26b pariëähavaçäd bhinnä tadvaçäd bhäni bhuïjate//

1.27a çéghragas täny athälpena kälena mahatälpagaù/
1.27b teñäà tu parivartena pauñëänte bhagaëaù småtaù//

The planets moving westward with exceeding velocity, but constantly beaten by the asterism, fall behind, at a rate precisely equal, proceeding each in its own path. Hence they have an eastward motion. From the number of their revolutions is derived their daily motion, which is different according to the size of their orbits; in proportion to this daily motion they pass through the asterisms. One which moves swiftly passes through them in a short time; one which moves slowly, in a long time. By their movement, the revolution is accounted complete at the end of the asterism Revati.

1.28a vikaläna à kalä ñaño yä tatñaño yä bhäga ucyate/
1.28b tattri à çatä bhaved räçir bhagaëo dvädaçaiva te//

Sixty seconds (vikala) make a minute (kala); sixty of these, a degree (bhaga); thirty of the latter is composed a sign (rasi); twelve of these are a revolution (bhagana).

1.29a yuge süryaj ï açukräëäm khacatuñkaradärëaväù/
1.29b kujärkiguruç é ghräëä à bhagaëäù pürvayäyinäm//

1.30a indo rasägnitritr é ñusaptabhüdharamärgaëäù/(57753336)
1.30b dasratryaño arasä ì käkñilocanäni kujasya tu//(2296832)

1.31a budhaç é ghrasya çünyartukhädritrya ì kanagendavaù/(17937060)
1.31b båhaspateù khadasräkñivedañaòvahnayas tathä//(364220)

1.32a sitaç é ghrasya ña ö saptatriyamäçvikhabhüdharäù/(7022376)
1.32b çaner bhuja ì gañaöpa ï carasavedaniçäkaräù//(146568)

1.33a candroccasyägniçünyäçvivasusarpärëavä yuge/(488203)
1.33b väma à pätasya vasvagniyamäçviçikhidasrakäù//(232238)

1.34a bhänäm añöäkñivasvadritridvidvyañöaçarendavaù/(1582237828)
1.34b bhodayä bhagaëaiù svaiù svair ünäù svasvodayä yuge//

In an Age (yuga), the revolutions of the Sun, Mercury, and Venus and of the conjunctions (sighra) of Mars, Saturn, and Jupiter, moving eastward, are 4 320 000; of the Moon, 57 753 336; of Mars, 2 296 832; of Mercury's conjunction (sighra), 17 937 060; of Jupiter, 364 220; of Venus's conjunction (sighra), 7 022 376; of Saturn, 146 568; of the Moon's apsis (ucca), in an Age, 488 203; of its node (pata), in the contrary direction 232 238; of the asterisms, 1 582 237 828. The number of risings of the asterisms, diminished by the number of the revolutions of each planet respectively, gives the number of risings of the planets in an Age.

1.35a bhavanti çaçino mäsäù süryendubhagaëäntaram/
1.35b ravimäsonitäs te tu çeñäù syur adhimäsakäù//

1.36a sävahähäni cändrebhyo dyubhyaù projjhya tithikñayäù/
1.36b udayäd udaya à bhänor bhümisävanaväsaraù//

1.37a vasudvyañöädrirüpä ì kasaptädritithayo yuge/(1577917828)
1.37b cändräù khäñöakhakhavyomakhägnikhartuniçäkaräù//(1603000080)

1.38a ñaòvahnitrihutäçä ì katithayaç cädhimäsakäù/(1593336)
1.38b tithikñayä yamärthäçvidvyañöavyomaçaräçvinaù//(25082252)

1.39a khacatuñkasamudräñöakupa ï ca ravimäsakäù/(51840000)
1.39b bhavanti bhodayä bhänubhagaëair ünitäù kvahäù//

1.40a adhimäsonarätryärkñacändrasävanaväsaräù/
1.40b ete sahasraguëitäù kalpe syur bhagaëädayaù//

The number of lunar months is the difference between the number of revolutions of the Sun and the Moon. If from it the number of solar months be subtracted, the remainder is the number of intercalary months. Take the civil days from the lunar, the remainder is the number of omitted lunar days (tithiksaya). From rising to rising of the Sun are reckoned terrestrial civil days; of these there are, in an Age, 1 577 917 828; of lunar days, 1 630 000 080; of intercalary months, 1 593 336; of omitted lunar days, 25 082 252; of solar months, 51 840 000. The number of risings of the asterisms, diminished by that of the revolutions of the Sun, gives the number of terrestrial days. The intercalary months, the omitted lunar days, the sidereal, lunar, and civil days – these, multiplied by a thousand, are the number of revolutions, etc, in an Aeon .

1.41a präggateù süryamandasya kalpe saptäñöavahnayaù/(387)
1.41b kaujasya vedakhayamä baudhasyäñöartuvahnayaù//(204, 368)

1.42a khakharandhräëi jaivasya çaukrasyärthaguëeñavaù/(900, 535)
1.42b go +agnayaù çanimandasya pätänäm atha vämataù//(39)

1.43a manudasräs tu kaujasya baudhasyäñöäñöasägaräù/ (214, 488)
1.43b kåtädricandrä jaivasya trikhäìkäç ca tathä bhågos //(3. bhågos tathä)(174, 903)

1.44a çanipätasya bhagaëäù kalpe yamarasartavaù/(662)
1.44b bhagaëäù pürvam evätra proktäç candroccapätayoù//

The revolutions of the Sun's apsis (manda), moving eastward, in an Aeon, are 387; of that of Mars, 204; of that of Mercury, 368; of that of Jupiter, 900; of that of Venus, 535; of the apsis of Saturn, 39. Farther, the revolutions of the nodes, retrograde, are: of that of Mars, 214; of that of Mercury, 488; of that of Jupiter, 174; of that of Venus, 903; of the node of Saturn, the revolutions in an Aeon are 662: the revolutions of the Moon's apsis and node have been given here already.

1.45a ñaëmanünäà tu sampéòya kälaà tatsandhibhiù saha/
1.45b kalpädisandhinä särdhaà vaivasvatamanos tathä//

1.46a yugänäm trighanaà yätaà tathä kåtayugaà tv idam/
1.46b projjhya såñöes trataù kälaà pürvoktaà divyasaàkhyayä//

1.47a süryäbdasaàkhyayä jïeyäù kåtasyänte gatä amé/
1.47b khacatuñkayamädryagniçararandhraniçäkaräù//(1953720000)

1.48a ata ürdhvam amé yuktä gatakäläbdasaàkhyayä/
1.48b mäsékåtä yutä mäsair madhuçuklädibhir gataiù//

Now add together the time of the six Patriarchs (manu), with their respective twilights, and with the dawn at the commencement of the Aeon (kalpa); farther, of the Patriarch Manu, son of Vivasvant, the twenty seven ages (yuga) that are passed, and likewise the present Golden Age (krita yuga); from their sum subtract the time of creation, already stated in terms of divine years. In solar years, the result is the time elapsed at the end of the Golden Age; namely, 1 953 720 000. To this, add the

number of years of the times since passed, reduce the sum to months, and add the months expired of the current year, beginning with the light half of Caitra.

1.49a påthaksthäs te +adhimäsaghnäù süryamäsavibhäjitäù/
1.49b labdhädhimäsakair yuktä dinékåtya dinänvitäù//

1.50a dviñöhäs tithikñayäbhyastäç cändraväsarabhäjitäù/
1.50b labdhonarätrirahitä laìkäyäm ärdharätrikaù//

1.51a sävano dyugaëaù süryäd dinamäsäbdapäs tataù/
1.51b saptabhiù kñayitaù çeñaù süryädyo väsareçvaraù//

Set the result down in two places; multiply it by the number intercalary months, and divide that by the solar months, and add to the last result the number of intercalary months thus found; reduce the sum to days, and add the days expired of the current month. Set the result down in two places, multiply it by the number of omitted lunar days, and divide by that of lunar days; subtract from the last result the number of omitted lunar days thus obtained: the remainder is, at midnight, on the meridian of Lanka, the sum of days, in civil reckoning. From this may be found the Lord's of the day, the month, and the year, counting from the Sun. If the number be divided by seven, the remainder marks the lord of the day, beginning with the Sun.

1.52a mäsäbdadinasaàkhyäptaà dvitrighnaà rüpasaàyutam/
1.52b saptoddhåtävaçeñau tu vijïeyau mäsavarñau//

Divide the same number by the number of days in a month and in a year, multiply the one quotient by two and the other by three, add one to each product, and divide by seven; the remainders indicate the lords of the month and year.

1.53a yathä svabhaganäbhyasto dinaräçiù kuväsaraiù/
1.53b vibhäjito madhyagatyä bhagaëädir graho bhavet//

Multiply the sum of days (dinarasi) by the number of revolutions of any planet, and divide by the number of civil days; the result is the position of that planet, in virtue of its mean motion, in revolutions and parts of a revolution.

1.54a evaà svaçéghramandoccä ye proktäù pürvayäyinaù/
1.54b vilomagatayaù pätäs tadvac cakräd viçodhitäù//

Thus also are ascertained the places of the conjunction (sighra) and apsis (mandocca) of each planet, which have been mentioned as moving eastward; and in like manner of the nodes, which have a retrograde motion, subtracting the result from a whole circle.

1.55a dvädaçaghnä guror yätä bhagaëä vartamänakaiù/
1.55b räçibhiù sahitäù çuddhäù ñañöyä syur vijayädayaù//

Multiply by 12 the past revolutions of Jupiter, add the signs of the current revolution, and divide by sixty; the remainder the year of Jupiter's cycle, counting from Vijaya.

1.56a vistareëaitad uditaà saàkñepäd vyävahärikam/
1.56b madhyamänayanaà käryaà grahäëäm iñöato yugät//

1.57a asmin kåtayugasyänte sarve madhyagatä grahäù/
1.57b *vinä tu pätamandoccän meñädau tulyatäm itäù (3. vinendu)//

1.58a makarädau çaçäìkoccaà tatpätas tu tulädigaù/
1.58b niraàçatvam gatäç cänye noktäs te mandacärïeaù//

The processes which have thus been stated in full detail, are practically applied in an abridged form. The calculation of the mean place of the planets may be made from any epoch (yuga) that may be fixed upon. Now, at the end of the Golden Age (krita yuga), all the planets, by their mean motion; excepting, however, their nodes and apsides (mandocca) – are in conjunction in the first of Aries. The Moon's apsis (ucca) is in the first of Capricorn, and its node is in the first of Libra; and the rest, which have been stated above to have a slow motion – their position cannot be expressed in whole signs.

1.59a yojanäni çatäny añöau bhükarëo dviguëäni tu/
1.59b tadvargato daçaguëät padaà bhüparidhir bhavet//

1.60a lambajyäghnas trijéväptaù sphuöo bhüparidhiù svakaù/
1.60b tena deçäntaräbhyastä grahabhuktir vibhäjitä//

Twice eight hundred yojanas are the diameter of the Earth: the square root of ten times the square of that is the Earth's circumference. This, multiplied by the sine of the co-latitude (lambajya) of any place, and divided by radius (trijiva), is the corrected (sphuta) circumference of the Earth at that place. Multiply the daily motion of a planet by the distance in longitude (desantara) of any place, and divide by its corrected circumference.

1.61a kaläadi tat phalaà präcyäà grahebhyaù pariçodhayet/
1.61b rekhäpratécésaàsthäne prakñipet syuù svadeçajä//

The quotient, in minutes, subtract from the mean position of the planet as found, if the place be east of the prime meridian (rekha); add, if it be west; the result is the planet's mean position at the given place.

1.62a räkñasälayadevaukaùçailayor madhyasütragäù/
1.62b rohétakam avanté ca yathä sannihitaà saraù//

Situated upon the line which passes through the haunt of the demons (rakshasa) and the mountain which is the seat of the gods, are Rohitaka and Avanti, as also the adjacent lake.

1.63a atétyonmélanäd indoù paçcät tadgaëitägatät/(2. atétyonmélanäd indor dåksiddhir gaëitägatät/)
1.63b yadä bhavet tadä präcyäà svasthänaà madhyato bhavet//

1.64a apräpya ca bhavet paçcäd evaà väpi nimélanät/
1.64b tayor antaranäòébhir hanyäd bhüparidhià sphuöam//

1.65a ñañöyä vibhajya labdhais tu yojanaiù präg athäparaiù/
1.65b svadeçaù paridhau jïeyaù kuryäd deçäntaraà hi taiù//

When, in a total eclipse of the Moon, the emergence (unmilana) takes place after the calculated time for its occurrence, then the place of the observer is to the east of the central meridian. When it takes place before the calculated time, his place is to the west: the same thing may be ascertained likewise from the immersion (nimilana). Multiply by the difference of the two times in nadis the corrected circumference of the Earth at the place of observation, and divide by sixty, the result, in yojanas, indicates the distance of the observer from the meridian, to the east or to the west, upon his own parallel: and by means of that is made the correction for difference of longitude.

1.66a väräpravåttiù prägdeçe kñapärdhe +abhyadhike bhavet/
1.66b taddeçäntaranäòébhiù paçcäd üne vinirdiçet//

The succession of the week day (vara) takes place, to the east of the meridian, at a time after midnight equal to the difference in nadis; to the west of the meridian, at a corresponding time before midnight.

1.67a iñöanäòéguëä bhuktiù ñañöyä bhaktä kalädikam/
1.67b gate çodhyaà yutaà gamye kåtvä tätkäliko bhavet//

Multiply the mean daily motion of a planet by the number of nadis of the time fixed upon, and divide by sixty: subtract the quotient from the place of the planet, if the time be before midnight; add, if it be after: the result is its place at a given time.

1.68a bhacakraliptäçétyaàçaà paramaà dakñiëottaram/
1.68b vikñipyate svapätena svakräntyantäd anuñëaguù//

1.69a tannavàçaà dviguëitaà jévas triguëitaà kujaù/
1.69b budhaçukrärkajäù pätair vikñipyante caturguëam//

1.70a evam trighanarandhrärkarasärkärkä daçähatäù/
1.70b candrädénäà kramäd uktä madhyavikeñepaliptikäù//

The moon is, by its node, caused to deviate from the limit of its declination (kranti), northward and southward, to a distance, when greatest, of an eightieth part of the minutes of a circle; Jupiter, to the ninth part of that multiplied by two; Mars, to the same amount multiplied by three; Mercury, Venus, and Saturn are by their nodes caused to deviate to the same amount multiplied by four. So also, twenty-seven, nine, twelve, six, twelve, and twelve, multiplied by ten, give the number of minutes of mean latitude (vikshepa) of the moon and the rest, in their order.