

Technical Notes on Primary Directions to accompany *American is Born: Introducing the Regulus USA National Horoscope*

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November 2011: Reformatted posts into single document; very minor edits.

Introduction

What started as a convenient method to supply readers of *America is Born* with an Excel spreadsheet showing all Ascendant primary directions has morphed into a bigger project. Writing this post January 24, 2009, I have met an expanded goal of providing Excel spreadsheets with calculations for all major methods of primary directions:

1. Ascendant directions
2. Midheaven directions
3. Interplanetary directions
 - Ptolemy's method (also known as Placidus-classic, Placidus Semi-arc, and Alchabitius)
 - Regiomontanus Under the Pole
 - Placidus Under the Pole
 - Placidian Mundo

Methodology behind these spreadsheets is explained in this writeup; the actual spreadsheets are available for download: see the zipped file "AIB Data Files."

At present an intermediate knowledge of the celestial sphere and primary directions is assumed. I do not, for instance, take the most basic steps to explain variables like Meridian Distance, Semi-Arcs, and the like. In the future I plan to do so in a planned third book: *Primary Directions: The Practice Manual*.

Intermediate students who have purchased Rumén Kolev's books on primary directions will probably feel most at home here as my spreadsheets for Placidian Mundo, Placidus under the Pole, and Regiomontanus under the Pole methods follow Kolev's algorithms, variables, and other naming conventions.

Students of Robert Zoller will also feel at home. Starting with the example of directing the trine of Jupiter to the Sun in Zoller's own chart used in his teaching materials - now implemented in Excel - Zoller students can begin the journey of comparing different systems of interplanetary primary directions.

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Notes for Excel Spreadsheet Users

I. 1904 Date Conversion workaround

Because of Excel's 1904 date convention which prevents adding and subtracting dates prior to 1904, a constant of 1000 years is added to all spreadsheet dates. If you see '6-Jun-2864' think instead '6-Jun-1864.' It's that way on all the spreadsheets.

II. Conversion from Degrees, Minutes and Seconds to Decimal Format

Example:

21AR24'28" => decimal format: = (21 + ((24 + 28/60)/60)) = 21.407778.

III. Conversion from Radians to Degrees for Trigonometry Functions

Microsoft Excel trig functions assume the input is radians, not degrees. A translation is required.

As an example compute the tangent of 50 degrees.

The Excel function is $\tan(x)$

But $\tan(50) = -0.2719$ which is not correct. The function assumes 50 radians, not 50 degrees.

To convert FROM degrees TO radians, multiply degrees by 'PI()/180'

So $\tan(50 * \pi() / 180) = 1.191754$ which is what we want.

Similarly for functions like arcsin which we need to compute the ascensional difference, the arcsin function will produce a figure in radians as output, not degrees. The fix is to use the degrees function.

Staying with the tangent example above, let's take the arctan of 1.191754

$\text{atan}(1.191754) = 0.872665$ radians => wrong answer

but

$\text{degrees}(\text{atan}(1.191754)) = 50$ degrees => right answer



Interplanetary Directions – Ptolemy

What Robert Zoller names the 'Alchabitus Method'; what Ptolemy refers to in *Tetrabiblos*, and what Rumen Kolev refers to as 'Placidus-Classic' are all different names for the same method. I have decided to choose 'Ptolemy' to describe it.

I. Mathematical Outline for Computing Ptolemy's Interplanetary Primary Directions

1. Compute right and oblique ascensions for both the significator and promissor.
2. Compute the difference between the right ascensions of the significator and promissor. Name this the 'Significator of the Right Circle (SRC).'
3. Compute the difference between the oblique ascensions of the significator and promissor. Name this the 'Significator of the Region (SOR).'
4. Compute the absolute value of the difference between the Significator of the Right Circle and the Significator of the Region found in steps 2 and 3.
5. Compute the proportional part (PPT) by multiplying the number computed in Step #4 by a ratio. Choice of ratio depends on whether the significator is below the horizon (quadrants 1 and 2) or above the horizon (quadrants 3 and 4). If below the horizon, the ratio is defined to be the Lower Meridian Distance divided by the Nocturnal Semi Arc (LMD/NSA). If above the horizon, the ratio is defined to be the Upper Meridian Distance divided by the Diurnal Semi Arc (UMD/DSA). Note that most traditional texts merely refer only to Meridian Distance (MD) and Semi-Arc (SA) which can sometimes be confusing. Rumen Kolev has introduced a more explicit notation which I support.

$$\text{UMD} = \text{absolute value}[\text{RAMC} - \text{RA}]$$

$$\text{LMD} = \text{absolute value} [\text{RAIC} - \text{RA}]$$

$$\text{DSA} = 90 + \text{AD}$$

$$\text{NSA} = 180 - \text{AD}$$

where

RAMC = Right Ascension of Midheaven (global parameter for all directions)

RAIC = Right Ascension of Imum Coeli (global parameter for all directions)

DSA = Diurnal Semi-Arc (specific parameter for each individual direction)

NSA = Nocturnal Semi-Arc (specific parameter for each individual direction)

RA = Right Ascension of a planet or aspect (specific parameter for each individual direction)

AD = Ascensional Difference (specific parameter for each individual direction)

6. Adjust the Significator of the Right Circle computed in step #2 by the proportional part computed in step #5. The result is the Directional Arc. How to make the adjustment? Below I define 8 permutations.

Significator in Quadrant 1 (Houses 1, 2, 3)

If SRC < SOR, DA = SRC + PPT

If SRC > SOR, DA = SRC - PPT

Significator in Quadrant 2 (Houses 4, 5, 6)

If SRC < SOR, DA = SRC - PPT

If SRC > SOR, DA = SRC + PPT

Significator in Quadrant 3 (Houses 7, 8, 9)

If SRC < SOR, DA = SRC - PPT

If SRC > SOR, DA = SRC + PPT

Significator in Quadrant 4 (Houses 10, 11, 12)

If SRC < SOR, DA = SRC + PPT

If SRC > SOR, DA = SRC - PPT

where

SRC = Significator of Right Circle

SOR = Significator of Region

PPT = Proportional Part computed in step #5

DA = Directional Arc

7. Convert Directional Arc to a time measure; add to starting date to compute time projection. End.

II. Alternative Calculation Method based on Oblique Descensions

Kolev suggests that when directing significators in the western half of the chart (quadrants 2 and 3) that we switch to oblique descensions when computing the Significator of the Region in Step 3. Making this choice maintains the computed directional arc between the Significator of the Right Circle and the Significator of the Region. It also allows for these formulas for the directional arc to be used for significators in all quadrants:

If SRC < SOR, DA = SRC + PPT

If SRC > SOR, DA = SRC - PPT

Both approaches are mathematically equivalent.

III. Excel Notes

The choice of LMD/NSA vs. UMD/DSA is made in column AC. Choosing the correct formula for the Directional Arc (one of eight permutations) is made in column AD.

IV. Reference

Al-Qabisi (Alcabitius): The Introduction to Astrology. Edited and translated by Charles Burnett, Keiji Yamamoto, and Michio Yano. The Warburg Institute, London. 2004. pp. 121-127.

Robert Zoller: *More Light on Primary Directions.*
Privately printed, 2-Sep-2002.

Interplanetary Directions – Regiomontanus

This post offers an orientation to Regio Under the Pole primary directions computed for the Regulus USA National Horoscope. Examples in this section refer to the following two spreadsheets:

Regulus USA National Horoscope – Moon Directions – Regiomontanus.xls and
Regulus USA National Horoscope – Moon Directions – Ptolemy.xls

I. Understanding Latitude Options

The Moon/Regiomontanus spreadsheet was saved to row 586 which presents the direction:

REG	D	Mars/Pisces	P	dex. square Mars (l=MA) d. => Moon (l=MO)	23-Sep-1791
-----	---	-------------	---	---	-------------

arc of direction = 15 degrees 13 minutes

The next directions in rows 587 and 589 compute the same direction for different latitude options for Mars; row 587 = latitude = zero; row 589 = latitude = Moon. Here is the presentation format for these two directions:

Row 587

REG	D	Mars/Pisces	P	dex. square Mars (l=0) d. => Moon (l=MO)	25-Jan-1792
-----	---	-------------	---	--	-------------

Row 589

REG	D	Mars/Pisces	P	dex. square Mars (l=MO) d. => Moon (l=MO)	6-Oct-1793
-----	---	-------------	---	---	------------

II. Delineation of the Direction

Having now implemented both Ptolemy and Regio directions in Excel, we can start to compare computed directions to historical events as see which method is more accurate.

Using Regio under the Pole of the Moon, the direction

REG	D	Mars/Pisces	P	dex. square Mars (l=MO) d. => Moon (l=MO)	6-Oct-1793
-----	---	-------------	---	---	------------

is a direct hit to the peak of Philadelphia's infamous yellow fever epidemic of 1793. Public Records indicate that colder weather during mid-October caused the infection rate to decline. Colder weather kills mosquitos which are the carriers of yellow fever. The earlier direction computed for the latitude of Mars for 23-Sep-1791 appears to time a smaller yellow fever epidemic in New York City.

How does a Mars square Moon direction match the delineation of a yellow fever epidemic? Consider that Moon is the universal significator of the public, the Moon rules the 8th of death, and Moon/Aquarius/3rd signifies the public circulating around transportation hubs based around waterworks. Most who died from yellow fever epidemics lived nearest the Philadelphia harbor where ships docked and loaded/unloaded their goods. Mars is the universal signifies of fevers; in the sign of Gemini, infectious diseases which permeate the lungs. Because Mars is ruled by Mercury who in turn rules the 6th of illness (QS), Mars - with Mercury - sends his effects to the 6th house. Mercury also rules the 9th of foreign lands (QS). Yellow fever was imported to Philadelphia via foreign immigrants arriving on ships. For more on the epidemic, I recommend:

<http://www.geocities.com/bobarnebeck/fever1793.html>

The next analysis step is to start to evaluate the Mars square Moon primary direction computed under different methods of primary direction computation. If one switches over to the Moon Directions - Ptolemy worksheet (you will need to open this one as well), see on rows 22 and 23 the same set of Mars square Moon directions computed for 8-May-1793 and 21-Aug-1793. The same Philadelphia epidemic had definitely started by 21-Aug-1793 but did not culminate until the 6-Oct-1793 direction computed by Regio Under the Pole of the Moon primaries. So the 8-May-1793 direction using Ptolemy's method more accurately timed the start of the epidemic, but the 6-Oct-1793 direction using Regio Under the Pole more accurately timed the peak of the epidemic. Based on this single example, there appears to be merit to both Ptolemy and Regio Under the Pole methods of directing. A single example tells us nothing but this process is indicative of the type of research which is required to test the accuracy of competing primary directions calculations (e.g., Regio vs Ptolemy; zero latitude vs full latitude; etc.,).

III. Kolev Algorithm

Click on the 'Constants' tab at the bottom of the workbook and switch to the Constants Worksheet. Cells highlighted in yellow indicate required inputs. All other cells contain formulas.

Rows 14-24 contain basic parameters for the Moon common to each style of interplanetary direction method.

Rows 26-34 implement Kolev's Regio algorithm. Users of Kolev's Placidus program can compare these figures to the Regio Speculum available as a printout from the Placidus program. Note that the full latitude of the Moon is assumed here. What we are really after in any type of 'under the pole' method of primary directions is the Pole of the significator; cell H31 contains the formula for the Pole of the Moon under its own Pole. We need the Moon's pole to compute the Ascensional Difference of the Moon under its own pole; flip back to the 'Moon Directions' sheet and see the Moon's Ascensional Difference from cell H32 in the 'Constants' sheet carried to cell Y10 in the 'Moon Directions' sheet. Next is computation of the Oblique

Ascension of the Moon under its own Pole in cell Z10, 'Moon Directions' sheet. These two results are what Kolev refers to as 'ADf' and 'OAF' in formulas available from the help pages of the Placidus program.

Next is to compute the Ascensional Difference and the Oblique Ascension for each promissor *Under the Pole of the Moon*. These computations begin in cells Y13 and Z13 and are copied down the worksheet. Kolev refers to these results as 'ADff' and 'OAff.'

The difference between the Oblique Ascensions for the Significator and the Promissor is the sought after Directional Arc.

The tricky part is figuring out whether the Ascensional Difference should be *added to* or *subtracted from* the Right Ascension of the respective Significator/Promissor. The decision rests sole on whether the significator is placed in the eastern half of the chart (houses 1,2,3,10,11,12) or the western half of the chart (houses 4,5,6,7,8,9). This choice is implemented in column Z and underscores the correct quadrant of the significator, input in cell H15 in the Constants sheet. Placing the significator in the wrong quadrant produces bogus results. Also! be sure to use quadrant houses not whole sign houses when determining the eastern/western location of the significator.

Rows 36-40 contain a listing of various keys for converting the arc of direction into a date projection. The default setting is Ptolemy's key of 1.00000. Individuals wishing to try different keys can do so; just type whatever key you wish in cell H36. A manual entry is required.

Interplanetary Directions – Placidus Under the Pole

I. Similarity of Under the Pole Directions

Spreadsheets for Directions Under the Pole are very similar in design. In fact the conversion from Regiomontanus Under the Pole to Placidus Under the Pole takes less than a minute.

Here is how I made the conversion: Open any Regio Under the Pole spreadsheet and refer to the 'Constants' tab. The formula for the Pole of the Significator in Row 31 is changed; Rows 27-30 are deleted. That's it. Those are the only changes required to convert the Regio spreadsheet to Placidus Under the Pole.

II. Formula for the Pole of the Significator

If significator is **above** the horizon:

Pole =
 $\arctan(1/\tan(\text{dec of sig}) * \sin(\text{upper meridian distance of sig} * \text{ascensional difference of sig} / \text{diurnal semi arc of sig}))$

If significator is **below** the horizon:

Pole =
 $\arctan(1/\tan(\text{dec of sig}) * \sin(\text{lower meridian distance of sig} * \text{ascensional difference of sig} / \text{nocturnal semi arc of sig}))$

III. Theoretical Problems with this Methodology

Worth emphasizing is the Placidus Under the Pole system was advocated by Placidus as only an approximation of his true semi-arc system. Because directions could also be read from an appropriate Table of Houses without resorting to extensive calculations, the system also gained popularity through authors like Sepharial. For details, see Michael Wackford's series of articles on house construction available through Skyscript's article menu.

Interplanetary Directions – Placidian Mundo

Placidian Mundo Directions have a completely different technical assumption than do zodiacal primary directions. They are two very different animals. For those first learning primary directions for the first time, I recommend approaching the methods separately. Master one before moving to the next. Whether one starts with zodiacal and moves on to mundo or vice versa doesn't matter. Try to study both at the same time and risk losing one's sanity!

The accompanying spreadsheet replicates two examples of Placidian Mundo directions for the nativity of King Edward VII of England. They are taken from Sepharial's *Prognostic Astrology*, published 1901, Chapter 4. The objective of this post and the attached spreadsheet are designed to demonstrate:

- How to calculate Placidian Mundo directions in Excel without logarithmic tables.
- To compare Excel results with Sepharial's calculations.
- To compare Excel results with Kolev's results based on his Placidus software.

I. Data

Kind Edward VII
9-Nov-1841
10:48 AM, LMT +0:00
London, England
0w00'00"
51n32'00"
ASC 27SA34'59"

Note: All constants taken from Janus 4.0 software.

II. Example: Direct Venus to the conjunction of the Moon, direct motion.

The spreadsheet is saved to this example, tab = 'Venus-Moon example,' row = 6.

Print or view the horoscope and see that Venus at 29VE26 is just over a degree inside the 9th Placidus cusp of 00LI35. Venus falls late in the 8th house.

At the heart of Placidian Mundo directions is the following question:

Q. Given the ratio between the Moon's distance from the 8th Placidus cusp to the Moon's Diurnal Semi-Arc, how far would Venus have to be from the 8th Placidus cusp on her own diurnal path to form the equivalent ratio as does the Moon?

$$A. CDd_VE = CDd_MO / DSA_MO * DSA_VE$$

where

CDd_VE = cuspal distance of Venus from the 8th house Placidus cusp.

CDd_MO = cuspal distance of the Moon from the 8th house Placidus cusp.

DSA_MO = Moon's diurnal semi-arc.

DSA_VE = Venus' diurnal semi-arc.

All measurements are in right ascension.

Trick! Diurnal semi-arcs are used because both Venus and the Moon are above the horizon; if they were below the horizon, nocturnal semi-arcs would be used instead!

Solving the equation yields (using 2 significant digits - no rounding):

$$CDd_VE = 24.34 / 85.45 * 82.45$$

$$CDd_VE = 23.48$$

Recall: this measurement in right ascension tells us how far from the 8th cusp Venus would have to be in her own diurnal path to be at the same relative position the Moon is from the 8th cusp for the Moon's diurnal path.

Adding Venus' cuspal distance to the 8th house Placidus cusp yields the target position where natal Venus must move by direct motion to form a conjunction with the Moon.

Note that Venus' cuspal distance to the 8th house Placidus cusp is a custom measurement computed in right ascension for Venus' own diurnal path. Because each planet has a slightly different diurnal path, each planet will have its own separate set of house cusps. These customized house cusps are presented on the 'Speculum' tab of the Excel workbook. Note the 4th and 10th Placidus house cusps are identical for all planets. Kolev offers a good summary (with pictures) of how each planet's own set of house cusps are created.

Target = 8th House Placidus cusp for Venus' own diurnal circle + cuspal distance of Venus (from above)

$$\text{Target} = 155.47 + 23.48$$

$$\text{Target} = 178.96$$

To compute the directional arc, subtract the target from the position of natal Venus.

Directional Arc = Right Ascension (Venus) - Right Ascension (Target position to which Venus shall move)

$$\text{Directional Arc} = 198.39 - 178.96$$

$$\text{Directional Arc} = 19.42867 \text{ (decimal) or}$$

Directional Arc = 19 degrees 26 minutes (longitude)

As a comparison:

Directional Arc of Sepharial = 19 degrees 25 minutes (longitude)

Directional Arc of Placidus program = 19.42824 (decimal)

Adding the directional arc to King Edward VII's birthday of 9-Nov-1841 yields a projection of 14-Apr-1861 which agrees with both the Excel spreadsheet and the Placidus program.

III. Example: Direct the Sun to the conjunction of the Jupiter, converse motion.

Within Excel, choose the 'Sun-Jupiter Example' worksheet tab and review the results in row 16.

Excel's directional arc of 44.78195 (decimal) or 44 degrees 47 minutes (longitude) compares to:

Sepharial's directional arc of 44 degrees 49 minutes and

Kolev's directional arc of 44.78497

IV. Additional Notes for Excel Users

As a study aid, directions of the promissors (Venus and Sun) are computed for all aspects to the significators (Moon and Jupiter). This provides all permutations, direct and converse.

As a followup to Example 1, continue by studying the direction of Venus to the dexter sextile of the Moon in the row below. Return to the 'Venus-Moon Example' worksheet and review the formula for cell J7. See that since the dexter sextile of the Moon falls **below the horizon**, the **nocturnal semi-arc** of Venus is used. Move up to cell J6 in the example just worked out and remind yourself that the Moon herself falls in the 9th house. Since this position is **above the horizon**, any direction to the Moon herself will use the **diurnal semi-arc** of Venus as we just did. These are important subtleties which can get lost if one is not careful.

V. Reference

Rumen Kolev. *Primary Directions II: Classic Placidian Interplanetary Directions*. Self-published. Available from Kolev's site.

Note to Robert Zoller Students on the Alchabitus Method

Zoller students will recall the example of the sinister trine of Jupiter directed to the Sun for Zoller's own natal chart used to exemplify the calculation of interplanetary primary directions.

Robert Zoller
25 Jan 1947
8:59 AM
EST +5:00
Mount Vernon, NY
ASC 12PI29

Rumen Kolev also used this same example in an article 'Robert Zoller & the Alchabitus Primary Direction Method' published in *Considerations Magazine*, Aug-Oct 2007, Vol XVIII, No. 3. Kolev compares Zoller's algorithm to what Kolev names 'Ptolemy' or 'Placidus-Classic' and concludes they are identical. In my books I have referred to this method as 'Ptolemy's method' which is what I will continue to use.

The attached spreadsheet reproduces Kolev's calculations (using his constants - not from Janus software) in order to show how Ptolemy's primary directions can be implemented in Microsoft Excel. This is the type of spreadsheet model I will use for all Ptolemy primary directions posted elsewhere on the site. My objective here is to demonstrate the mathematical consistency between my Excel spreadsheet format and results made by Kolev in his *Considerations* article and in his Placidus software program.

Important note for Robert Zoller students

Regarding the proportional part used to adjust the Significator of the Right Circle, Zoller states:

If the Significator of the Right Circle is LESS THAN the Significator of the Region, then ADD the proportional adjustment TO the Significator of the Right Circle.

While this is correct for the example for directing the trine of Jupiter to the Sun for Zoller's own natal horoscope which falls in the **eastern** half of the figure, the formula only holds for significators in the **western** half of the figure if one switches from **oblique ascension** to **oblique descension** when computing the directional arc. Sticking with oblique ascensions for significators in all quadrants requires modifying the rule for treatment of the proportional part listed above. To sort out this confusion, I list all permutations in the earlier section to a separate post 'Interplanetary Primary Directions - Ptolemy' elsewhere in this Primary Directions bulletin board.

Interplanetary Directions: Which method works best?

How is it possible to evaluate the efficiency of different systems of primary directions?

I suggest framing the question along the following lines of inquiry:

(1) Mundo vs Zodiacal, (2) House Systems, (3) Pole of Significator, (4) Latitude, (5) Keys.

Here are some initial thoughts which I will update as needed.

Mundo vs Zodiacal

The historical record indicates that up until the time of Placidus, astrologers directed in zodiaco, e.g., working with the zodiacal positions of planets and aspects. Not until the time of Placidus were mundo directions introduced. From a philosophical standpoint, what underlies the debate appears a preference for the symbolism of the zodiac espoused by proponents of zodiacal directions compared to a mathematical elegance demonstrated by the mundo approach of Placidus. To be sure, choices for latitude and direct/converse motion produce many permutations of directions for zodiacal directions. My guess - and this is purely my own speculation - is these permutations appeared 'sloppy' to someone like Placidus. By creating mundane directions, Placidus was able to eliminate these permutations with his algorithm.

The most important finding from my second book - *America is Born: Introducing the Regulus USA National Horoscope* - is the relevance of Egyptian bounds as Distributors in the system written up by Abu Ma'shar. Few primary directions practitioners are aware of it. In my opinion this is a large hole in the tradition which needs a revival in order to shed more light on the Mundane vs Zodiacal debate. For the Regulus USA National Horoscope, the power of the directed ascendant to time changes in social movements is staggering. It provides solid evidence in favor of the symbolic interpretation of zodiacal directions for there is no reasonable way to convert the Egyptian bounds as defined on the zodiac to Placidian Mundane directions. For this reason I tend to lean to the validity of zodiacal directions on philosophical grounds.

Then there is the empirical evidence. All of the interplanetary directions which timed death for the USA Presidential database were computed *in zodiaco*. Not a single mundo direction among them!

House Systems

The question of house systems is caught up in the first Mundo vs Zodiacal debate because the Mundo technique of Placidus relies on his system of House construction.

In *A Rectification Manual*, Chapter 3, pp. 32-24, I suggest testing dynamic activity to Arabic Parts (or Hellenistic Lots) whose formulas depend on intermediate house cusps as a method for

settling the debate of competing house systems.

The following Parts use intermediate house cusps in their formulas (house indicated in bracket):

- P. Substance (H2)
- P. Death (H8)
- P. Journeys (H9)
- P. Necessity (H3)
- P. Secret Enemies (H12)
- P. Delay & Inertia (H3)

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The assumption which drives this type of test is simple:

IF there is truly only one house system

AND IF dynamic activity to Parts times events consistent with the Part interpreted as Significator and the dynamic planet as Promissor

THEN the true house system should yield the smallest error when comparing dynamic measurements to Parts whose construction includes an intermediate house cusp (e.g., 2,3,5,6,8,9,11,12).

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Because of my research on the arcus vitae, I am most familiar with the Lot of Death. In support of Alchabitius-Semi Arc Houses, in *A Rectification Manual* (pp. 32-24) I gave the example of transits of Mars and Saturn opposed to the Lot of Death for Andrew Jackson. Mars is relevant because it is Jackson's high scoring killing planet. Saturn is relevant because he is the greater malefic. At time of death, the measurement error between these transits and the opposition of the Lot of Death was smallest for the Lot of Death computed under Alchabitius Houses. Computed under Placidus Houses, the measurement error was more than five degrees. This is but a single example; obviously a sample of 200-300 is required for solid conclusions. Yet if it can be shown that dynamic activity to these Arabic Parts is more accurately timed under any other system besides Placidus Houses, the Placidus House system is effectively exploded. And with it the theoretical rationale for Placidian Mundo primary directions. It's an interesting study that I wish to pursue further.

Pole of the Significator

Pole is really the corresponding terrestrial latitude of the significator; either the birthplace latitude for Ptolemy directions, or a latitude variant based on construction of a new great circle based on other house systems. Comparing interplanetary directional methods of Ptolemy and

Regiomontanus, I concluded that both systems appeared viable but that I often achieved greater accuracy using Regiomontanus.

Given the successful results for directing the Ascendant through the Bounds, another approach to establishing the efficiency of interplanetary directions is to examine under which method does the Directing through the Bounds method best work? Should a single interplanetary directional method yield consistent results, a hierarchy of interplanetary methods can be established.

At this point, I have no evidence or hunch that a 'single' method will prove 'best.' Considering I have found solar arc directions just as efficient as primary directions, I am open to the possibility that more than one system of interplanetary directions will prove workable.

Latitude

To properly understand the importance of latitude on primary directions, one has to study the historical precision of Tables of Longitude, etc., for the planets. I suggest we divide history into three sections: (1) Before logarithms (pre ~1600), (2) After logarithms (post ~1600), and (3) After personal computers (1982-present).

Before Logarithms

I suspect the original use of zero latitude directions occurred not because astrologers didn't care about latitude, but because the inaccuracy of available tables prevented the addition of latitude from yielding any improvement in precision.

After Logarithms

In the history of mathematics, the development of logarithms by John Napier (first published in 1614) was a seminal development in history of primary directions. It is at this point when astrologers increased their experiments with latitude. Though chart calculation errors were reduced with logarithms, they were not eliminated. As a consequence, astrologers like Morin who came up with their own latitude solutions have to be questioned. In his translation of Book 22 of Morin's *Astrologia Gallica*, translator James Holden makes this exact point:

In view of the fact that the maximum errors in the Moon's longitude given by the best tables of Morin's time are equal to or greater than the maximum aspect longitude correction given by his theory, it seems doubtful that Morin's 'experience' with his method is entitled to as much weight as he gives it. Astrologia Gallica, Book 22, p. 188.

After Personal Computers

The availability of personal computers, increased availability of accurate ephemerides, and astrological software with primary directions algorithms has led the field of primary directions

to a new era. It has allowed for a more intense investigation of the latitude problem. In my case, I offer the *primary direction sequence* as a solution. It required 3-4 year of work and testing and is indicative of the types of results which are now possible with the easy availability of personal computer software.

The *primary direction sequence* (published December 2007) has yet to be vetted or accepted by the astrological community. Like everything new, it requires testing and experimentation on a wider sample in order to demonstrate reproducible results.

Keys

So far I have worked with nothing but Ptolemy's Key of 1 degree = 1 year for natal and mundane figures. For solar returns, I have had success both with the keys of Ptolemy and Naibod.

I am somewhat reluctant to begin switching around keys for a single figure; this kind of tinkering usually ends up as a data mining exercise with results which are not reproducible for other charts. I suspect that the inability of a single key to work correctly for zero latitude zodiacal directions is symptomatic of failing to properly account for the effect of latitude on a direction's timing. Stuck with zero latitude directions, it is easy to see why astrologers would start to tinker with different keys. To date, my results using the *primary direction sequence* appear to eliminate the rationale for multiple keys.

Mini Case Study: Choosing between Ptolemy, Placidus Under the Pole, and Regiomontanus for the Regulus USA National Horoscope

Included in the zipped *PD – Teaching Example Files* is the file: "Distributor Comparison" which lists side by side Distributor lists for the Sun, Moon, and Part of Fortune for the Regulus USA National Horoscope. Though I have suggested that more than one system of interplanetary directions may prove workable (with Ptolemy and Regiomontanus the best two candidates so far), if one method can demonstrate better results using the Directing through the Bounds method, that method should rank higher in the predictive hierarchy.

As an example of the type of empirical testing required, consider Distributors for the Moon; specifically for the sign of Cancer. I take Cancer because if one carefully examines the differences between Ptolemy and Placidus under the Pole, they are negligible in most signs (2-5 days). Their differences are most notable in Gemini and Cancer; I choose Cancer as a starting place.

Here is a recap of the Moon's Distributors from the attached spreadsheet:

Bound	Ptolemy	Placidus/Pole	Regiomontanus/Pole
Mars/Cancer	5-May-1880	20-Jun-1880	30-Sep-1874
Venus/Cancer	23-Jan-1888	6-Mar-1888	29-Jun-1882
Mercury/Cancer	13-Oct-1894	22-Nov-1894	15-Apr-1889
Jupiter/Cancer	30-Jul-1901	3-Sep-1901	10-Mar-1896
Saturn/Cancer	19-Jul-1909	15-Aug-1909	4-May-1904

Due to the unique configuration of the Moon and Ascendant in the Regulus USA National Horoscope, falling just 2 signs apart, it turns out that a given Distributor hits the Moon first and the Ascendant about 40 years later. For instance:

Distribution of Mars/Cancer

For the Moon: 5-May-1880 to 22-Jan-1888

For the Ascendant: 5-Apr-1917 to 29-Jan-1925

With the Moon ruling the 8th of investments, findings so far indicate that the Moon first establishes investments with themes consistent with the current Distributor. About 40 years later when the directed Ascendant passes through the same Distributor, the same theme is picked up again by the nation as a whole.

In AIB I delineated Mars/Cancer as white racism and the rise of the second Ku Klux Klan. But planet/sign combinations have multiple permutations. So let us look for inventions/investments in the 1880s whose theme was recapitulated starting in 1917.

Mars/Cancer

In 1880, James Albert Bonsack built the first prototype for a mass production cigarette rolling machine. After it was destroyed by a fire Bonsack rebuilt the machine and filed a patent application on 4-Sep-1880. This date follows the start of the Moon's Mars/Cancer Distribution by roughly 4 months. James Buchanan Duke, soon to become a wealthy tobacco magnate, acquired a license from Bonsack to use his cigarette rolling machines in 1885. Cigarette production from 1880 to 1888 was a major investment theme for the United States.

Now why can cigarettes be delineated as Mars/Cancer? For one thing, cigarettes cause cancer. Yes the illness cancer does correspond to the astrological sign of Cancer. The type of cancer produced by cigarettes is lung cancer; the lungs are located directly below the breastbone which is (guess what!) assigned to Cancer according to medical astrology. Second cigarettes are hot, so is Mars. Third consider that Mars/Cancer is a disruptive force for Cancerian issues of comfort and nutrition. In lieu of appropriate food/nutrition, the heat of smoking and the effects of nicotine provide a type of relief. Why else would cigarettes be such a prized commodity among soldiers, prison inmates, and citizens of communist regimes who routinely confront food scarcity?

They turn to the Mars/Cancer nutritional solution => cigarettes.

Fast forward to 5-Apr-1917 when the Directed Ascendant started its Mars/Cancer Distribution. How did the theme of mass production of cigarettes from the 1880s repeat? The start of this Distribution followed Woodrow Wilson's 2-Apr-1917 Declaration of War speech. Significant to the fortunes of American tobacco companies was the decision to provide cigarettes as rations to American troops while fighting overseas during World War I. Many servicemen remained smokers when they returned home.

To use this information to evaluate competing sets of Distributors requires accepting one delineation as Mars/Cancer as cigarette production. The patent application of 4-Sep-1880 falls near Mars/Cancer Distributor changeovers for both Ptolemy and Placidus under the Pole methods. Regiomontanus, as you will see with all the other examples, is way off. The date of Bonsack's first prototype cigarette rolling machine made earlier in 1880 would be of interest in refining the choice between Ptolemy and Placidus Under the Pole but I have not yet found it. We move on.

Venus/Cancer

Holding sway as Ascendant Distributor from 30-Jan-1925 to 22-Jan-1932, the Distributor Venus/Cancer timed the rise of consumer products and the consumer economy during the roaring 1920s. After the stock market crash, the nation turned to the voluptuous Mae West whose curves functioned as a substitute for Venus/Cancer consumer products which were unaffordable.

Can we trace any roots of the consumer product industry to the 1880s? Yes we can. The first incorporation of Coca Cola, one of the largest and most well-known consumer product companies, was made on 24-Mar-1888, within weeks of both changeovers to Venus/Cancer as Distributor for Ptolemy and Placidus under the Pole methods. Johnson & Johnson also dates from this period through its incorporation is not a precise match as is Coke's. Johnson & Johnson is also one of America's largest consumer products corporations.

Mercury/Cancer

As Ascendant Distributor from 23-Jan-1932 to 3-Apr-1939, Mercury/Cancer timed the sensationalism of political demagogues Charles Coughlin and Huey Long. It also was the era of radio and an important phase in the development of the advertising industry.

Can any roots of the American advertising industry be found in late 1894? Yes.

McClure's Magazine hired future muckraker Ida Tarbell during the summer of 1894 and in November 1894 her series on Napoleon debuted which caused an explosion in circulation for McClure's. In the history of American advertising, magazines were a dominant force in the 1880s/1890s. Application of half-tone photoengraving developed in 1886 took off in the 1890s. Photoengraving increased the visual appeal of magazines like McClure's not only for articles accompanied by photographs but by a commensurate upgrade in the stylistic design of magazine advertising.

Once again, Tarbell's November 1894 publication date for her 'Napoleon' series does not offer sufficient specificity to choose between Ptolemy (13-Oct-1894) or Placidus under the Pole (22-Nov-1894), so we move on.

Jupiter/Cancer

From 4-Apr-1939 to 8-Nov-1947, Secretary of Agriculture Henry Wallace epitomized the importance of the farm economy at the national level. Are there any inventions within the agricultural sector during the Moon's Jupiter/Cancer Distribution in the early 1900's? Yes.

The Hart-Parr firm was incorporated in Iowa during June 1901. They produced the first farm tractor in 1902 which revolutionized agricultural field production. They also are credited (by some) as inventing the word 'tractor' itself. With this example, we finally get a definitive piece of evidence favoring Ptolemy's system. The June 1901 incorporation precedes the Jupiter/Cancer Distribution of 30-Jul-1901 by just a few weeks under Ptolemy's system. The same Distribution starting 3-Sep-1901 under Placidus under the Pole is late.

Saturn/Cancer

The witch-hunts of the McCarthy era timed by the Ascendant Distributor as Saturn/Cancer from 9-Nov-1947 to 4-Nov-1952 appear on first glance a tough match to the Moon's Distribution,

e.g., how does one 'invest'? in a witch-hunt? The trick in approaching this is to consider some other effects of Saturn/Cancer based on Saturn's recent transit through Cancer in 2003-2005. Remember Homeland Security?

It turns out that the first invention of Walter Schlage, cofounder of the Schlage security company known for its locks, was the 1909 invention of a door lock that turned lights on and off. This was his first patent. What is the connection? Locks are a form of containment which provides security. Saturn = containment/structure; Cancer = home. Saturn/Cancer = home door locks. Both Ptolemy and Placidus under the Pole have changeovers in 1909 so this event is consistent.

What else?

If one searches for 'American Inventions' and '1909' one comes across the invention of the first paper shredder by Abbot Augustus Low. His patent was filed on 2-Feb-1909 and received on 31-Aug-1909 a few weeks after both Distributor changeovers. How is a paper shredder relevant to Saturn/Cancer? Especially since Low's invention was not put into production? Consider the Wiki entry for 'paper shredders' continues with the first known paper shredder used by Adolf Ehinger in 1935 under Nazi Germany, used to shred anti-Nazi propaganda from Nazi witch-hunts! AHA! Now we have a connection between paper shredders and witch-hunts.

The import of Wilhelm Van Berkel's meat slicer to America in 1909 is another candidate because the same technology was adapted to produce bread slicers. White bread - the mainstay of American comfort food - is a Cancer product. With Saturn/Cancer, bread is partitioned. Some would argue bread slicing should be assigned to Mars/Cancer because Mars cuts. This same kind of issue arose when deciding on whether to assign the meatpacking industry to Mars/Taurus or Saturn/Taurus in *America is Born* (see pp. 120-121). The Saturn/Taurus Distribution better timed the growth of the Chicago meatpacking industry. I suggest bread-slicing is a Saturnian process because bread is partitioned prior to consumption in the same way an animal carcass is divided into sections before delivery to the consumer market. Consider also the Berkel product line later included vacuum packing which is most definitely a Saturnian process.

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One can see how tedious this type of analysis can be. At the end of the day, we are left to hunt for dates like: when did Bonsack build the prototype for his first cigarette rolling machine? to when did the November 1894 issue of McClure's magazine actually hit the stands?

Of course from a theoretical perspective, the Placidus under the Pole method is technically bankrupt, a point I have mentioned elsewhere and which is hammered into the ground by a series of articles by Michael Wackford. From that perspective, we need only reject the null hypothesis that Ptolemy's method does not work to settle the debate. On that note, the incorporation of the Hart-Parr company in June 1901 fits only with Ptolemy's method; not

Placidus under the Pole.

Perhaps the larger conclusion here (a tentative one based on limited examples I realize) is that Ptolemy wins over Regiomontanus in these examples. Though I continue to find Regiomontanus yields better results in natal astrology so far (e.g., timing the arcus vitae), it seems we must regard Regiomontanus a workable variant of interplanetary directions but a method which occupies the notch immediately below Ptolemy's method on the predictive hierarchy.

to be continued.....

Links

Primary Directions made Easy by Bob Mckransky

Designed for hard core mathematicians, this work is a technical treatise on all variants of primary directions. Also included are several articles by Mckransky including the highly recommended *Primary Directions: An Overview* which is reprinted from the NCGR Journal, Winter 1988-1989. This article is found on pages 131-135 of Part 3 of the download which is free. Formulas for declination, right ascension, and other basic parameters are found on pages 128-129. I use them in all my Excel workbooks. <http://www.dearbrutus.com/buyprimarydirections.html>

Rumen Kolev's Site - the direct source for Kolev's books and software.

<http://babylonianastrology.com/>

Kolev's introductory article on primary directions is worth a read:

http://www.babylonianastrology.com/index.php?option=com_content&task=view&id=13&Itemid=27

Martin Gansten on Primary Directions

Primary Directions: Astrology's Old Master Technique was published in 2009 by Martin Gansten

<http://www.martingansten.com/pd.php>

My review (October 7, 2009) is posted on another page in this primary directions board.

Gansten also has produced an online course in primary directions.

<http://www.martingansten.com/pddc.php>

Michael Wackford's Skyscript article collection - a scathing indictment of Topocentric and Placidus Under the Pole methods of Primary Directing. Must read.

<http://www.skyscript.co.uk/wackford.html>

http://www.skyscript.co.uk/polar_oblique.html

<http://www.skyscript.co.uk/placido.html>

Free Primary Directions Software - the best current freeware on the market

<http://pymorinus.extra.hu/>

From Anton Grigoryev's Blog - reviews the history of primary directions

First two articles review methods used during the Hellenistic era:

<http://www.antonblog.net/2008/09/01/primary-directions-the-story-of-calculations-vol-1/>

<http://www.antonblog.net/astrology/primary-directions-the-story-of-calculations-vol-2/#more-37>

Third article reviews Ptolemy's method as given in Tetrabiblos:

<http://www.antonblog.net/astrology/primary-directions-the-story-of-calculations-vol-3/#more-251>

Fourth article reviews Al-Qabisi's methodology:

<http://www.antonblog.net/astrology/primary-directions-the-story-of-calculations-vol-4/>

Online Tools Calculator - helpful for those performing manual calculations without Excel

<http://www.antonblog.net/tools/>

Pottenger Algorithm for Regiomontanus Directions (used by Janus software)

http://www.ccrsdodona.org/m_dilemma/1987/gem/primdir.html

http://www.ccrsdodona.org/m_dilemma/1987/sag/primary.html

Ben Dykes

Translator Ben Dykes has produced a full edition of Abu Ma'shar's On the Revolutions of the Years of Nativities which features the fullest explanation of Directing through the Bounds in any extant translation. Required reading for all primary directions practitioners.

<http://bendykes.com/persians.php#t5>