

OrionWorks Sonova Quark

Brought to you by Steven Vincent Johnson and Darlene P. Coltrain, snail mail address: 6666 Odana Road, 213, Madison, WI 53719. Email Steve: svj@orionworks.com. Email Darlene: dpcoltrain@gmail.com Web: <http://OrionWorks.com>. All material is Copyrighted © by Steven Vincent Johnson and Darlene P. Coltrain unless otherwise specified. Quark is brought to you by *OrionWorks* with occasional help from **Grasshopper Press** when I feel an inspirational mood overtake me. Final layout is assembled in InDesign CS5. Printing done on a HP Color Laserjet Pro MFP M277dw. Some might be asking how do you pronounce "Sonova Quark"? There isn't one.

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Completed (*somewhere around*) on March 21, 2016

First Walkabout Confessions of Science Fiction Artist

Part 3

What better way to initiate my long-overdue journey into the unknown than to hop into a 1974 Honda Civic and head out west with the flimsiest of plans in place.

I drove on I-94 travelling through flat and boring expanses known as North Dakota. Montana was more interesting. I turned left on I-15 and drove south to briefly visit my uncle, Archie, and his wife, Shea, in Pocatello, Idaho. Appearing on his door step I knew that Archie was concerned even though he was aware of the fact that I was coming. During a private lunch Archie urged me not to give up on my college education. There wasn't much I could tell him let alone assure him. There wasn't that much I understood about what I was going through myself. I had no idea if I would resume my college education. I had no interest in doing so at the time. It felt prudent not to tell Archie that. All I could tell him was that I needed to take a solo-trip out west. I tried to assure him not to worry. Two days later I said my good-byes and got back on the interstate. Next destination, Oregon.

About five days by my reckoning after leaving Madison I rolled into the boom town of Bend, Oregon. I knew my brother, Norm, had staked out a living driving large commercial trucks. He delivered wine coolers, Snapple beverage products, and cement trucks. I had a pretty good idea where to find him after work hours. He had given me directions to the Century

West Tavern. I rolled into the parking lot and looked at the entrance. Norm told me it had acquired the all-too familiar reputation of where men were men and the sheep were nervous. I found Norm parked at the bar. It was a happy reunion. Afterwards we dove to his house where he put me up in his living room. On that first day he didn't press me on what my plans were. I was grateful for that. I'm not sure what I would have told him.



1974 Honda Civic

A couple of days went by where Norm resumed his work schedule and I pretty much loafed about the town and slept in his living room at night. Several days of me taking advantage of his hospitality didn't take Norm long to reassess the situation. He must have noticed upon casually questioning me that I had not offered up any personal plans, like possibly looking for employment. I was simply trying to find refuge from a collection of unrealized demons. Regardless of the fact that we were siblings Norm really didn't need a freeloader. It had not occurred to me that in my current situation I might be in the process of repeating the same co-dependent-like behavior I had done back in Madison when I abruptly dropped out of MATC, left my apartment and returned home with mom and dad. Instinctively, Norm must have sensed I was running away from something, and at his expense. Eventually, I got notice from the landlord: You need to find a place to live on your own. And go find a job! Of course I sulked when Norm informed me. I had been ignoring the fact that when one doesn't feel he knows what to do with his life one is in danger of imposing on the

hospitality of others. Truth be known, a truth I didn't appreciate at the time, my brother was also wrestling with own collection of demons. He certainly didn't need to entangle his with mine. One of my brother's demons at that time in his life was a regular dose of alcohol from the Century West Tavern - to help him slow down after a full-day's work... for medicinal purposes.

In no way do I mean to imply that my brother was insensitive to my situation. He set me up with a contracting gig doing light labor with a construction associate he knew. He went out of his way to point me in a positive direction. It was his way of trying to help empower myself towards financial independence.

Upon moving out I spent several days doing odd-jobs in a house under construction out in the semi-arid desert country outside of Bend. I stayed at a local flea bag motel at night. For whatever reason, my employment experience didn't take. It never occurred to me to seek subsequent employment after my initial construction gig was up. I think I had already come to the conclusion that there wasn't anything left for me in Bend. I was also still pissed off at my brother. I wanted to act out in some dramatic way. But with few options at my disposal I rebelled the only way I could think of. At the conclusion of my part-time job, after not asking my former employer if he had any new work for me or if he knew of other job openings in the area, I packed up my belongings and abruptly left Bend making a petulant point of not informing my brother of my departure. Yeah, I thought to myself. *That* will show him! On a more positive point, bumbling my "point" may have been, I took some action. I realize that if I gotta work, I should at least do myself a favor and find work in a place... a city I had some familiarity with. That meant heading back to Madison.

The return trip was uneventful. The only memorable experience I recall was waking up one night in a dark motel room to the squeaking and muffled sounds of a couple on the other side of paper-thin walls knowing each other in the biblical sense. Nobody slept much that night. At least someone was having fun.

Back in Madison I wasted little time executing my new plan. I had at least learned one valuable lesson, the result of my brief walkabout trip out west and back: I wouldn't be staying at home. The plan was to secure a full-time job doing something I already had experience doing, probably at a fast-food establishment off of State Street. I would then rent a room in walking distance. It was easy finding work as a busboy / pizza delivery boy at Rocky Rococo's since I was a known quantity having previously worked there and at Mc Donald's. Once employment was secured I moved out of my parent's house and renting a small efficiency around the 300 block of West Main street.

Thus, began my new life: Working full-time, making

minimum wage, tending tables and washing dishes.

Next installment: *MY LIFE AS A BUSBOY*

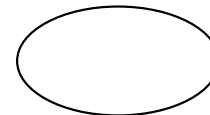
Or

Revisiting that Kepler Thing

I have been working full time on my Kepler project for almost a full year, now. I believe I have made good progress. I've had learn how to roll with the mistakes and misinterpretations I've made, repeatedly so. I haven't always done a good job of keeping all of the mathematical nuances straight in my head.

I started my Kepler project with a collection of preconceived ideas. It goes without saying that approaching any subject with preconceived ideas is not advisable. If the goal is to learn something new, harboring a collection of preconceived ideas is a good way of blinding one's self from finding them. I'm getting better at it, but it's still a lesson I'm learning.

Kepler discovered something utterly unique with nothing more than pen and paper, and a complex table of planetary positions of Mars inherited from his associate, Tycho Brache. Kepler's inquisitive mind managed to determine the fact that planets orbit in elliptical paths, not perfect circles. When we think of the geometry of an ellipse we typically think of a shape as follows:



Now, take a look at the orbital shape of the martian orbital ellipse path revealed in Fig 1. It's astonishing to me that Kepler was able to discern that Mar's orbital path wasn't a perfect circle.

How do I go about discerning things? I seem to follow an occasionally obtuse path towards discovery. However, more than once what I believed I had just uncovered in truth turns out to have been discovered by someone else, typically a venerable old scholar ages ago... sometimes hundreds of years ago.

I've included a recently scanned page from my Kepler research notebook. See Fig 2. This page

shows recent challenges I've encountered trying to understand an elegant mathematical function called *Kepler's Equation*.

My note taking predilections often involve a lot of copying and pasting. I combine, or coalesce, everything into pages of personal notes using the Corel-Draw software suite. CorelDraw is comparable to Adobe Illustrator & PhotoShop. I augment my copied images with copious notes, graphic diagrams, circles and arrows. Think of the song, *Alice's Restaurant*. You get the picture.

Incidentally, what this page of turgid glyphery reveals is my realization that I had been using *Kepler's Equation* incorrectly. Numerous pencil scratchings show my efforts to work through the correct methodology for using the equation the right way.

I've lost count of the number of times I've made incorrect assumptions on how to apply Kepler math. One of my goals is to computer animate a planet in an elliptical orbit around the sun with precise accuracy, something I haven't been able to accomplish yet. The computer code involved is not a trivial matter. Strange mathematical artifacts must be taken into account, one of them having to do with how to work with *transcendental* equations. What that basically means is that a whole lot of computer iteration is called for. From what I have read, it appears to be the only way to come up with reasonably accurate answers (data points) when plotting orbital positions. Fortunately, my recent mathematical mistake does not affect the validity of my prior research. The so-called empty foci still represents the origin point for all velocity vectors.

At some point, possibly by late fall (2016), I may be in a position to place portions of my research on-line. However, from past experience I've learned I only get myself into trouble making predictions of this nature. In my experience, research rarely follows a predictable a time-table. And being retired means I don't need to follow a god damned time table anymore either.

There is still a ton of work to do. I have to research *how* (in what medium) am I going to present my findings. What software packages might work best in

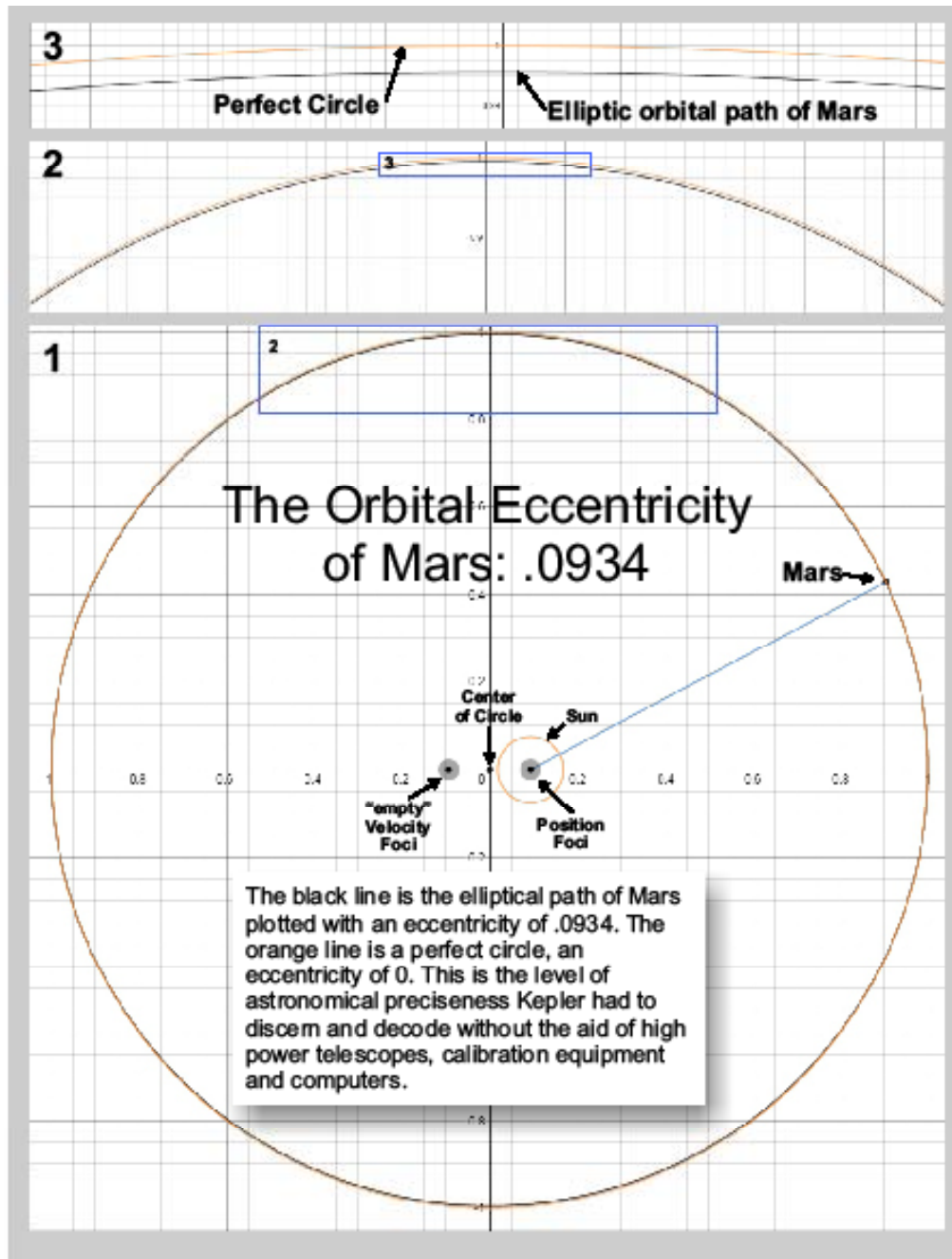


Fig 1
The Eccentricity of Mars

FILE: CurveFittingWorkSheets.cdr

NOTE: $c = e$ (eccentricity)

In this example Eccentricity = 0.8
 E = Eccentric Anomaly
 M = Mean Anomaly
 θ or f = True Anomaly

UPDATE

Algebraic algorithm recipe for finding TRUE ANOMALY

Plug in different estimated ECCENTRIC values and see what MEAN value results. Once ECCENTRIC value generates a MEAN value sufficiently close to the targeted MEAN value, plug in the last estimated ECCENTRIC value into Kepler's Equation to derive the TRUE ANOMALY angle value. Use the generated TRUE ANOMALY value to derive the correct r (Radius/distance) of elliptic orbit path from position foci.

$\theta(t) = ?$

time = $t = 0.5$ sec

total area = πa^2

orbital period = $T = 4$ sec

one revolution = 2π

USE THAT FOR STEP 3
 KEPLER'S EQUATION
 $M = E - \epsilon \sin E$
 $.25\pi = E - 0.8 \sin E$

$\tan \frac{\theta}{2} = \sqrt{\frac{1+\epsilon}{1-\epsilon}} \tan \frac{E}{2}$

$\theta = 2 \tan^{-1} \left(\sqrt{\frac{1+\epsilon}{1-\epsilon}} \tan \frac{E}{2} \right)$

$r = \frac{a(1-\epsilon^2)}{1-\epsilon \cos \theta}$ $r = a(1-\epsilon \cos E)$

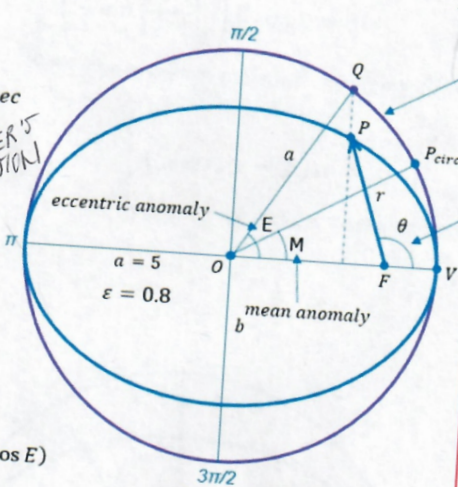
$M = \frac{0.5}{4} 2\pi = \frac{1}{4} \pi = E - \epsilon \sin E$

$0.25\pi = E - (0.8) \sin E$

STEP 1
 $M = E - \epsilon \sin E$

ECCENTRIC Anomaly Change this value	MEAN Anomaly What is the result?
$E = 0.5\pi$	0.245 π
$E = 0.55\pi$	0.298 π
$E = 0.52\pi$	0.266 π
$E = 0.51\pi$	0.255 π
$E = 0.505\pi$	0.250 π

Keep refining/iterating value "E" till theta = (or close to) 0.250 π



Eccentric Anomaly
 $E = 2 \tan^{-1} \left(\frac{(1-\epsilon) \tan \frac{x}{2}}{(1+\epsilon)} \right)$

What value is "E" when "M"ean value is .250 π ?

iterate $E - (0.8) \sin E = M$

$E = 0.5\pi$	0.245 π
$E = 0.55\pi$	0.298 π
$E = 0.52\pi$	0.266 π
$E = 0.51\pi$	0.255 π
$E = 0.505\pi$	0.250 π

STEP 2
 Kepler's Equation
 $\theta = 2 \tan^{-1} \left(\sqrt{\frac{1+\epsilon}{1-\epsilon}} \tan \frac{E}{2} \right) = 2 \tan^{-1} \left(\sqrt{\frac{1+0.8}{1-0.8}} \tan \frac{0.505\pi}{2} \right) = 0.798\pi$
 $r = a(1-\epsilon \cos E) = 5(1-0.8 \cos 0.505\pi) = 5.06$ r (radius) at 0.505 π

STEP 3
 $2 \tan^{-1} \left(\sqrt{\frac{1+0.8}{1-0.8}} \tan \frac{0.505\pi}{2} \right) = \theta$
 True Anomaly = 0.798 π

FORMULA FOR GETTING THE TRUE ANOMALY, THE TRUE ANGULAR POSITION OF THE PLANET'S ORBIT.

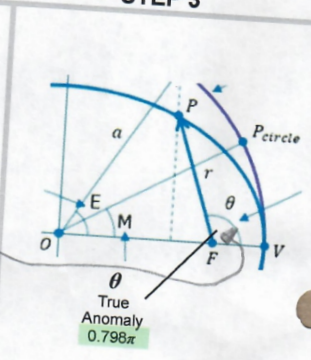


Fig 2
 A page from my Kepler Notebook

generating mathematically correct animations? Most animation software I've reviewed has been designed specifically for cartoon animation. In truth, *it's really cool software* ... but not necessarily the best choice when for animating orbital mechanics.

More later...

