Hopewellian Octagons

Proof that the Allegewi Astronomers could see Jupiter up close; Analysis of the Octagon formations of Chillicothe and Newark Earthworks

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ABSTRACT

The Allegewi astronomers (Adena/Hopewell) are renowned for their calculative prowess and prediction of the lunar events, and marking of the seasons. However, they would have no need to build such massive earthworks (largest in the world) for this. The strange asymmetric octagon formation at Newark, Chillicothe, and High Bank indicate instead some type of cosmic inspiration. In all the solar system there is only one such formation to inspire such inspiration. In this paper, comparisons of alignments with the Jovian Octagon of polar vortices at the north pole is made and probabilities calculated at a minimum and maximum likelihood for alignment with the octagons, and internal structures such as crosses and triangles. The alignments are found to be practically impossible to be coincidental, based on the alternating oblique patterns, and specifically the presence of a ~50 degree acute triangle in all considered structures, and finally because the Newark site has a mound that breaks format and this matches the weakest of the 8 polar vortices of Jupiter. The implications of this are either that the Hopewell culture had highly advanced telescopy, or that the EPEMC theory about the Jupiter Myth is more accurate (and in agreement with worldwide mythic data), and in fact the earthworks date to prior to the 1000 BC era (more like to 1500 BC), and were maintained as part of a religious mythos surrounding the Thunder God. The inspiration of these asymmetric octagons is tested against 4 surveys and all are within acceptable engineering margins to generate either a 1 in 350,846,577 chance (average standard deviations) or 1 in 4.125×10^{45} chance (product of standard deviations) of reaching the same alignments. In the final sections, predictions are made for the High Bank site, which prove in 6 out of 11 constraints to follow the model, and the majority of these are under 5% error margins. Lastly, graphic overlays using the surveys and proportion constrained and accurately rotated shapes are used to compare with data the most accurate site survey or design which is Newark/Squier-Davis, and the least accurate namely High Bank, in alignment with the JOPV.

Keywords: Jupiter - Hopewell -Newark - Chillicothe - octagon - earthworks - astroarchaeology

Introduction

In a previous work[1], the author showed that the Egyptians were able to measure the polar and equatorial diameters of both Saturn and Jupiter, resulting in ratios that were within 1% of satellite measured ratios[2]. In fact, the ratio of Jupiter:Saturn diameters was within 10% of actual measurements! This means that the two gas giants were close enough to make measurement ratios that equates to a 1 in 583,017 probability of success[3]. This, for most people, is enough proof. However, what it lacks is independent verification. In the minds of some, the Ramesses Stele may represent a bizarre fluke. Or, more likely, proof that the Egyptians had some form of a telescope; perhaps a very large convex mica observatory.

However, there is another culture that has maintained independent verification of the Jovian Age astronomical feats of the ancient pyramid cultures: the Allegewi. In particular, it is the Hopewell, descended from the 'Adena' culture, which in turn is likely descended from the Archaic and Woodland peoples of the Ohio River Valley and Kentucky, who have etched into earthworks the very highly unlikely proof that they could see the north pole of Jupiter, which itself is unique and unlike the south pole[4].

In the alignment presented, the author will demonstrate that the Newark site is better aligned to current polar vortices on Jupiter than the Chillicothe site, but that the average of surveys from the three sites, measured as ratios of segments to each other, and angles to each other, and considering the factor of the triangle formed by finding the key-stone mound, creates a probability that they would have the asymmetric octagons aligned to Jupiter's similarly asymmetric polar vortex octagon (APVO) of 1 in 4.125×10^{45}. In engineering terms, there is practicably 0 chance of an asymmetric octagonal alignment. In fact, it is the strange shape of it which caught the author's eye as soon as the Jupiter survey was completed and IR diagrams were released. Because of the specialization and separation of anthropology from astronomy - which did not exist in ancient times nor even in Newton's times - it is very unlikely that either profession would consider the connection. Most do not doubt the Standard Model of Accretion as a formation of the Solar System, despite the overwhelming mythic, textual, and astronomical data which do not support Accretion, but a Saturnian origin for Earth. However, rankling these two professions notwithstanding, the ratios, as measured using calipers and protractors, speaks definitively. In this paper their overlays will be compared, and all source data and files provided for other astro-archaeologists to replicate the work. It will be thus understood by any that look into the matter from a statistical standpoint, that it is simply impossible that the Hopewellians had *guessed* the polar alignment by seeing a far off dot, or even by telescope (given the angle of inclination). Rather, it is obvious that the Earth, in the transition from Saturnian to Solian orbit, must have spent a time in transit around Jupiter, seeing both poles. It was the transition period between the two which accounts for the sudden onslaught of the infamous winters between the Deluge and the foundations of the Yin Dynasty of China, but that is not the subject of this paper.

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[1] [23]
[2] http://bit.ly/2Ulwt95
[3] (2 planets*2 diameters*2 ratios) x product of standard deviations ~583,017.17
[4] In a part 2 to this paper, the south pole will be discussed in its potential role in Chinese metaphysics.

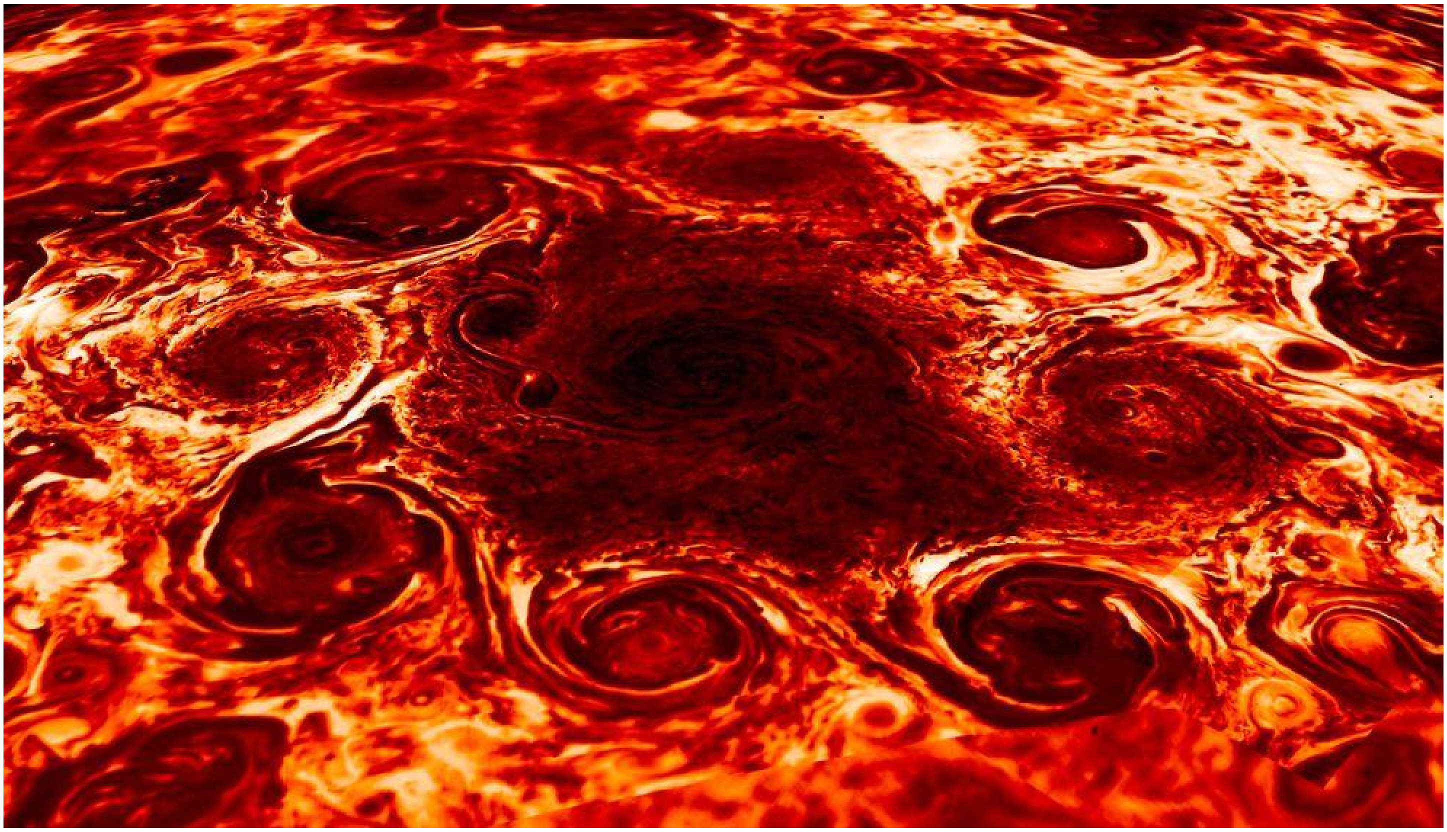


Figure 1: Jupiter’s North Pole (APVO); credit: NASA/JPL

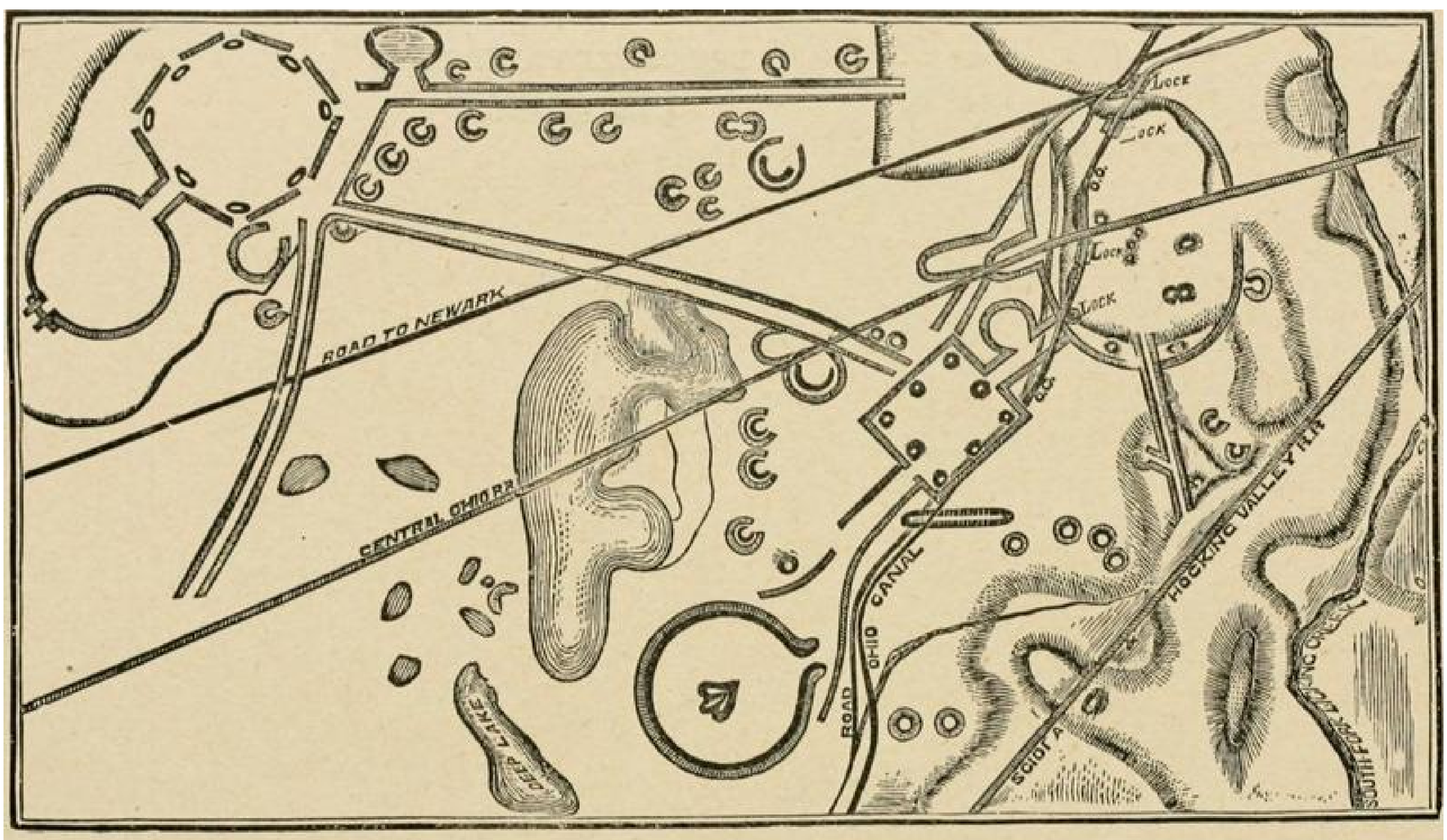
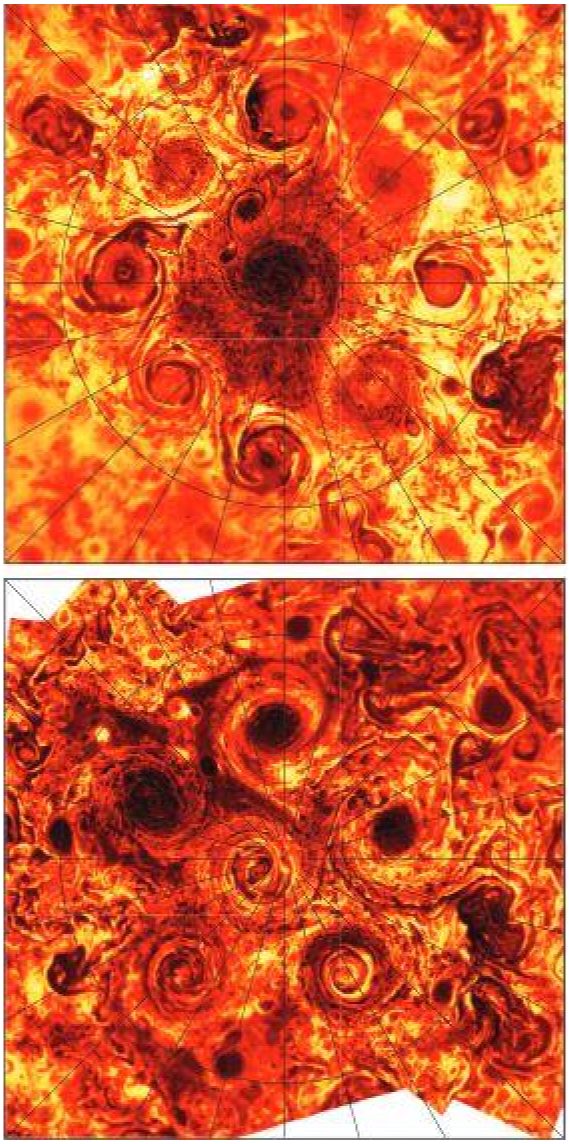


PLATE II.—WORKS AT NEWARK.

Figure 2: Newark, OH Earthworks - an astronomic marvel

Diagrams of Jovian Poles and Hopewell Earthworks

To start with, we should find diagrams that are orthogonal, to avoid any trigonometry in determining the actual segment ratios. Fortunately such a diagram does exist for the Jovian poles **and** the Hopewellian octagon earthworks.



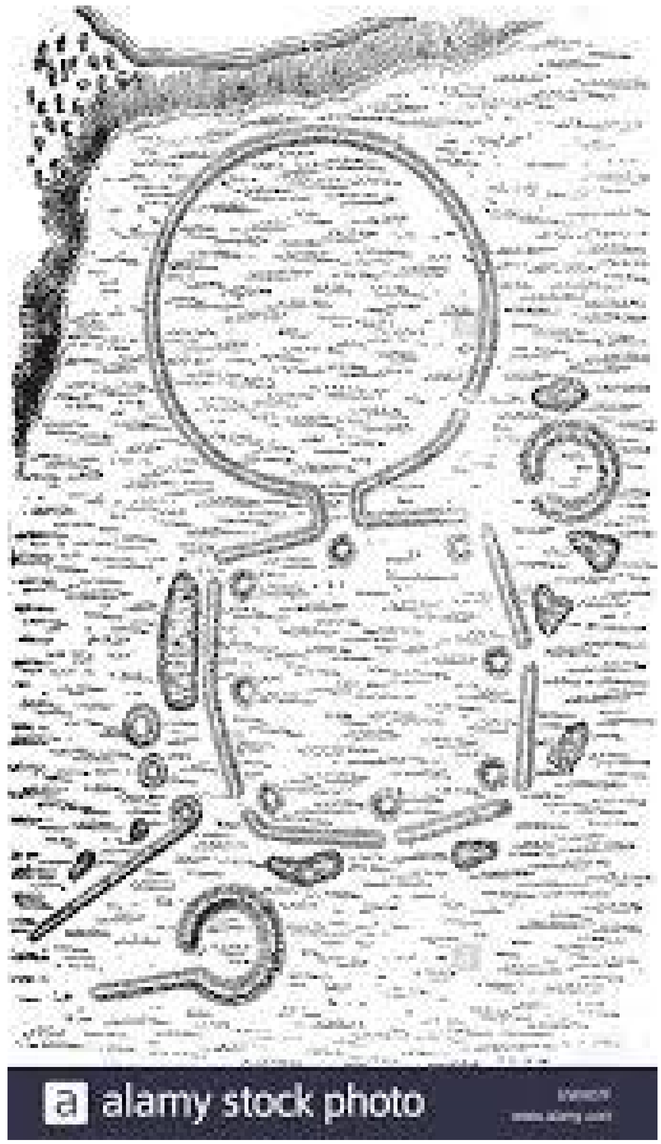


Figure 3 & 4: Orthogonal View of Jupiter's Poles (JPL); Chillicothe Earthworks, credit: Squier-Davis[5]

[5] "Ancient Monuments in the Mississippi Valley," Squier & Davis, 1848

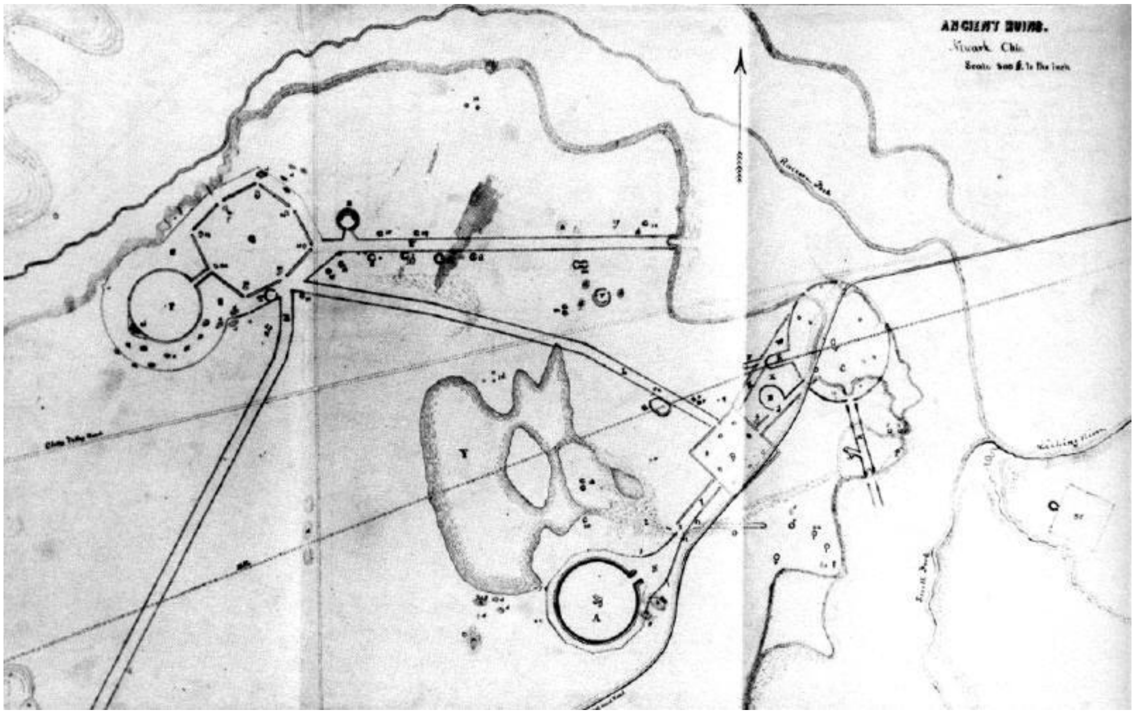


Figure 5: Newark Earthworks Survey #1

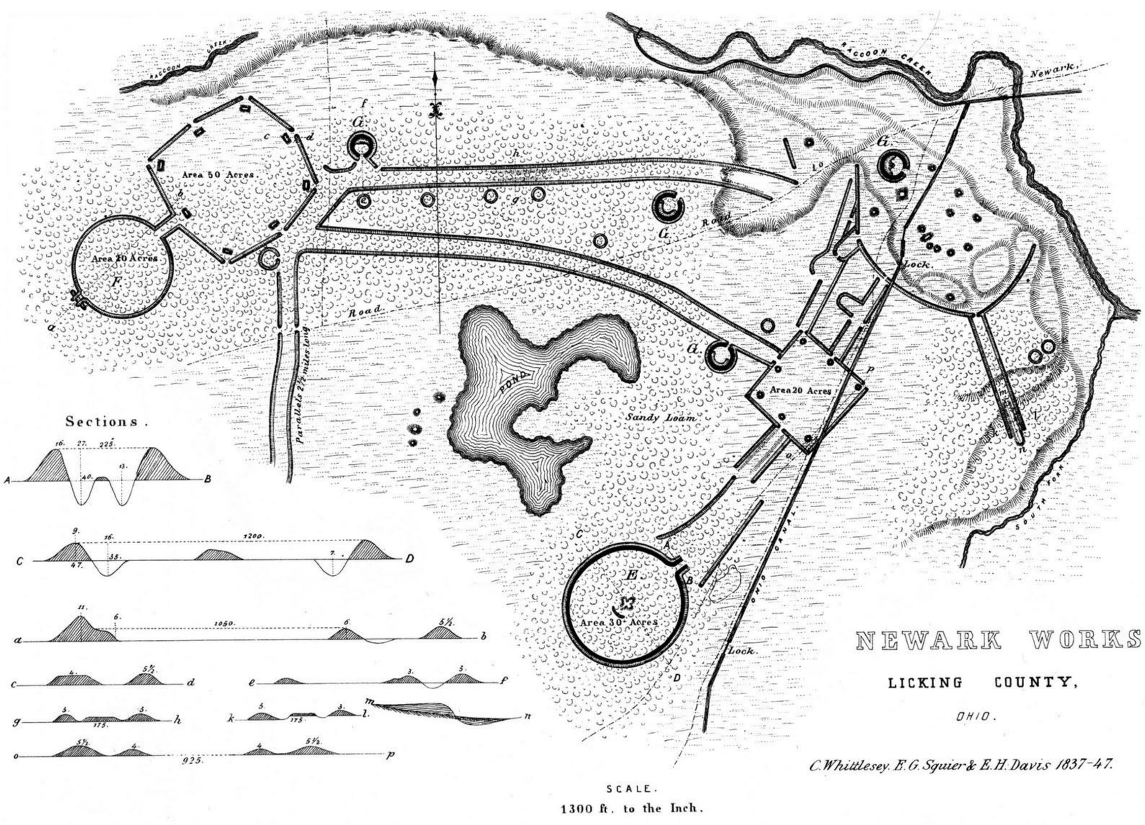


Figure 6: Newark Earthworks Survey #2; credit: Squier-Davis

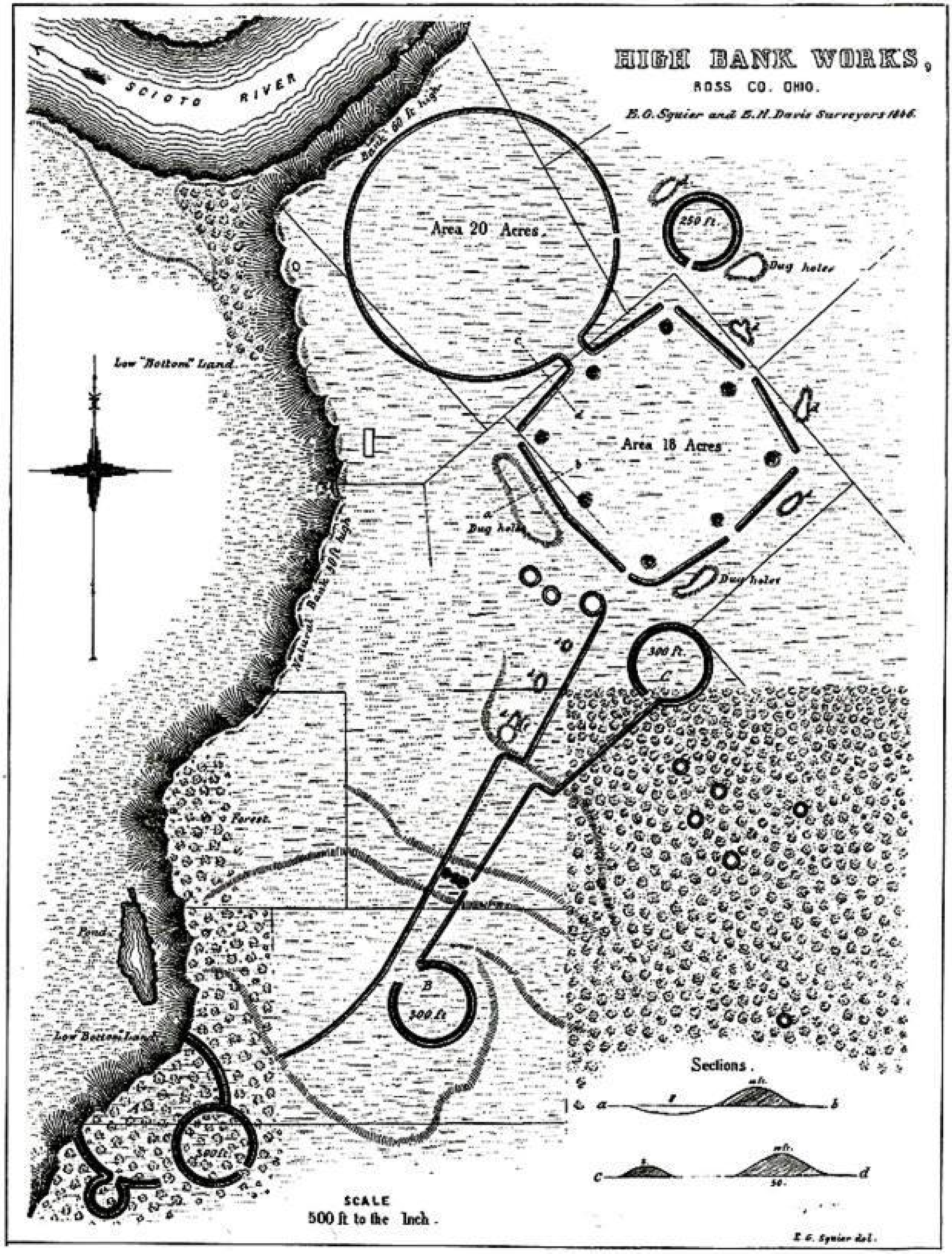


Figure 7: High Bank Earthworks; credit: Squier-Davis

The proofs will go as follows:

1. Label the diagrams with nodes as A through H
2. Compare the caliper measurements of segment ratios of Figures 4-6 with those of Figure 3.

3. Use the triangulation and comparison with Jupiter’s four sides to determine which side aligns with the Hopewellian ‘necks’.
4. Rotate Jovian diagram and compare angular ratios with Figures 4 - 6, and with the average of Figures 5 & 6.
5. Calculate standard deviations.
6. Insert charts that show all the ratios and deviations.
7. Calculate probability of similarity.
8. Test the results by comparing with Figure 7, a separate Hopewell octagon site.
9. Create 4 overlays by resizing (proportionately) the 4 surveys with the Jovian counterpart.

Starting Diagrams, with lines of measurement

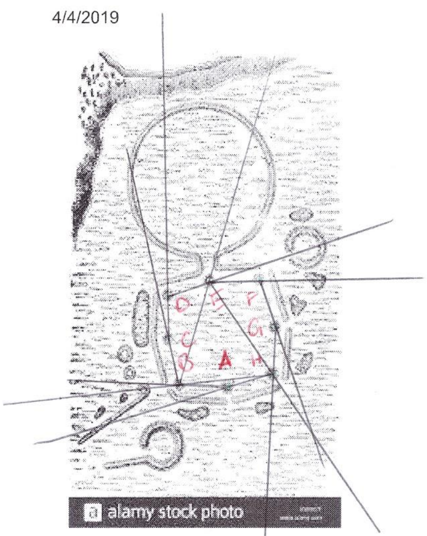


Figure 1

Chillicothe

images.jpg

	Figure 1	2	3	Jup.
AB	.2989	.248	.3361	.613
BC	.2808	.2481	.34	.605
CD	.2808	.249	.355	.6519
DE	.2809	.249	.3551	.6447
EF	.3039	.242	.355	.6189
FG	.3169	.2329	.3335	.63
GH	.2873	.2415	.3389	.6751
HA	.284	.2258	.3411	.6441
AC	.4858	.4041	.5711	1.1099
AD	.6969	.5751	.852	1.5488
AE	.6913	.591	.8298	1.553
CG	.6841	.5807	.79	1.5159
DH	.8305	.6295	.9599	1.8224
BF	.8501	.7981	.97	1.6738
∠ BAH	159	150	146	147
∠ CBA	105	108	120	131
∠ DCB	170	160	158	149
∠ EDC	107	123	107	114
∠ FED	162	146	161	150
∠ GFE	108	127	102	117
∠ HGF	157	143	165	157
∠ GHA	109	120	118	108
∠ EBH	67	62	64	73
∠ BEH	51	50	48	46.5
∠ EHB	62	68	68	60.5

Figure 8: (1) - Chillicothe, lined

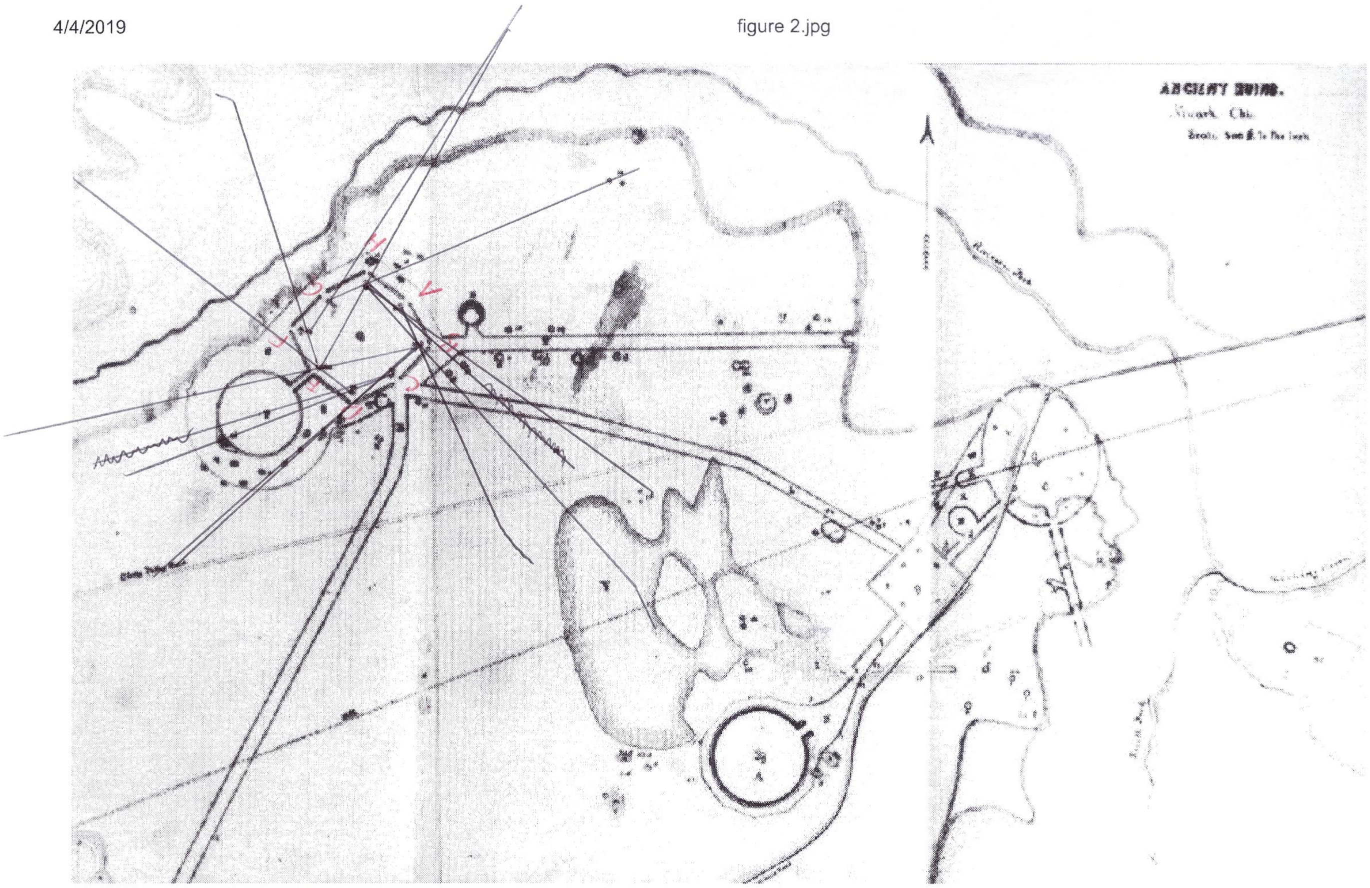


Figure 9: (2) - Newark Survey #1, lined

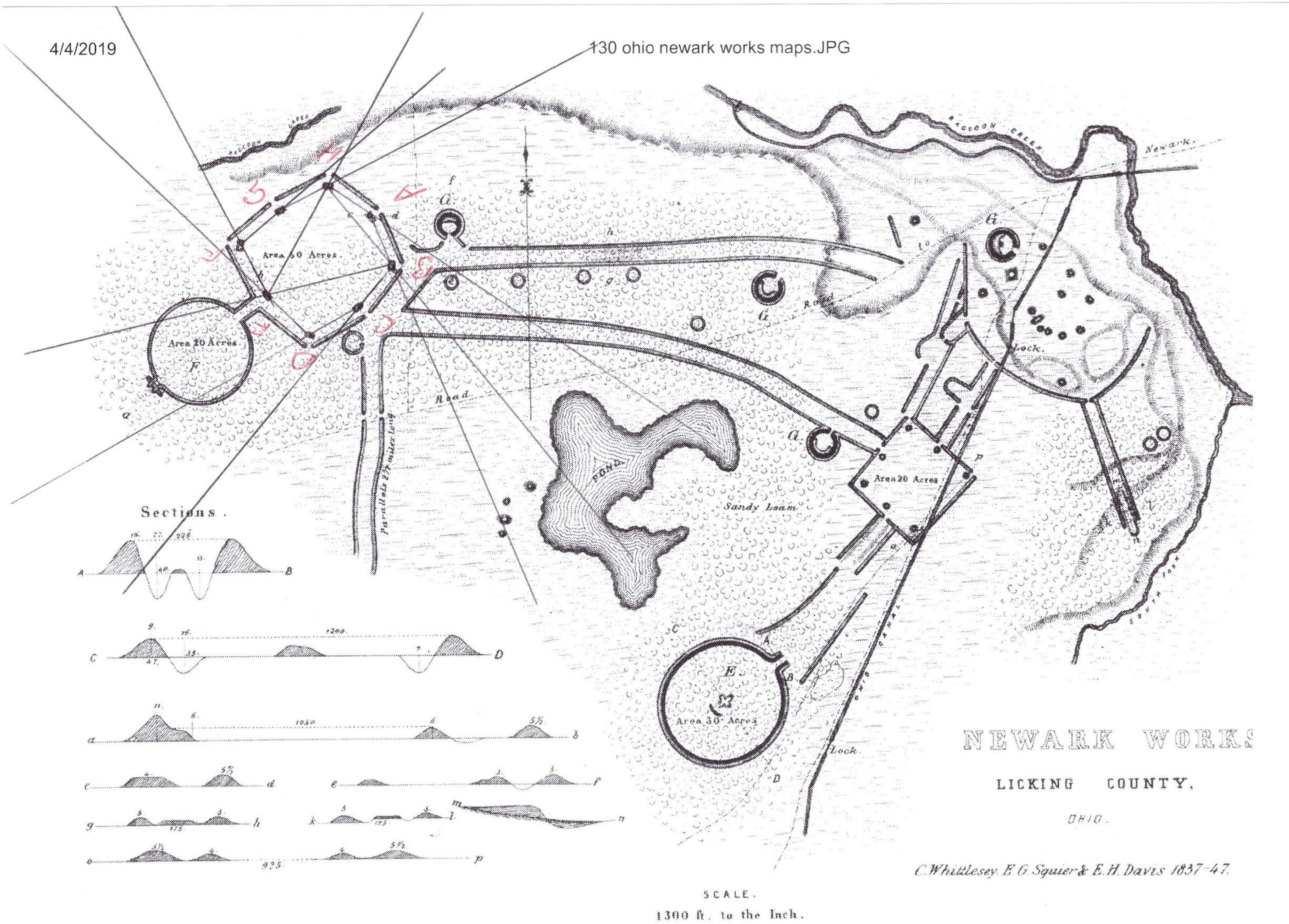


Figure 3

Figure 10: (3) - Newark Survey #2, lined

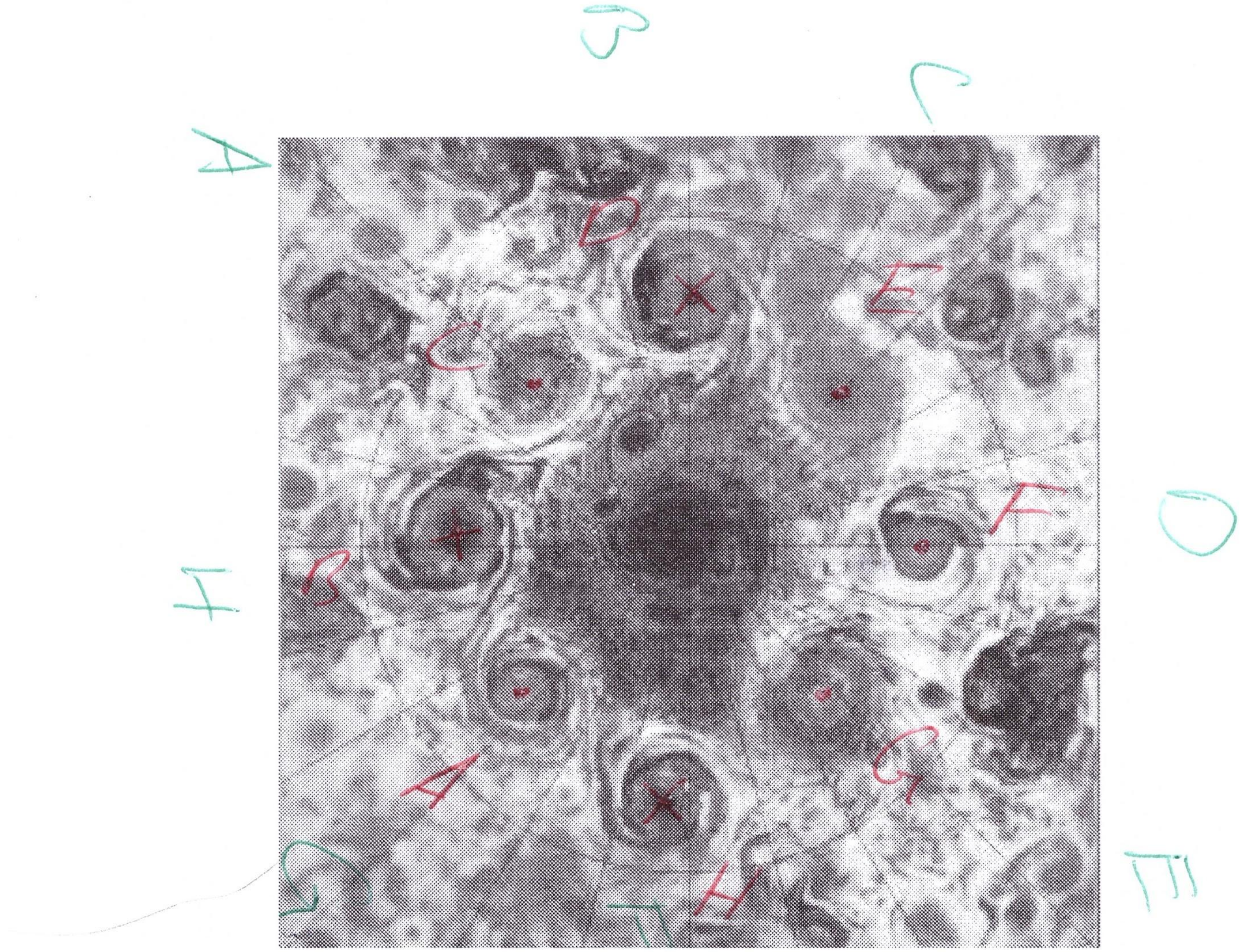


Figure 11: Jupiter North Pole, labeled

Note: Red labels are the original; green labels are after they are rotated.

Using standard engineer quality analog calipers, the author measured, to the 10,000th of an inch, the segment lengths for each diagram, in order to calculate the ratios. There are three important facts to note:

1. The units do not matter because they will cancel out in the ratio calculations, but for the calipers the inch measurements are more precise.
2. The centers of the mounds and circles in the diagrams are by eye, and so a small margin of error will exist. This will be the same with the protractor section which cannot be more precise than ½ a degree.
3. The surveys themselves are obviously not perfect. The surveyors used old equipment, and the printed versions may be off by small margins. That's why multiple diagrams of surveys are being considered, especially for Newark which is the site with the most likely chance of being accurate.

Segment Ratios and Standard Deviations

In the first stages of the experiment, we must compare the results of the main four diagrams, in order to calculate the likelihood of the Hopewell astronomers being in alignment with their asymmetric octagons to the Jovian APVO. Also, the correct side of the APVO with the Neck, labeled as shown as node E in each diagram.

Table 1: Segment Ratios and Standard Deviation

Segments	***(1)***	***Ratios***	***(2)***	***Ratios***	***(3)***	***Ratios***	***Stan_dev_rat***
AB	**0.2989**	1.064458689	**0.248**	0.99638409	**0.3361**	0.9885294118	4.18%
BC	**0.2808**	1	**0.2489**	0.9995983936	**0.34**	0.9577464789	2.43%
CD	**0.2808**	0.9996440014	**0.249**	1	**0.355**	0.9997183892	0.02%
DE	**0.2809**	0.9243172096	**0.249**	1.02892562	**0.3551**	1.00028169	5.41%
EF	**0.3039**	0.9589775955	**0.242**	1.039072563	**0.355**	1.064467766	5.51%
FG	**0.3169**	1.103028194	**0.2329**	0.964389234	**0.3335**	0.9840660962	7.50%
GH	**0.2873**	1.011619718	**0.2415**	1.069530558	**0.3389**	0.9935502785	3.97%
HA	**0.284**	0.950150552	**0.2258**	0.910483871	**0.3411**	1.014876525	5.27%
Triangular							
AC	**0.4858**	1.62529274	**0.4041**	1.629435484	**0.5711**	1.699196668	4.15%
AD	**0.6969**	2.331549013	**0.5751**	2.318951613	**0.852**	2.534959833	12.12%
AE	**0.6913**	2.31281365	**0.591**	2.383064516	**0.8298**	2.468908063	7.82%
Vert:Horiz							
CG	**0.6841**	0.9895848402	**0.5807**	0.982571912	**0.79**	0.9520366353	2.00%
Cross							
DH	**0.8305**	1.023600241	**0.6295**	1.267831612	**0.9599**	1.010521929	14.49%
BF	**0.8501**		**0.7981**		**0.97**		

Please note the ratio for HA is in reference to AB; the ratios for Triangulation are all in reference to AB. The ratio for Vert:Horiz is in relation to AE

Table 2: Table of Segment Ratio Averages, etc.

Avg of Figures	***Avg Ratio of Avg of Figures***	***Avg of Ratios***	***Stand_dev_Avgs***	***Avg of Avgs***
0.2943333333	1.01529263	1.016457397	0.08%	1.015875013
0.2899	0.9829339964	0.9857816241	0.20%	0.9843578103
0.2949333333	0.9997740113	0.9997874635	0.00%	0.9997807374
0.295	0.9823509824	0.9845081732	0.15%	0.9834295778
0.3003	1.01992528	1.020839308	0.06%	1.020382294
0.2944333333	1.017978564	1.017161175	0.06%	1.017569869
0.2892333333	1.019743801	1.024900185	0.36%	1.022321993
0.2836333333	0.9636466591	0.9585036493	0.36%	0.9610751542
0.487	1.654586636	1.651308297	0.23%	1.652947467
0.708	2.405436014	2.395153486	0.73%	2.40029475
0.7040333333	2.39195923	2.388262076	0.26%	2.390110653
0.6849333333	0.9728706027	0.9747311292	0.13%	0.9738008659
0.8066333333	1.081945535	1.100651261	1.32%	1.091298398
0.8727333333				

Note same rows as Table 1

Table 3: Jovian Ratios and Standard Deviations from Averages in Table 2

Jupiter	***Ratios***	***Standev with Avgs***
0.613	1.01322314	***0.19%***
0.605	0.9280564504	***3.98%***
0.6519	1.011167985	***0.81%***
0.6447	1.041686864	***4.12%***
0.6189	0.9823809524	***2.69%***
0.63	0.9331950822	***5.97%***
0.6751	1.048129172	***1.82%***
0.6441	1.050734095	***6.34%***
1.1099	1.810603589	11.15%
1.5488	2.526590538	8.93%
1.553	2.533442088	10.14%
1.5159	0.9761107534	***0.16%***
1.8224	1.088780022	***0.18%***
1.6738		

Please note that this table demonstrates that the crosses of AE:CG **and** the criss-cross ratio DH:BF are both less than 0.2% standard deviation with the Jovian APVO. This is one of the measurements which gives such a ridiculously impossible probability, and even by itself might be considered proof of concept. However, the author will continue further with the experiment.

Table 4: Side Triangulations for all four oblique sides of the JOPV

Jupiter Triangulars		***Ratios***	***Standev with Avg Triangular***
AB	0.613		
AC	1.1099	1.810603589	11.15%
AD	1.5488	2.526590538	8.93%
AE	1.553	2.533442088	10.14%
		Avg standdev	10.07%
CD	0.6519		
CE	1.0858	1.665592882	0.89%
CF	1.4945	2.292529529	7.62%
CG	1.5159	2.32535665	4.58%
		Avg standdev	**4.36%**
EF	0.6189		
EG	1.0748	1.736629504	5.92%
EH	1.5911	2.570851511	12.06%
EA	1.553	2.509290677	8.43%
		Avg standdev	8.80%
GH	0.6751		
GA	1.0608	1.571322767	5.77%
GB	1.4082	2.085913198	22.23%
GC	1.5159	2.245445119	10.23%
		Avg standdev	12.74%

From this we can easily see that node C for Figure 11 is the only one within 5% deviation of the averages of the 3 surveys, and is by far the best angular alignment. To verify if this is correct, the rest of the angular alignments can now be calculated and compared with Jupiter.

Angular Ratios and Standard Deviations; Newark Focus

Table 5: Angular Ratios and Standard Deviations, Avg Angles

Angles	***(1)***	***Ratios***	***(2)***	***Ratios***	***(3)***	***Ratios***	***Stan_dev_rat***	***Avg Figures***
BAH	**159**	1.514285714	**150**	1.388888889	**146**	1.216666667	14.94%	151.6666667
CBA	**105**	0.6176470588	**108**	0.675	**120**	0.7594936709	7.14%	111
DCB	**170**	1.588785047	**160**	1.300813008	**158**	1.476635514	14.52%	162.6666667
EDC	**107**	0.6604938272	**123**	0.8424657534	**107**	0.6645962733	10.39%	112.3333333
FED	**162**	1.5	**146**	1.149606299	**161**	1.578431373	22.83%	156.3333333
GFE	**108**	0.6878980892	**127**	0.8881118881	**102**	0.6181818182	14.01%	112.3333333
HGF	**157**	1.440366972	**143**	1.191666667	**165**	1.398305085	13.31%	155
GHA	**109**	0.6855345912	**120**	0.8	**118**	0.8082191781	6.86%	115.6666667
Triangle								
EBH	**67**	1.31372549	**62**	1.24	**64**	1.333333333	4.92%	64.33333333
BEH	**51**	0.8225806452	**50**	0.7352941176	**48**	0.7058823529	6.07%	49.66666667
EHB	**62**	0.9253731343	**68**	1.096774194	**68**	1.0625	9.07%	66

Table 6: Averages for Angular Ratios

Avg Ratio of Avg Figures	***Avg of Ratios***	***StanddevAvgs***	***Avg of Avgs***
1.366366366	1.373280423	0.49%	1.369823395
0.6823770492	0.6840469099	0.12%	0.6832119795
1.448071217	1.45541119	0.52%	1.451741203
0.7185501066	0.722518618	0.28%	0.7205343623
1.391691395	1.409345891	1.25%	1.400518643
0.7247311828	0.7313972652	0.47%	0.728064224
1.340057637	1.343446241	0.24%	1.341751939
0.7626373626	0.7645845898	0.14%	0.7636109762
1.295302013	1.295686275	0.03%	1.295494144
0.7525252525	0.7545857052	0.15%	0.7535554789
1.025906736	1.028215776	0.16%	1.027061256

Based on Table 4, we are able to surmise the rotation from A to C, which shifts E to G. Then calculate the standard deviations. It is possible for it to be rotated the opposite way, but the author will stick with the method of Table 4, which determined the best segment triangle ratios for node A was node C in Figure 11.

Table 7: Jovian Angles, Rotated, and Standard Deviations of ratios with Avg Table 5,6

Jupiter angles	***rotated***	***Stdev angle***	***Ratios***	***Stdev Ratios***
147	**149**	***1.89***	1.307017544	4.44%
131	**114**	***2.12***	0.76	5.43%
149	**150**	***8.96***	1.282051282	12.00%
114	**117**	***3.30***	0.7452229299	1.75%
150	**157**	***0.47***	1.453703704	3.76%
117	**108**	***3.06***	0.7346938776	0.47%
157	**147**	***5.66***	1.122137405	15.53%
108	**131**	***10.84***	0.8791946309	8.17%
73	**61.5**	***2.00***	1.268041237	1.94%
46.5	**48.5**	***0.82***	0.6928571429	4.29%
60.5	**70**	***2.83***	1.138211382	7.86%

Table 8: Standard Deviations for 3 diagrams to Avg, and for Jupiter, angle and %

Stdev (1)	***Stdev (2)***	***Stdev (3)***	***Avg (2) & (3)***	***Ratios***	***Stdev Jupiter angles***	***Stdev Jupiter vs Newark Ratios***
14.66%	5.79%	6.39%	148	1.30	0.71	0.62%
10.07%	6.01%	0.04%	114	0.72	0.00	3.04%
21.69%	1.33%	13.76%	159	1.38	6.36	7.11%
5.99%	6.88%	5.70%	115	0.75	1.41	0.28%
3.27%	21.50%	8.82%	153.5	1.34	2.47	8.00%
3.31%	10.85%	8.24%	114.5	0.74	4.60	0.62%
22.50%	4.92%	19.53%	154	1.29	4.95	12.16%
13.69%	5.60%	5.02%	119	0.80	8.49	5.31%
3.23%	**1.98%**	**4.62%**	63	1.29	**1.06**	**1.25%**
9.17%	**3.00%**	**0.92%**	49	0.72	**0.35**	**1.96%**
15.05%	**2.93%**	**5.35%**	68	1.08	**1.41**	**4.16%**

Please note that the bold on the left are to show the excellent triangulation for Newark (as opposed to Chillicothe), and the bold on the right are the angle deviations (in degrees) and % deviations of Newark with

Jupiter's APVO! Please note they are all +/- 1 degree and definitely under 5% deviation, which is simply impossible for a randomly created asymmetric octagon earthwork made out of dirt… **unless it were planned with precision**.

Charting The Deviations

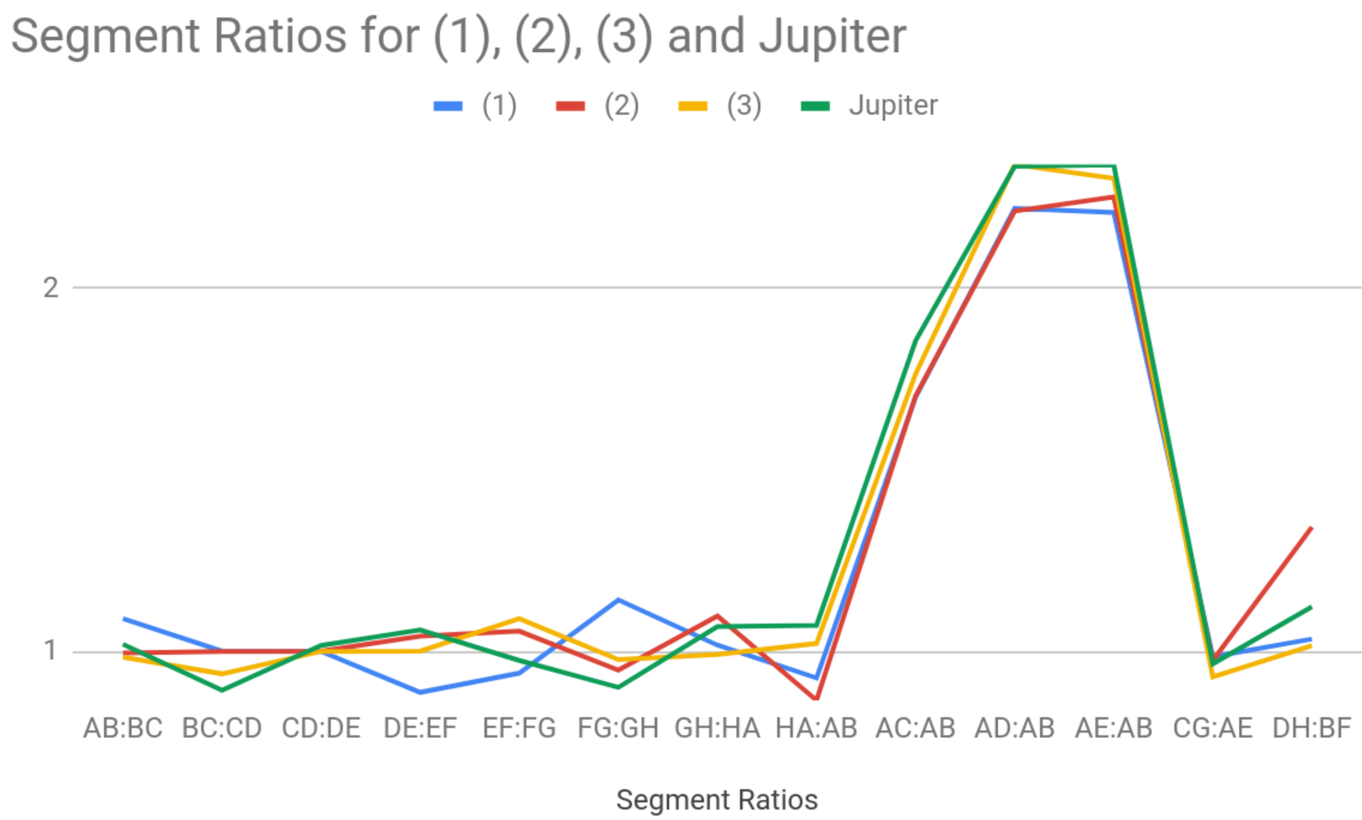


Figure 12: Segment Ratios for (1), (2), (3) & Jupiter

Please note the triangular ratios are supposed to increase. The most important thing to note is how closely one survey's measurements follow the trend for Jupiter (whose center points were figured by eye in the first place, as they would have been on some level by the early surveyors). From this it is quite easy to see how much better the third graph (the Squier graph) follows the Jovian curve, especially the criss ratios. However, Chillicothe's (1) cross ratio is superior (barely) to Newark's. The criss ratio CG:AE is particularly good on all graphs, while the cross is less accurate. Perhaps this is a classic longitudinal measurement problem? Or more likely a matter of triangulation calculation error on the part of the astronomers as Jupiter would have definitely been on tilt.

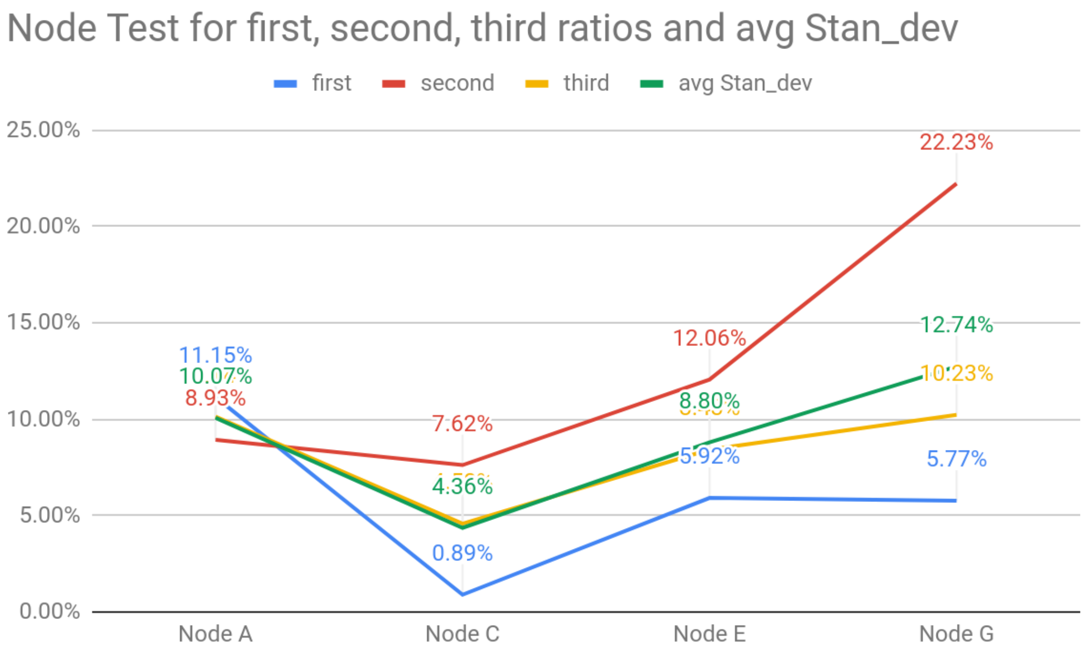


Figure 13: Node Testing for all 4 oblique sides of the JOPV vs avg of three surveys.

It is very clear from this which node has the best series of triangles to describe alignment of a Hopewellian octagon and the JOPV. Node C on Figure 10 is our actual Node A (opposite the neck).

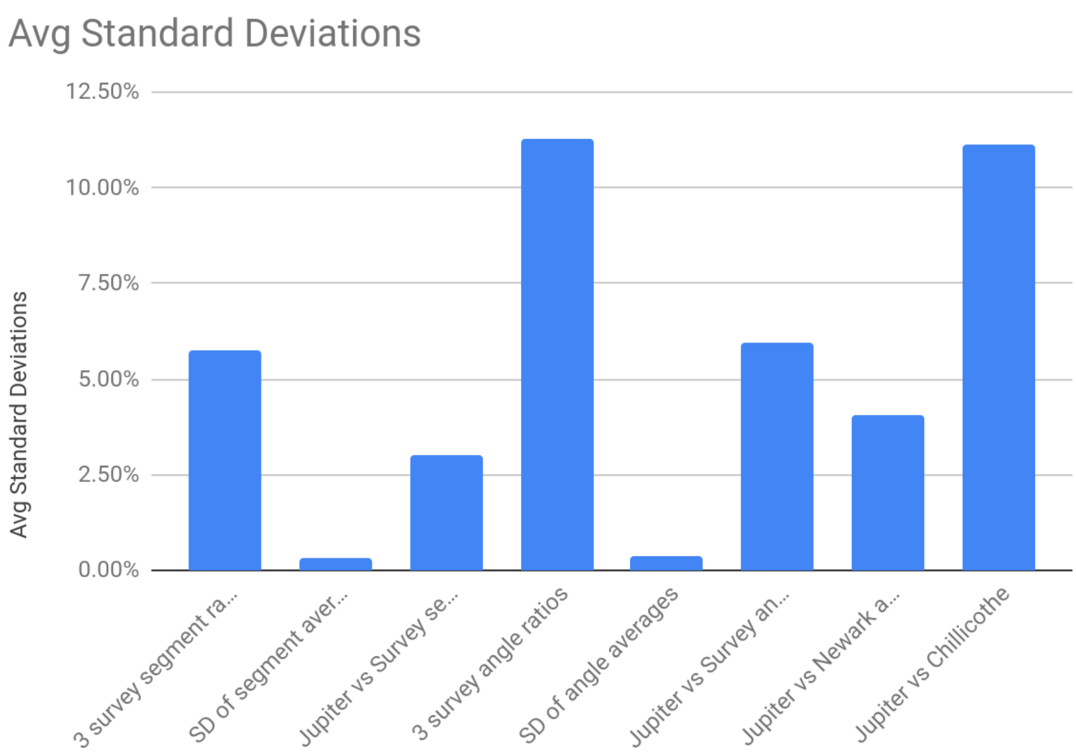


Figure 14: Average Standard Deviations throughout the experiment

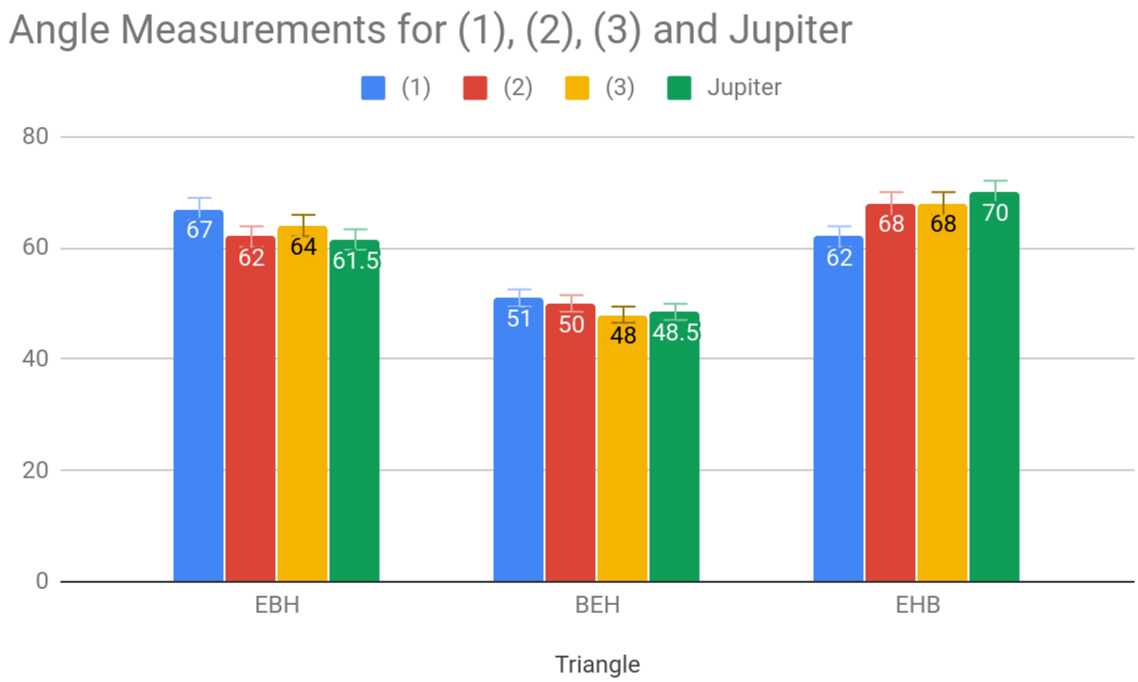


Figure 15: Angle Measurements for three surveys and Jupiter

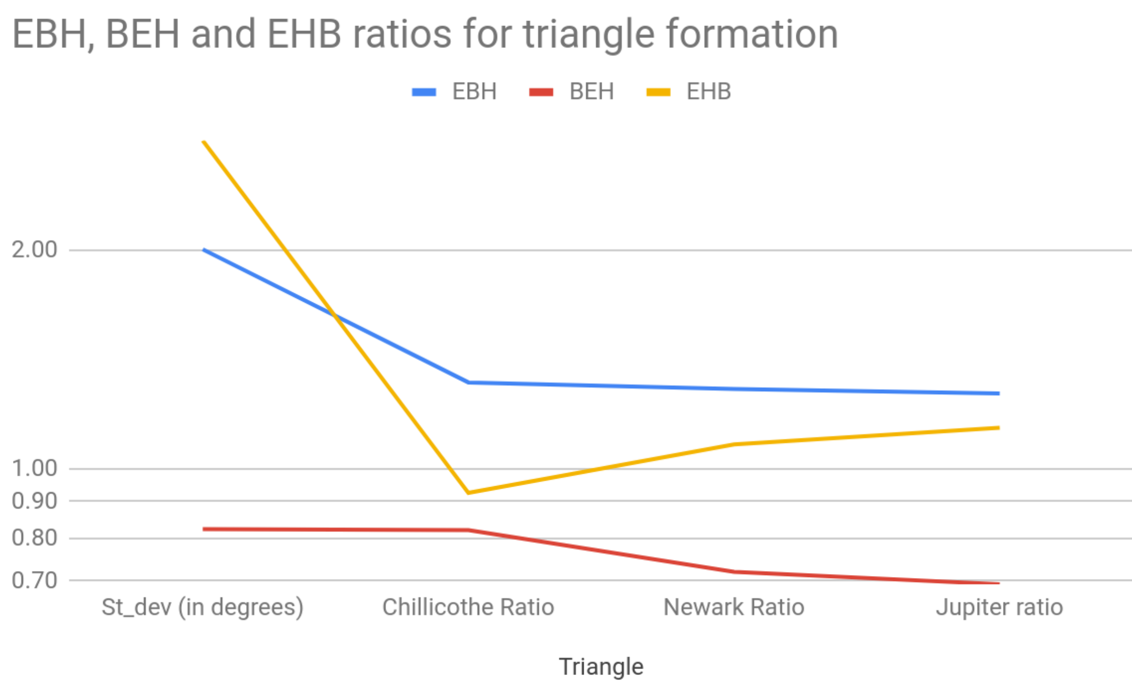


Figure 16: Triangular Ratios and the Standard Deviation (in degrees)

From this we can see that Newark has the best triangular formation in common with Jupiter, although the angle for EHB (with H node as the centerpoint) is better for Chillicothe than Jupiter.

Calculating Probability of Alignment Similarity

In order to calculate probability of diagrammatic similarity, the author chose simple probability. There are likely more precise ways to determine the probability, and very likely they could yield even more constrained results. However, as will be shown, the probability is already sufficiently infinitesimal.
The following formula was used to determine the probability:

$$\frac{3\ sides\ of\ a\ triangle * Avg\ angular\ deviation * products\ of\ Standard\ Deviations\ (segment\ ratios, angular\ ratios, cross\ ratios)}{8\ sides\ of\ an\ octagon * 8\ segment\ ratios * 8\ angle\ ratios * 2\ cross\ ratios * 178\ degree\ swing\ in\ single\ angle * 2\ poles} = P(A)$$

Equation 1: Probability of Octagonal Alignment with JOPV

Please note that constraining percentages of the standard deviations are used to fairly lessen the probability, and they represent precise values. The ⅜ ratio refers to the triangle alignment inside the octagon, but there are technically more than 1. However, more than one was not measured. The 178 degree swing is taking into account the imprecision of the protractor, which cannot make a better than 2 degree triangular measurement. The cross ratios are obvious, but it is easy to forget that there are 2 poles on Jupiter, and so already the chance for getting the earthwork misaligned technically exists. That number, even if eliminated does not change much the order of magnitude of P(A).

The result of $P(A)^{-1}$ is precisely 4.1253E+45. Its calculation may be referred to in the tab in the source data[6]. If the reader wishes to calculate a more precise or technically accurate probability for this engineering question, then they may do so. The data is open sourced.

The flipside of this conclusion is that the alignments for High Bank should be predictably within +/-5% error margin of the Standard Deviations from the averages in Tables 2, 3, 6, and 7. That is what will be tested in the next section.

Some may take exception to the use of the product of the standard deviations. So a second equation using the averages will yield a different, less infinitesimal probability.

$$\frac{3\ sides\ of\ a\ triangle * Avg\ angular\ deviation * averages\ of\ Standard\ Deviations\ (segment\ ratios, angular\ ratios, cross\ ratios)}{8\ sides\ of\ an\ octagon * 8\ segment\ ratios * 8\ angle\ ratios * 2\ cross\ ratios * 178\ degree\ swing\ in\ single\ angle * 2\ poles} = P(A)$$

Equation 2: Alternate Probability of Octagonal Alignment with JOPV

This yields the result $P(A)^{-1}$ = 350,846,577.5 ; the author feels this, as seemingly unlikely as it is, is still far too likely for a result[7]. However, it still far surpasses the unlikelihood of the Ramesses Stele successfully predicting the diameters of the two major gas giants. Therefore it is acceptable as an alternate, and still supports the view that it should be quite easy for the High Bank earthwork to exceed the expected results.

[6] http://bit.ly/2UkO6G0
[7] The use of averages for the standard deviation is that it enables a greater, or wider error for the octagonal alignment; sort of a fuzzy range wherein the circles could be within nearby ranges, but need not be as precise as the results have indicated. One positive argument for this idea would be the fact that the centers of the vortices are not precise, and also the centers of the mounds in the surveys were also not precise, and therefore the ranges ought to be fuzzier.

Table 9: High Bank vs other Surveys and vs Jupiter

3 Figure ratios	***Segments***	***High Bank***	***Ratios***	***Standev***	***Jupiter Ratios***	***Standev Jupiter***
1.015875013	AB	0.6189	0.9153971306	7.10%	1.01322314	6.92%
0.9843578103	BC	0.6761	1.128526123	10.19%	0.9280564504	14.18%
0.9997807374	CD	0.5991	0.9400596265	4.22%	1.011167985	5.03%
0.9834295778	DE	0.6373	0.9743158538	0.64%	1.041686864	4.76%
1.020382294	EF	0.6541	0.9627612599	4.07%	0.9823809524	1.39%
1.017569869	FG	0.6794	1.071946986	3.85%	0.9331950822	9.81%
1.022321993	GH	0.6338	0.9814183958	2.89%	1.048129172	4.72%
0.9610751542	HA	0.6458	1.043464211	5.83%	1.050734095	0.51%
	Triangular	**0.6430625**	**1.002236198**	**4.85%**	**1.001071718**	**5.91%**
1.652947467	AC	1.042	1.683632251	2.17%	1.810603589	8.98%
2.40029475	AD	1.525	2.464049119	4.51%	2.526590538	4.42%
2.390110653	AE	1.5185	2.453546615	4.49%	2.533442088	5.65%
	Vert:Horiz	**1.361833333**	**2.200409328**	**3.72%**	**2.290212072**	**6.35%**
0.9738008659	CG	1.4289	0.9409944024	2.32%	0.9761107534	2.48%
	Cross					
1.091298398	DH	1.818	1.013806381	5.48%	1.088780022	5.30%
	BF	1.8431				
		1.696666667	**0.9774003915**	**3.90%**	**1.032445387**	**3.89%**

Table 10: High Bank Constraints and Conformations

	standev segments	***segment ratios***	***Jupiter ratios***	***standev Jupiter***	***triang***	***standev***	***cross***	***standev***
average	4.28%	1.001524495	1.001071718	3.24%	2.290212072	10.07%	1.032445387	0.17%
+5%	4.50%	1.05160072	1.051125304	3.40%	2.404722675	10.57%	1.084067657	0.18%
-5%	4.07%	0.9514482702	0.951018131	3.08%	2.175701468	9.57%	0.9808231181	0.16%
Within Range?	NO	YES	YES	NO	YES	YES	YES	NO
%error	13.22%	0.07%	0.12%	82.60%	3.92%	63.05%	5.33%	2180.12%

In a discussion of the quality of prediction, the author holds that the model worked remarkably well considering the obvious sinking of the earthwork's quality by Node B, which had a very high standard deviation from the surveys and from Jupiter. Still the average standard deviation was just over 5% from Jupiter's segment ratios, and under 5% from the three surveys. The criss-cross and triangulation had fairly good quality, just not as good as Newark or Chillicothe. The Vert:Horiz (criss) ratio represented the worst standard deviation of over 6%.

When it comes to seeing if it fits the model, the 5% error margin was used. In the main, it conformed. In the case of deviation from the survey segments, its error was under 5%, but not under 4.5%. This is evidence that the site was not as well engineered, or some other factor such as different lunar pathways, or a more mobile vortex center in the node B of the JOPV.

In the deviation of the segments from Jupiter, it was also not successful, being at 5.91% instead of a max of 3.4%. That is deviation from present Jupiter. It is unknowable what the Node B was at the time of being built, or worse, when the shapes were first recorded prior to 1500 BC.

Finally the standard deviation of the criss-cross was the worst… and while ~3% deviation from Jupiter, it was clearly much worse a site than Newark. The first impulse is to say, 'It'd be better to use High Bank and Chillicothe to predict Newark." But actually, this is a proof of concept because it demonstrates all the more remarkably the prediction of Newark being within 0.2% standard deviation. But the High Bank standev is inferior at more than 2180% worse than those of the other three surveys. This begs the question: what happens when all 4 surveys are averaged together?

Table 11: Combined 4 Surveys vs. Jupiter

Combined with other surveys	***standev Jupiter***	***All surveys***	***Standev***	***Triang***	***Standev***	***Cross***	***standev***
0.9911923305	1.56%	**1.001303328**	**3.78%**	**2.158783297**	**9.29%**	**1.022618494**	**0.69%**
1.021467749	6.61%	1.051368495	3.97%	2.266722462	9.76%	1.073749419	0.73%
0.9848555043	1.86%	0.9512381621	3.60%	2.050844132	8.83%	0.9714875694	0.66%
0.9819600934	4.22%						
1.006319796	1.69%						
1.030857628	6.91%						
1.014029738	2.41%						
0.9797437896	5.02%						
1.659389286	10.69%						
2.412377395	8.08%						
2.404583211	9.11%						
0.9662969475	0.69%						
1.078940041	0.70%						

Note: Rows are otherwise the same as last two tables.

The answer is that all of the results become acceptable with Table 10 constraints!

High Bank Angular Alignments

Table 12: Angular Deviations and Constraints on High Bank

Angles	*Avg of Avgs*	*Jupiter*	*Stdev 3 Surveys*	*High Bank angles*	*Ratios*	*Stdev 3 Surveys*	*Stdev Jupiter*	*Avg Stdev*
BAH	1.369823395	1.307017544	4.44%	164	1.56937799	14.11%	18.55%	16.33%
CBA	0.6832119795	0.76	5.43%	104.5	0.6220238095	4.33%	9.76%	7.04%
DCB	1.451741203	1.282051282	12.00%	168	1.592417062	9.95%	21.95%	15.95%
EDC	0.7205343623	0.7452229299	1.75%	105.5	0.6552795031	4.61%	6.36%	5.49%
FED	1.400518643	1.453703704	3.76%	161	1.548076923	10.43%	6.67%	8.55%
GFE	0.728064224	0.7346938776	0.47%	104	0.619047619	7.71%	8.18%	7.94%
HGF	1.341751939	1.122137405	15.53%	168	1.555555556	15.12%	30.65%	22.88%
GHA	0.7636109762	0.8791946309	8.17%	108	0.6585365854	7.43%	15.60%	11.52%
Triangle	**1.05740709**	**1.035502672**	**6.44%**	**135.4**	**1.102539381**	**9.21%**	**14.71%**	**11.96%**
EBH	1.295494144	1.268041237	1.94%	66	1.346938776	3.64%	5.58%	4.61%
BEH	0.7535554789	0.6928571429	4.29%	49	0.7538461538	0.02%	4.31%	2.17%
EHB	1.027061256	1.138211382	7.86%	65	0.9848484848	2.98%	10.84%	6.91%
	1.025370293	**1.033036587**	**4.70%**	**60**	**1.028544471**	**2.21%**	**6.91%**	**4.56%**

Note: Bold = averages.

As can be plainly seen, the prediction that High Bank was not as high quality is born out in the angular deviations. There are two nodes whose angles are over 10% at variation with the 3 surveys, and 3 with Jupiter. Secondly, the average standard deviation for the angles is over 10% from Jupiter's angles. However, please note the triangular formation chosen of E, B and H. The site surveys were within 4.7% of Jupiter. But High Bank, although 6.9% from Jupiter is only 2.2% at variation with the other sites. The average standard deviation is therefore 4.56%, which is better than the 3 surveys alone. This signifies that High Bank's triangular alignment actually improved the model.

Clearly, the results from High Bank, however, are contestable, and not yet to be considered as final proof of the Hopewellian model. But the probability of its success was low, and yet it succeeded in **six of eleven constraints**. If other octagon earthworks are found with the signature asymmetric shape and alternating segment and angle ratios, it should be expected to conform to these measurements and mostly to the Jovian Octagonal Polar Vortices. After all, consider how although the average angle for the center was 60 degrees, the angle BEH was always, in all cases around 50 degrees, and usually less. For Jupiter that angle is currently 48.5º and the other two are hovering between 65 and 72 degrees! This *cannot* be a coincidence!

The reader may check the measurements with the following scan of High Bank, used for these diagrams.

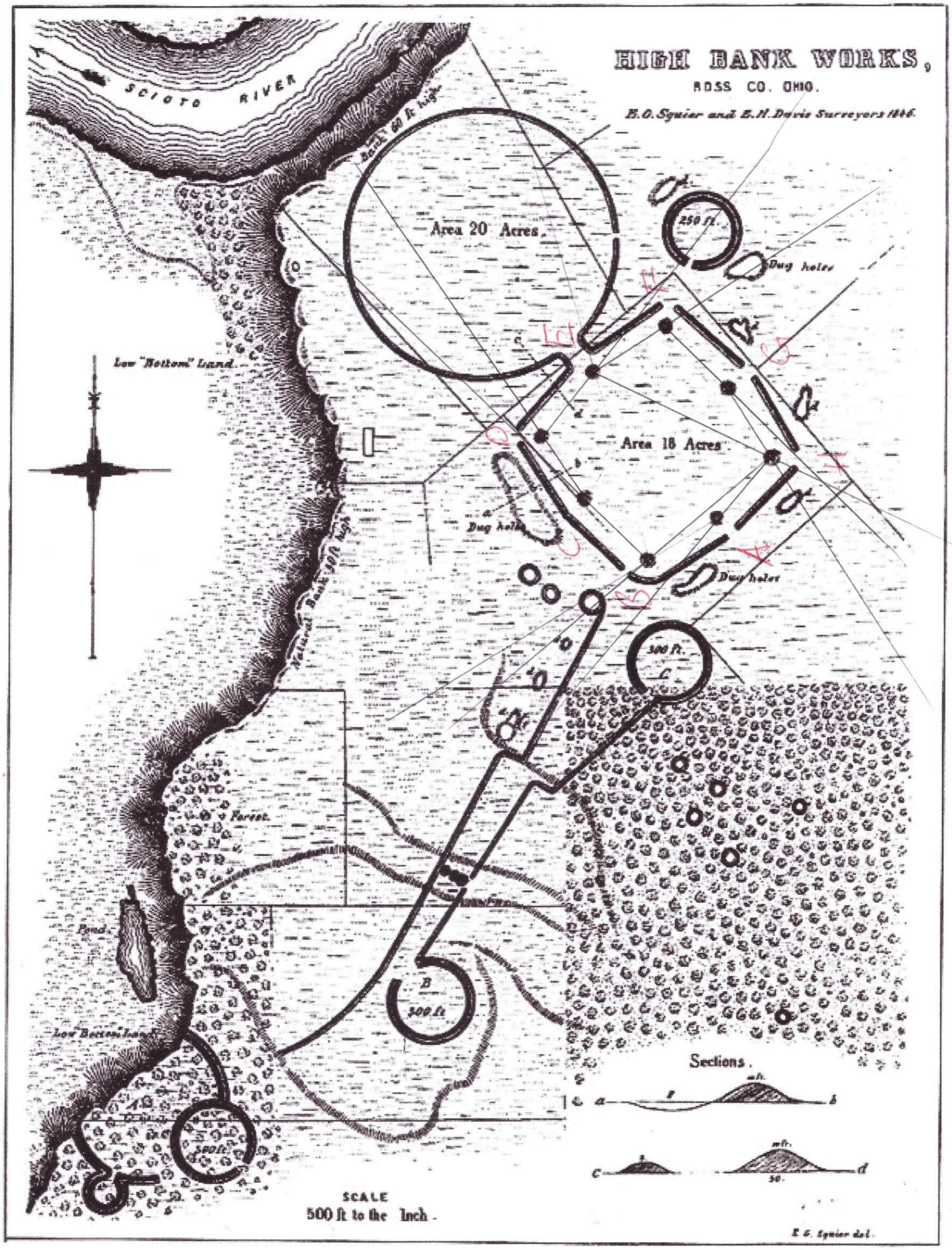


Figure 17: High Bank with lines; credit Squier & Davis, and author

Photoshop Overlays, Visual Evidence, and Surprising Lessons

The method here is very simple: snatch the mound layers from surveys, rotate and proportionally resize, so that all utilize the same E=neck standard. For Jupiter, Figure 3 was cropped and color inverted, then rotated left 90 degrees as per Table 4 results. Thus E becomes the neck node (leading always to the circle, for reasons unknown as of this time). The results were then overlaid in 4 different graphs, with a fifth and sixth one used for some visual aid and for lessons to be garnered.

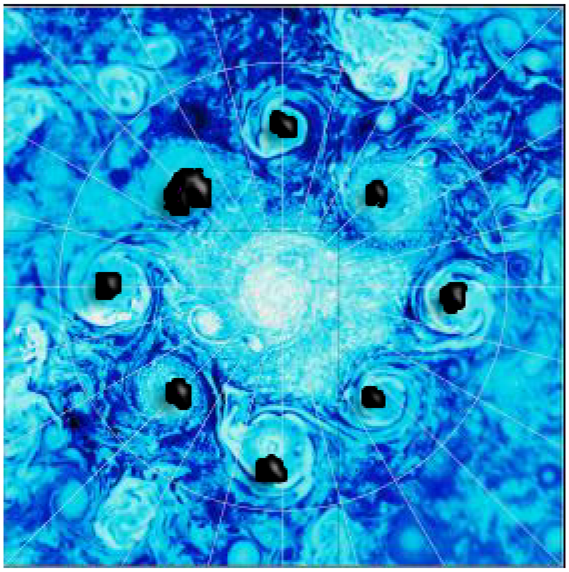


Figure 18: Chillicothe (1) Overlay

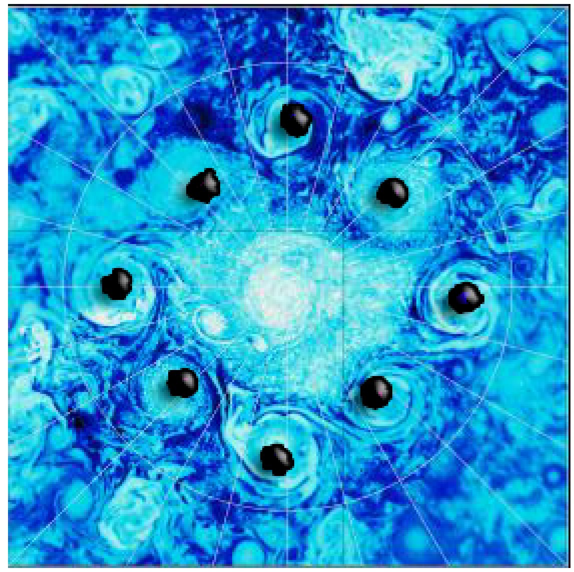


Figure 19: High Bank Overlay

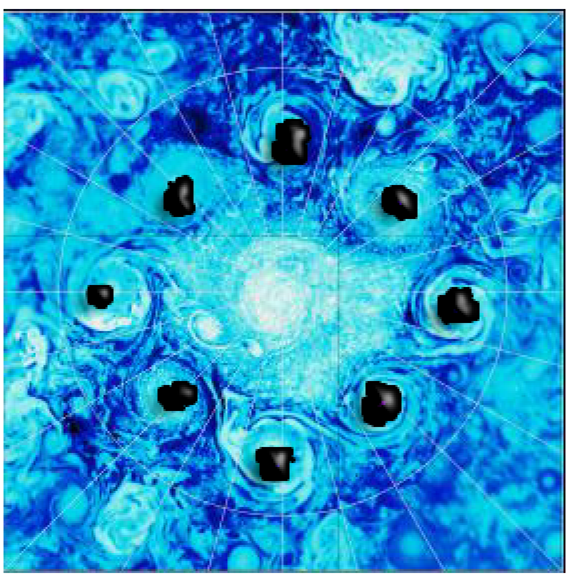


Figure 20: Newark (2) Overlay

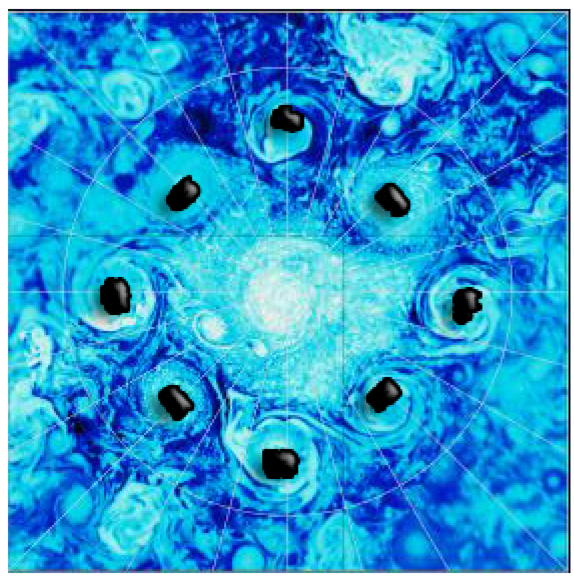
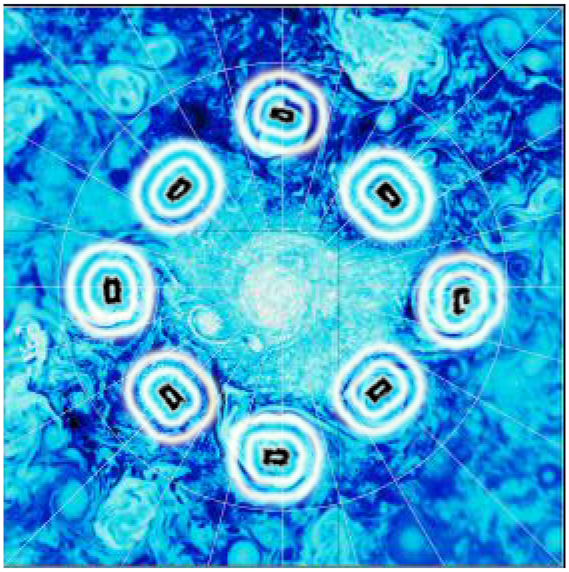


Figure 21: Newark (3) Overlay (Best)

Immediately we can note that of the three sites, Newark > Chillicothe > High Bank[8] in terms of alignment quality. Regarding the two Newark surveys, the Squier-Davis is superior (3) showing nearly perfect alignment, which matches the data. Furthermore, what are the odds but the one mound which "breaks the

8 Chillicothe has 4 on center, and 2 more near to; High Bank has 3 on center and 3 near to.

mold" in the Squier survey, at Node D (top of picture), happens to be the vortex on Jupiter with the weakest stability and diameter, almost as if they were making special note of it.



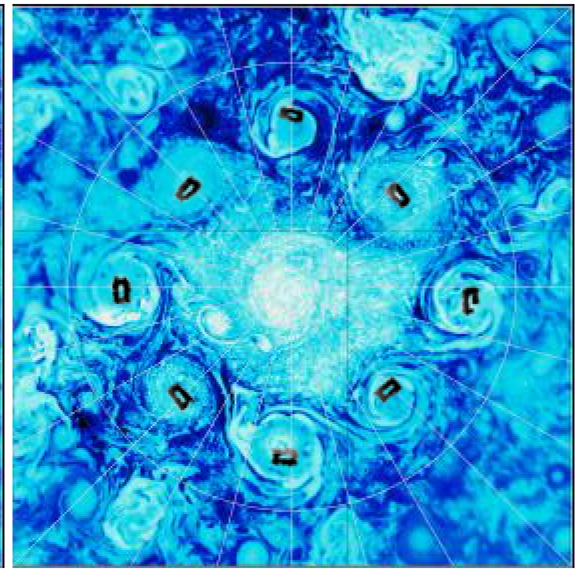


Figure 22: Newark (3) Overlay w/ swatch Figure 23: No swatch; note this is the Squier-Davis Survey

It's important in scrutinizing this to remember that these are gaseous vortices held in place by the Birkeland currents[9] which enter the poles[10].[11] [12] Though they are thousands of years old storms (at least), and inspired the Chinese Bagua (along with the other world's 8-spoked wheel designs), and the South Pole the Chinese Wuxing, the fact is they are still changing. It is to be expected that the centers will move, perhaps thousands of kilometers across the North pole surface. Indeed, they continue rotating and circulating around the central vortex, which (along with the southern pole) was seen as an eye, similar to the Great Red Spot.

There have been some famous proofs that the Newark octagonal earthworks are excellent predictors of the lunar alignments.[13] [14] This is not antithetical, and according to the Jupiter Myth[15] in EPEMC it is to be expected as the Moon was installed by Jupiter (as Enlil-Marduk) to be a watcher over the Earth.[16] Therefore it is entirely reasonable, given the danger the moon would have presented,(after the Tiamat myth incident which is discussed elsewhere in the author's works,[17]) to keep precise control and watch over this celestial body, including trying to calculate lunar eclipses, etc.[18] The resonance by which it was 'placed' becoming one of the twin children of Zeus (Sol/Apollo being the other)[19], would have marked the moon as especially important and in some cultures even worshipful.[20] However, the moon was also seen as a bringer of disaster and worship was also seen as heretical in the middle East. [21]

However the worship of Jupiter/Jove was and still is the primary honoring of the Thunder/Storm God.

[9] https://en.wikipedia.org/wiki/Birkeland_current
[10] http://www.ptep-online.com/2015/PP-41-13.PDF
[11] https://arxiv.org/pdf/astro-ph/0209070.pdf
[12] [24]
[13] https://en.wikipedia.org/wiki/Newark_Earthworks#Octagon_Earthworks
[14] https://www.ohiohistory.org/visit/museum-and-site-locator/newark-earthworks
[15] https://en.wikipedia.org/wiki/Jumping-Jupiter_scenario is one variation.
[16] See: Enuma Elish
[17] [15]
[18] "Astronomy and Mathematics in Ancient China: the Zhuo bi suan jing," C. Cullen, 1996
[19] http://www.greek-gods.info/greek-gods/apollo/myths/apollo-artemis-birth/
[20] https://www.britannica.com/topic/moon-worship
[21] https://www.quora.com/Why-do-some-non-Muslims-say-Allah-was-the-moon-god-of-Arab-polytheists-before-Islam

Conclusions

It is important in science to replicate results. In the spirit of this the data and method have both been provided, along with this challenge: test the surveys with the LiDAR and jovian results, using the same scans provided. If the LiDAR is not more able to improve the alignment and reduce the probability then the work should be doubted. However, do not forget that these octagons are **asymmetric**, and it seems highly unlikely their values were chosen at random, or for the movement of the moon alone. For as it is shown elsewhere by other mathematicians, the rough calculations of the lunar movements and seasonal equinoxes and solstices can be had with circle or square alike. There *would be no need for an asymmetric octagon at all*. The inspiration of which, including a not-quite-equatorial triangular center, narrowest at the neck towards the circular entryway happens to coincide with the behavior of the JOPV, and whose side segments perform an alternating ratio of over and under 1; and whose angles also go from very oblique to somewhat oblique. This would be quite a challenge for a primitive scriptless society!

Indeed the author maintains it is not possible that they were without letters, runes, or glyphic language not only due to the maths, but the mere need to record the events of the Jovian Age to keep until the end of the Adena. Unless, as has been hypothesized by the author, the site was maintained, ere it would erode away, at different ages by the resurgence of solar and/or lunar cults. The maintenance would definitely explain the hodge-podge of expansion, shifts in earthen walls along “roads”, and the introduction of seemingly randomized U-mounds. Unless they are otherwise a starmap, which is not a conjecture to make at this time, but worthy of long exploration using astro-archeological charts.

The fact remains that there are some impossibly precise alignments, such as the criss-cross and triangle, and a huge number of alignments within 10, 5, or even 3% constraints. If dirt were re-filled onto mounds, or otherwise shifted, or if the vortices moved, as is to be expected, then perhaps that would account for all major misalignments over 5% variance.

For now the author holds the assertion previously made in his more seminal work[22] to be proven right, and would defend this conclusion in an audience of archaeologists and anthropologists if they were inclined to open investigation and mathematics, rather than tradition for authority.

A final challenge and issue for a future paper remains: to use the model to test Amazonia and the emerging octagon mounds there, against the Allegewi measurements and Jupiter. At present more orthogonal surveys are necessary to complete this, but it would be a fair challenge to the Jupiter Myth in general. Further surveys and LiDAR should be used, and when those averages are collected, deep inquiries could be made as to how-if not by direct line of sight-three individual cultures could make highly unlikely measurements of values confirmable via satellite observation.

[22] [15]

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