A 44.77 Year Jupiter-Venus-Earth Configuration Sun-tide Period in Solar-Climatic Cycles

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If, as appears certain, terrestrial climatic fluctuations are influenced by variations in the solar energy reaching the earth; and, if also, the more or less accepted theory is accepted that sun-spot activity is influenced by planetary configuration, the conclusion that climatic fluctuations are influenced by planetary configuration is inescapable. Configuration recurrences of Venus, Earth and Jupiter at intervals of 11.1928695 years, 22.385739 years, 44.771478 years, 89.542956 years and 179,085912 years are here described. These periods are derived from the siderial and mean synodic periods of the planets, which are astronomic constants.

The siderial (revolution) period of Earth is 1.00004 years, Venus 0.61521 years and Jupiter 11.86223 years.

If for simplification of calculations, the eccentricity of the planetary orbits is neglected, and the three planets, Venus, Earth and Jupiter are assumed to be in conjunction to t_o, then at t. 44.771478 years they will again be in conjunction but in 81.25 degrees less advanced heliocentric longitude. This arises from the fact that in this period the number of revolutions of each planet is:

Earth	44.769687
Venus	72.7743
Jupiter	3.7742884

The mean synodic period of any pair of planets may be computed from their siderial periods. Thus let x=mean synodic period of Jupiter and Venus, since the siderial period of Jupiter is 11.86223 years and that of Venus 0.61521 years we may write

$$\frac{x}{11.86223}+1=\frac{x}{.61522};\quad \text{whence}\quad x=0.648862\ \text{years}$$

The mean synodic periods of Jupiter and Earth is 1,0921098 years and of Venus and Earth, 1.598718 years.

Four sun-spot cycle periods or 44.771878 years represents 69.0 Jupiter-Venus synods, 40.9953 Jupiter-Earth synods and 28.004612 Venus-Earth synods. The number of mean synodic periods at 11.192694 year sun-spot cycle intervals for the three planets are given in Table Ia. It will be noted that in the cycle phase, representing sun-spot maxima, the angles, between the three planets in this phase are 90°, whereas at a hemicycle or 5.59643475 years removed, representing sun-spot minima, the angular differences are 45°.

TABLE I

179.085912 Year (16 Phase) Jupiter, Venus, Earth Configuration Cycle
t.=VE/3 L320.55° Aug. 15, 1748.621242 and L354.312 Sept. 15, 1927.70713

1 JV Synod=0.648862 Years
17.25 JV Synods=11.1928694 years= −20.3144054° heliocentric Precession
8.625 Synods=5.59643475 years

(a) Phase Angle 90°

Sunspot Minimum		Mean	Synodic Periods		Configuration			Orientation t.=360°
Year	Cycle	Jupiter-Venus	Jupiter-Earth	Venus Earth	Jupiter-Venus	Jupiter-Earth	Venus-Earth	Long. Jupiter
11.1928694	1	17.25	10.248849	7.001153	☐	☐	☌	339.686°
23.38574	2	34.50	20.497698	14.002306	☍	☍	☌	319.37
33.578609	3	51.75	30.746547	21.00359	☐	☐	☌	299.06
44.7714780	4	69.00	40.995396	28.004612	☌	☌	☌	278.74
55.964349	5	86.25	51.244245	35.005765	☐	☐	☌	256.43
67.157218	6	103.50	61.493094	42.006918	☍	☍	☌	238.11
78.350087	7	120.75	71.741943	49.008071	☐	☐	☌	217.80
89.542956	8	138.00	81.990792	56.009224	☌	☌	☌	197.49
100.735829	9	155.25	92.239641	63.010377	☐	☐	☌	177.17
111.928698	10	172.50	102.48849	70.01153	☍	☍	☌	156.86
123.121567	11	189.75	112.737339	77.012683	☐	☐	☌	136.54
134.314436	12	207.0	122.986188	84.013836	☌	☌	☌	116.23
145.507305	13	224.25	133.235037	91.014989	☐	☐	☌	95.91
156.700174	14	241.50	143.483886	98.016142	☍	☍	☌	75.60
167.893043	15	258.75	153.732735	105.017295	☐	☐	☌	55.28
179.085912	16	276.0	163.981584	112.018448	☌	☌	☌	34.97

TABLE 1 (Continued)

(b) Phase Angle = 45°

SUNSPOT MAXIMUM

YEAR								
5.59643475	.5	8.625	5.124424	3.50057	☿+45°	♂+45°	☿	169.84
16.78930375	1.5	25.875	15.373273	10.5017295	□+45	□+45	☿	149.53
27.98217275	2.5	43.125	25.622122	17.5028825	♂+45	☿+45	☿	129.21
39.17504175	3.5	60.375	35.870971	24.5040355	□+45	□+45	☿	108.90
50.36791075	4.5	77.625	46.11982	31.5051885	☿+45	♂+45	☿	88.58
61.56077975	5.5	94.875	56.368669	38.5063415	□+45	□+45	☿	68.27
72.75364875	6.5	112.125	66.617518	45.5074945	♂+45	☿+45	☿	47.96
83.94651775	7.5	129.375	76.866367	52.5086475	□+45	□+45	☿	27.64
95.13938675	8.5	146.625	87.115216	59.5098005	☿+45	♂+45	☿	7.33
106.33225575	9.5	163.875	97.364065	66.5109535	□+45	□+45	☿	347.01
117.52512475	10.5	181.125	107.612914	73.5121065	♂+45	☿+45	☿	326.70
128.7179375	11.5	198.375	117.861763	80.5132595	□+45	□+45	☿	306.38
139.91086275	12.5	215.625	128.110612	87.5144125	☿+45	♂+45	☿	286.07
151.10373175	13.5	232.875	138.359461	94.5155655	□+45	□+45	☿	265.76
162.29660075	14.5	250.125	148.60831	101.5167185	♂+45	☿+45	☿	245.44
173.48946975	15.5	267.375	158.857159	108.5178715	□+45	□+45	☿	225.13

Since the tide-raising force of a planet varies directly with mass and inversely as the cube of distance from the sun an expression for the combined sun-tide effect of the three planets may be written:

$$\text{Sun-tide } I = \frac{m}{r^3} J + \frac{m}{r^3} V \cos 2(LJ-LV) + \frac{m}{r^3} E \cos 2(LJ-LE)$$

Where: M=Mass, r=radius vector, L=heliocentric longitude and J,V and E identify the planets.

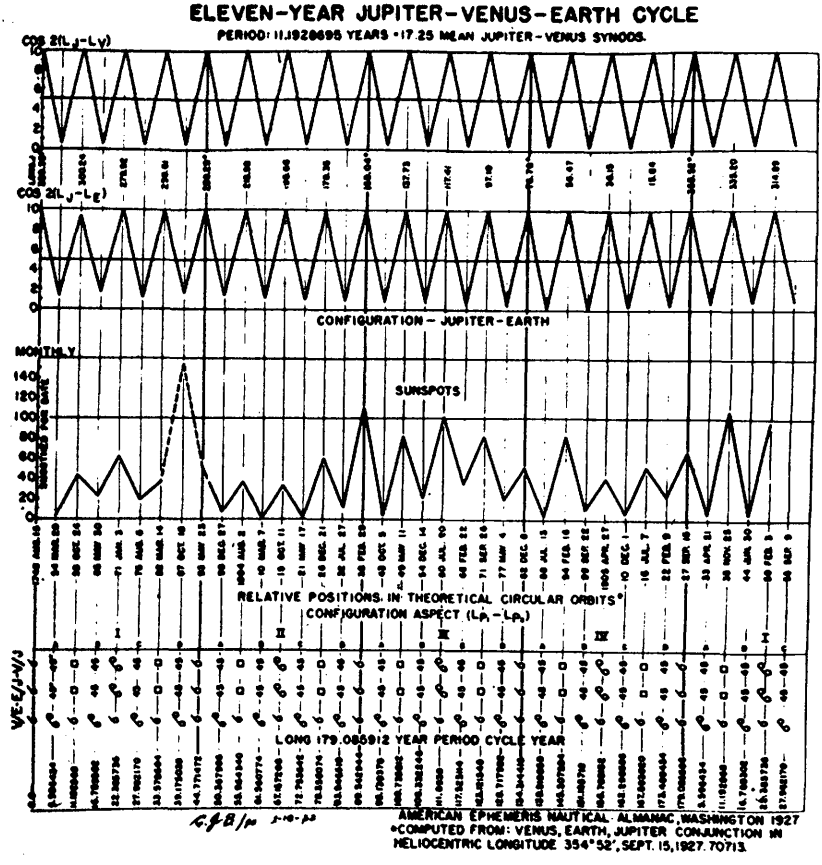

FIGURE 1.

In Figure 1, the relation between the recurrent 90° and 45° configuration patterns at 11.192694 year intervals along with smoothed monthly sunspots for phase dates during the period of record starting in 1749 are shown graphically.

A consistent relation is evident except in the cycle maximum of 1782, which may represent an error in the sun-spot record.

In light of the above periodicities it appears probable that the above formula, when extended to include all of the planets, and perhaps further

elaborated by the inclusion of terms for heliographic declination, will enable investigators to proceed directly from astronomic data to the exploration of *terra incognito*—in the fields of climatology and meteorology as well as to the interpretation of cycles now recognized, but not explained, in many catagories terrestrial phenomena. Thus the slow progress which in the past, it appears, may have been due to insufficient knowledge of sunspot cycle variation and/or a dearth of reliable "solar constant" data may be accelerated.