

Planetary Alignment Periodicities in Sunspots and Solar Radiation¹

CLYDE J. BOLLINGER, University of Oklahoma, Norman, Oklahoma

If the existence of sun-tides is postulated consistent relations between planetary alignment,¹ and sun-spot activity,² the "solar constant" of radiation,³ and terrestrial weather may, by application of the Kepler's third law of planetary motion and Newton's Universal law of gravitation, be demonstrated. Attention is here restricted to sunspots and radiation.

Sunspot numbers form a long reliable series of indices and have been calculated back to A. D. 1749.³ Harmonic analysis of the records of the past two centuries, has revealed more than a dozen constituent rythms with periods ranging from 57.6 to 178.8 months.² Solar constant values, considered less reliable, are available for a relatively short period, but also have been found by C. G. Abbot and others to contain rythms, with periods ranging up to 23.0 years.²

When two planets are in alignment with the sun, i. e. in conjunction or opposition their tidal forces (m/r^3) are added; when in quadrature, or 90° heliocentric degrees apart, the resultant of their tide raising forces is equal to the difference between their respective (m/r^3) values. The sidereal periods of the planets are astronomic constants.⁴ If, for simplification of calculations, the eccentricities of the planetary orbits are neglected, synodic periods of pairs of planets would be constants. The mean synodic periods are astronomical constants. Hence, neglecting eccentricity, any pair of planets will be in alignment and produce relatively high sun-tides periodically, at intervals equal to one-half their mean synodic periods.

The major sun-spot rythm periods, according to A. Schuster, K. Stumff, H. H. Clayton, A. E. Douglas and D. Alter, are given in Table I, and those found in Solar radiation, by C. G. Abbot and C. L. Sterne in Table II, along with the mean synodic periods of planets to which they most nearly correspond. A close agreement will be noted. Table I and II.

References

1. Abbot, C. G.
2. Dewey, Edward R., A list of Rythms Determined and/or Alleged. Compiled by Edward R. Dewey, Director, Foundation for the Study of Cycles. Riverside, Connecticut 1949.
3. Shove, D. Justin: The Sunspot Cycle A. D. 301-1950. Journal of Cycle Research Vol. 2, No. 4 Fall 1953.
4. The American Ephemeris and Nautical Almanac. U. S. Naval Observatory, Washington D. C., Annual. Vol. 1954

¹ Received for publication December 17, 1954.

Table I
Relation of Sunspot Rythms to Planetary Alignment

Sunspot Authority*	Period Months	Suntide Months	Period Synods	Planets	Difference Months	Ratio
(d)	57.6	57.5269227	19.5	Mercury-Jupiter	.0731	.00127
(e) (b)	67.2	67.1461518	3.5	Venus-Earth	.0538	.00080
(e)	87.6	87.5634012	23.0	Mercury-Earth	.0366	.00042
(a)	91.2	91.3705056	24.0	Mercury-Earth	.1705	.00187
(b) (a)	97.2	97.36787748	20.5	Mercury-Venus	.1168	.00120
(d)	100.8	101.222453	13.0	Venus-Jupiter	.4222	.00417
(c)	102.0	101.7734017	34.5	Mercury-Jupiter	.2216	.00218
(a)	104.4	104.492356	22.0	Mercury-Venus	.0924	.00088
(b)	107.28	106.867183167	22.5	Mercury-Venus	.4128	.00386
(b)	118.8	118.741314	25.0	Mercury-Venus	.0587	.00049
(b) (c) (e) (a)	120	119.9237886	31.5	Mercury-Earth	.0762	.00064
(b)	134.04	134.2294863	45.5	Mercury-Jupiter	.1895	.00141
(e) (d)	135.6	135.2128525	46.0	Mercury-Jupiter	.3871	.00286
(a)	136.44	136.2609948	17.5	Venus-Jupiter	.1790	.00131
(c)	136.8	137.0557584	36.0	Mercury-Earth	.2558	.00187
(e)	154.8	154.8801765	52.5	Mercury-Jupiter	.0802	.00052
(d) (c)	162	161.488187	34.0	Mercury-Venus	.5118	.00317
(a)	168	168.1556202	57.0	Mercury-Jupiter	.1556	.00093
(e) (c)	171.6	171.299536	22.0	Venus-Jupiter	.3005	.00175
(b)	178.8	178.9339068	47.0	Mercury-Earth	.1339	.00075

- * (a) D. Alter
(b) H. H. Clayton
(c) A. E. Douglas
(d) A. Schuster
(e) K. Stumff

Table II
Relation of Solar Radiation Rythms to Planetary Alignment

Radiation Authority	Period Months	Suntide Months	Period Synods	Planets	Difference Months	Ratio
C. L. Sterne	6.26	6.211096	½	Earth-Saturn	.048904	.00787365
C. G. Abbot	8.125	8.050632	2.5	Mars-Saturn	.074368	.00923753
C. L. Sterne	8.38			Mercury		
C. L. Sterne	9.68	9.592307	½	Venus-Earth	.087693	.00916672
C. G. Abbot	9.79					
C. L. Sterne	10.29	10.199089	3.5	Mars-Saturn	.090911	.0089136392
C. L. Sterne	11.15					
C. G. Abbot	11.29	11.309983	1.5	Venus-Saturn	.019983	.0017668461
C. L. Sterne	13.13	13.105317	1	Earth-Jupiter	.024683	.001883434
C. L. Sterne	15.20	15.079978	2	Venus-Saturn	.120022	.00795903
C. L. Sterne	17.45	17.484152	6	Mars-Saturn	.034152	.0019533117
C. L. Sterne	20.4	20.398178	7a	Mars-Saturn	.001822	.0000893217
C. G. Abbot	21.0					
C. L. Sterne	24.8	24.844385	2	Earth-Saturn	.044385	.00178652
C. G. Abbot	25.333					
C. G. Abbot	39.5	39.315953	3.0	Earth-Saturn	.184047	.004681229
C. L. Sterne	40.8	40.54936	14.0	Mercury-Neptune	.278064	.006862061
C. G. Abbot	45.25	45.239933	6	Venus-Saturn	.010067	.0002225246
C. L. Sterne	67.6	66.495136	14	Venus-Mars		
C. G. Abbot	68.0	68.018964	23.5	Mercury-Neptune	.018964	.0002788045
C. G. Abbot	91.0	91.174356	31.5	Mercury-Neptune		
C. G. Abbot	276.	275.479848	59	Venus-Mars	.52015	.00188816