SECTION F, GEOGRAPHY

Astronomical Foreshadowing of Seasonal Rainfall in the Southern Plains Region 1837-1925

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The diurnal and annual cycles caused by variations in insolation arising from the rotation and revolution of the Earth are understood by everyone and the relations between sunspot activity and radiation are now under intensive investigation. Sunspot activity, though important, is local and secondary to more fundamental processes arising from the tidal action of the planets on the sun. The forces producing sun-tides vary in strict conformity with the laws of Newton and Kepler. Hence, it appears that application of these laws may be expected to yield a universal climatology and long range climatic prediction.

The solar hypothesis of climatic variation assumes the existance of sun-tides which control solar radiation. The strength of the sun-tides depends on:

1. The degree of alignment of the planets
2. The orientation of the alignment
3. The seasonal timing of the alignment

It may be assumed that the current and cumulative effects of varying insolation control evaporation and the circulation and stability of the atmosphere and hence the climate.

The sidereal periodicity of the planets in conjunction with the eccentricity of the planetary orbits produces periodically and cyclically times of abnormal tidal stress on the sun. Because of the number of planets and their orbital differences these variations are complicated but are being revealed as calculation progresses.

In the meantime, a qualitative approach is possible on the basis of circular orbit calculations. The three highly eccentric planets Mercury, Saturn, and Earth are in perihelion in a small 43° heliocentric sector between the perihelion positions of Mercury, 57° and Earth, 102°; Saturn is in perihelion in 98°. This is the sector through which Earth passes between Nov. 2-Jan. 1 and is opposite between April 9 and July 2.

The tide force-values, expressed in earth mean distance tides force = 1.0, of the three planets when in perihelion and aphelion are:

	perihelion	aphelion
Mercury	1.888063	0.5400774
Saturn	0.12873329	0.0921817
Earth	1.0518809	0.9481191
Total:	3.06867719	1.58032467

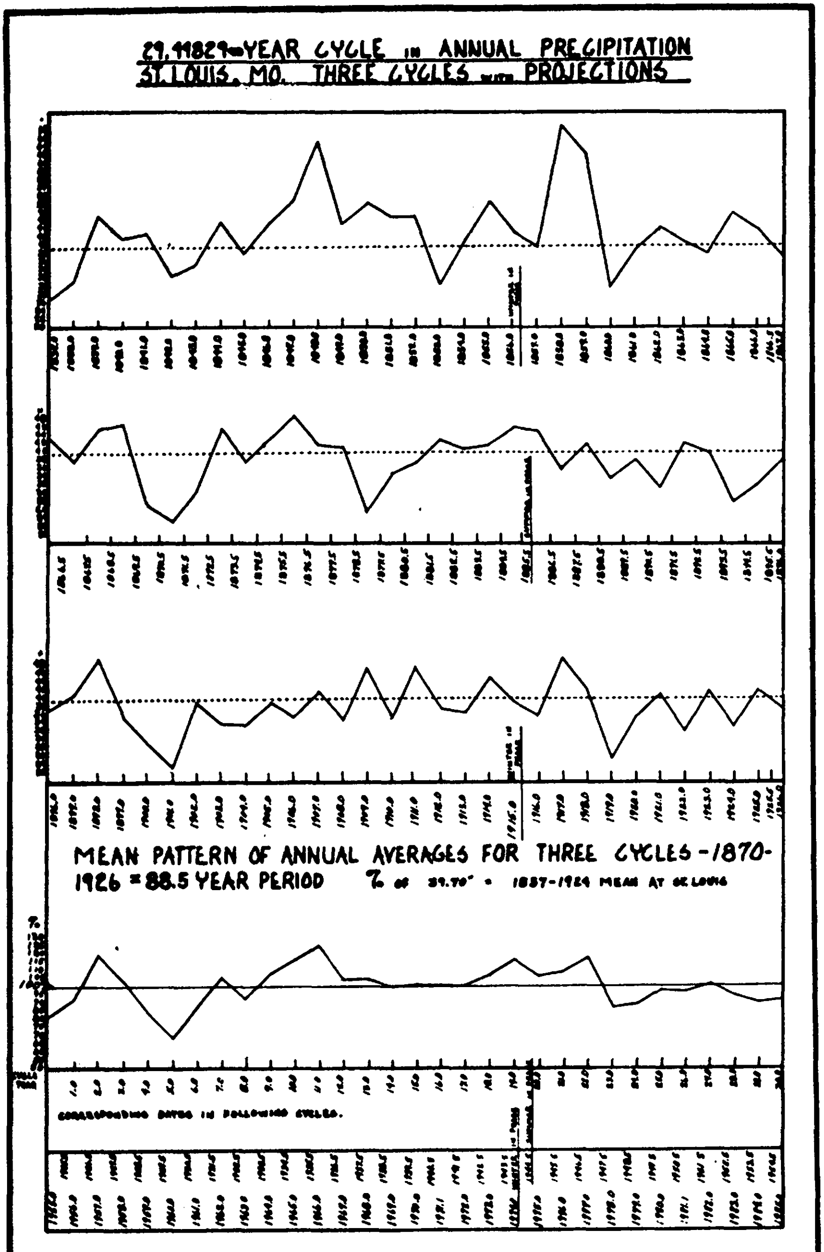
YEAR CYCLE IN ANNUAL PRECIPITATION
ST. LOUIS, MO. THREE CYCLES WITH PROJECTIONS
MEAN PATTERN OF ANNUAL AVERAGES FOR THREE CYCLES -1870-1926 = 88.5 YEAR PERIOD
CORRESPONDING DATES IN FOLLOWING CYCLES.

Figure 1

In any 29.49829-year period the planets complete revolutions as follows:

Earth	29.497711
Mercury	122.47577
Saturn	1.0013575
Venus	47.94832
Jupiter	2.4867406

It is evident that approximate realignment of the three planets and also of Venus and Jupiter recurs in the above period, and that at half-cycle phase 14.74914 years before and after alignment, the relative positions expressed in revolutions will be:

Earth	14.74855
Mercury	61.23786
Saturn	0.5006884
Venus	23.97415
Jupiter	1.233693

In this phase Earth, Mercury and Jupiter realign in an orientation 90° out of phase with Venus and Saturn, and weak or neap sun-tides result. Thus an alternation at intervals of 14.74914 years in sun tides and their climatic effects must occur.

This cycle is evident in the Rhoda gage Nile records (Jarvis, 1953) extending back to 622 A.D.; in the rainfall records for Milano, Italy, extending back to 1764,; and in the records of precipitation at St. Louis, Missouri and other stations in the Southern Plains and neighboring states.

The record of annual rainfall at St. Louis extends over more than three of the 29.49829-year cycles (Clayton, 1927). One June 28, 1944.48915 the planets Mercury, Venus, Saturn and Uranus were in the above-defined perihelion heliocentric quadrant: Mercury 77.4°, Uranus 69°, Saturn 90.4°, with Earth in opposition in 276.2°. Jupiter then in 152.8° was the only significant planet outside the strong alignment sector.

Variations in annual precipitation at St. Louis are shown graphically in Fig. 1. The 88.49487 years analyzed includes three of the 29 ½-year cycles. The average pattern, expressed in percentage deviations from the 1839-1924 mean of 39.70″ is given for the three cycles along with the projected cycle phase dates for the two following cycles 1925-1984.

Literature Cited

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