also, $A_3 - A_1 = 120°$ in 1910, and $= 61°$ in 1919. If we go back to 1904 we find almost the same difference for $A_3 - A_1$ [59°] as in 1919, suggesting a completion of some effect in a period of 15 years, and this is strengthened by the identity of P_4 in 1905 and 1920.

We must eventually inquire why P_4 completely changes the sign of its phase angle between 1919 and 1920 [64°+ 296° = 360°], while P_1 changes only $-4\frac{1}{2}°$ in phase. Also it must be investigated why A_4 in 1920 is 240° larger than in 1905. Has the equality of the ratio $\frac{P_2}{P_4}$ in 1905 and 1915, and the fact of $A_2 + A_4$ summing a simple multiple of $\frac{\pi}{2}$ in those years, anything to do with the fact that both 1905 and 1915 were years of maximum solar constant as observed at the Solar Physics Observatories ? Also, have the simple relations between phase angles in 1910 any connection with the fact that 1910 was a year of minimum solar constant ? Analysis of all curves by proper periodogram methods will surely show, when sufficient accurate observations have been obtained. But with regard to the value 2·86 occurring for P_3 in 1910, 1916, and 1920, it will be interesting to see whether 1906 or 1907, or perhaps both, have that value for P_3. Unfortunately, our measures for these years are not yet completed, though under way.

It is of especial importance to note that producing the analysed results backward a time is found for each year's components at which the P_1 and P_2 components are in the same phase, and it is found that in the above analysis between the years 1913 and 1920 these points of time in successive years are separated by 12 synodic solar rotations, taking the solar equatorial belt. This shows the all-compelling power of the sun's rotation on the phenomena, and connects the effects with that period.

An investigation has been made, by what may be called the method of jumbles, of the amount of the variation of H.F. at Christchurch in the period of 12 synodic solar rotations, denoted for convenience $\odot_{s\,12}$, the s suffix denoting synodic, to distinguish from $\odot_{12}$, the length of 12 absolute periods of rotation of which $\odot_{s\,12}$ is the synodic correspondence.

The investigations shows that after correcting for the separate average annual variations of H during the two intervals 1902 to 1905 (4 years) and 1913 to 1920 (8 years) a decided variation in $\odot_{s\,12}$ remains, and, plotting the results for the two intervals, two very similar curves result, with slightly different amplitudes ; and in phase the two curves differ by the expected amount, calculated from the middle of the one interval to the middle of the other, which shows that other variations are coming in also. Indeed, it is probable that periodicities occur of lengths that are simple multiples of $\odot_{s\,1}$, of which all the lowest come into the same relative phases in 9 years, most of them also in 3 or 6 years. They may be due to the earth's influence upon the outlying solar atmosphere, periodically affecting the quantity of radiant energy arriving at the earth. They may be due to such a semi-tidal effect with some kind of valve-action coming in. The sun, being fluid, can oscillate about its mean form quite well ; perhaps it does ; its heating and shrinking while rotating, and consequent ebullition, may make it do so. Such oscillations could be maintained by the minutest tidal forces under certain circumstances. We all know that it takes a considerable push to set the heavy pendulum of a clock swinging, but a very little power will keep it going, if the periodical application of the power is exactly synchronized, as the escapement ensures. Where can such easily maintained undamped oscillations exist in the sun ? I do not think they can be primarily electrical.

It is easy to suggest quite another thing to prove ; but it seems likely that in addition periodicities will be found of lengths that are simple multiples of the sun's absolute rotation period. Such periodicities will come again into the same relative phase in five of our years, and this would explain the connection found between 1914 change of H and 1919 change of H. Action in a period of 10 or 15 years would also be apparent. But why should 1914 and 1919 yield such a degree of symmetry in the average H curve ? To what epoch are they so relatively situated that effects should be complementary ? Was 1917·0 a node of all solar action, or the reverse, or of any particular solar action ?

The two curves over $\odot_{s\,12}$ are reproduced, also the average annual curves for the two intervals, and it will be seen that both year curves and $\odot_{s\,12}$ curves differ over the two intervals. But it seems that there is in them almost as much justification for the reality of the $\odot_{s\,12}$ periodicity as for the yearly periodicity, which is undoubtedly real.

The length of $\odot_{s\,12}$ found is almost exactly 328·7 days, or 0·9 of 1 year. The following table gives approximately the durations of 12, 11, 10 ... to 1 synodic solar revolutions, length in years, &c. :—

Synodic Solar Rotations.	Length in Years.	Number of Periods in						
		1 Year.	3 Years.	$4\frac{1}{2}$ Years.	5 Years.	8 Years.	9 Years.	15 Years.
$\odot_s$								
12	0·900	$1{\cdot}\dot{1}$	$3{\cdot}\dot{3}$	5·0	$5{\cdot}\dot{5}$	$8{\cdot}\dot{8}$	10·0	$16{\cdot}\dot{6}$
11	0·825	$1{\cdot}\dot{2}\dot{1}$	$3{\cdot}\dot{6}\dot{3}$	$5{\cdot}\dot{4}\dot{5}$	$6{\cdot}\dot{0}\dot{6}$	$9{\cdot}\dot{6}\dot{9}$	$10{\cdot}\dot{9}\dot{0}$	$18{\cdot}\dot{1}\dot{7}$
10	0·750	$1{\cdot}\dot{3}$	4·0	6·0	$6{\cdot}\dot{6}$	10·6	12·0	20·0
9	0·675	$1{\cdot}\dot{4}8\dot{1}$	$4{\cdot}\dot{4}$	$6{\cdot}\dot{6}$	$7{\cdot}\dot{4}0\dot{7}$	11·85	$13{\cdot}\dot{3}$	$22{\cdot}\dot{2}$
8	0·600	$1{\cdot}\dot{6}$	5·0	7·5	$8{\cdot}\dot{3}$	$13{\cdot}\dot{3}$	15·0	25·0
7	0·525	1·905	5·715	8·58	9·525	15·24	17·15	28·57
6	0·450	$2{\cdot}\dot{2}$	$6{\cdot}\dot{6}$	10·0	$11{\cdot}\dot{1}$	$17{\cdot}\dot{7}$	20·0	$33{\cdot}\dot{3}$
5	0·375	$2{\cdot}\dot{6}$	8·0	12·0	$13{\cdot}\dot{3}$	$21{\cdot}\dot{3}$	24·0	40·0
4	0·300	$3{\cdot}\dot{3}$	10·0	15·0	$16{\cdot}\dot{6}$	$26{\cdot}\dot{6}$	30·0	50·0
3	0·225	$4{\cdot}\dot{4}$	$13{\cdot}\dot{3}$	20·0	$22{\cdot}\dot{2}$	$35{\cdot}\dot{5}$	40·0	$66{\cdot}\dot{6}$
2	0·150	$6{\cdot}\dot{6}$	20·0	30·0	$33{\cdot}\dot{3}$	$53{\cdot}\dot{3}$	60·0	100·0
1	0·075	$13{\cdot}\dot{3}$	40·0	60·0	$66{\cdot}\dot{6}$	$106{\cdot}\dot{6}$	120·0	200·0