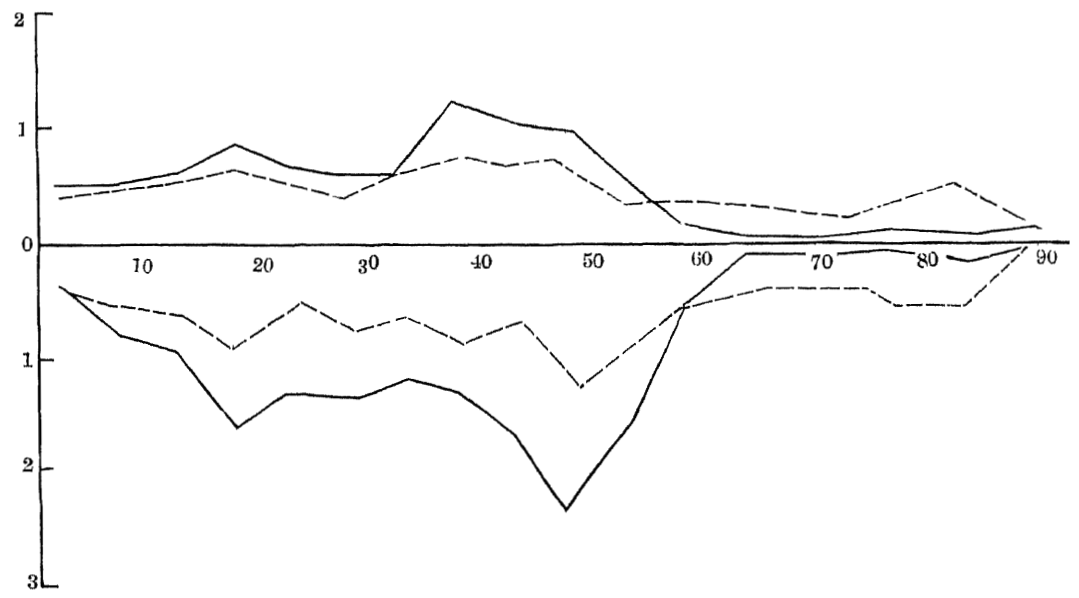
SUMMARY OF PROMINENCE OBSERVATIONS FOR THE SECOND HALF OF 1912.

The distribution of the prominences in latitude during the six months ending December 31, 1912, is represented in the accompanying diagram. In this the full line gives the mean daily areas and the broken line the mean daily numbers for each zone of 5° of latitude. The scale of ordinates represents tenths of square minutes for the full line and numbers for the broken line. Both are corrected for partial or imperfect observations, the total of 130 days of observation being reduced to 114 " effective " days.

MEAN AREAS AND MEAN NUMBERS OF PROMINENCES—
JULY 1 TO DECEMBER 31, 1912.

Mean areas—full line
Mean numbers—broken line.



There is a very slight reduction of activity compared with the previous six months, affecting chiefly the numbers for the southern hemisphere. The curves differ but little in form from those of the first half of the year. The polar regions to latitude 60° show the smallest activity, and the equatorial region extending for a few degrees on either side of the equator is also a region of relative poverty in prominence formation. A new zone of activity is indicated between 15° and 20° south but the zone of maximum activity remains as before between the parallels 45° and 50° south latitude. The general preponderance of the southern hemisphere over the northern is still maintained.

The mean daily areas and numbers for each hemisphere corrected for partial observations are as follows:—

	Mean areas (square minutes).	Mean numbers.
North	0·90	8·8
South	1·53	10·5
Total ..	2 43	19·3

The monthly, quarterly, and half-yearly frequencies, corrected for partial observations, are given in the following table in which the mean height and mean extent are also given.

Abstract for the second half of 1912.

Months.	Number of days of observation.		Number of prominences.	Mean daily frequency.	Mean height.	Mean extent.
	Total.	Effective.				
					"	°
July	17	14	221	16 0	25·6	1·27
August	22	19	358	18 8	28 4	1·85
September . ..	27	23	430	18·7	30·3	1·15
October	21	18	258	14·3	32·0	1·30
November	18	16	359	22·4	28·1	1·87
December	25	24	574	23·9	27·6	1·16
Third quarter	66	56	1012	18·1	28·5	1·15
Fourth quarter	64	58	1191	20·5	28·7	1·24
Half-year	130	114	2203	19 3	28·6	1·20

Compared with the previous six months the mean frequency has fallen off by about 4 per cent., but this is compensated by an increase in the mean extent of the prominences, so that the mean area for the whole sun is practically the same for both periods.

Mean height

The average apparent height of the prominences, 28″·6, is almost identical with that found for the previous six months.

The total number of prominences recorded during the 130 days of observation which attained an apparent height of 60″ or more was 214, which gives a daily average almost equal to that of the first half of the year. The highest prominences recorded were observed on September 30 at latitude — 33° east and on November 12 at latitude — 19° west. Both of these attained a height of 240″.

The larges tprominence recorded during the period was photographed on August 31 between latitude — 15° east and — 35° east. This had the form of a large cloud suspended at a considerable elevation above the chromosphere and connected therewith by very slender arch like filaments at $9^h\ 11^m$. The details of these filaments underneath the main mass were rapidly changing and at $9^h\ 45^m$ had assumed a stippled appearance, being composed for the most part of minute bright points. The under-surface of the cloud was very definitely bounded and brighter than the upper surface, and the cloud ended abruptly at latitude — 35°. At this point the lower surface was 40″ above the photosphere at $8^h\ 11^m$ but rose to 70″ at $9^h\ 11^m$ and 90″ at $9^h\ 45^m$. The top of the highest part of the cloud near its northern end rose from 136″ at $8^h\ 11^m$ to 156″ at $9^h\ 11^m$ and 162″

at $9^h\ 45^m$. A later photograph taken under cloudy conditions at $10^h\ 11^m$ showed that no marked increase in height had occurred. The prominence was comparatively short lived as no trace of it was visible on the previous or subsequent days.

Distribution east and west of the sun's axis.

The eastern limb shows a slight preponderance in numbers over the western, whilst for areas the west limb gives the larger totals. The figures are:—

1912 July to December.	East.	West.	Percentage east.
Numbers observed	1115	1091	50·54
Total areas in square minutes of arc	130 4	146·6	47·08

Metallic prominences.

Metallic prominences were exceedingly infrequent only four being observed during the six months, particulars of these are given in the following list:—

Metallic prominences during the second half of 1912.

Date.	Time I.S.T.	Base.	Latitude.		Limb.	Height.	Elements giving bright lines.
			North.	South.			
	h. m.	°	°	°			
July 31	8 51	1	78·5	...	West.	20″	Na, Mg and p. Fe.
September 10	9 00	3	...	32	East.	25″	Na, Mg and p. Fe.
November 2	8 48	6	...	18	East.	45″	Na, Mg and p. Fe.
„ 7	8 39	2	35	..	East.	15″	Na, Mg and p. Fe.

Displacements of the hydrogen lines.

Nineteen displacements of the C line were noted, ten of these were in high latitudes (60° or over), eight in middle latitudes between 20° and 60°, and one in latitude 18°. The greatest displacement observed amounted to 5Å towards the red, this was in the metallic prominence of November 2 at —18° east. It may be noted that all the displacements exceeding 0·5 Å were towards the red and on the east limb, and of the total number observed fourteen were towards the red and six towards the blue, whilst eleven were on the east limb and eight on the west.

The preference for the east limb and the preponderance of displacements towards the red is in accordance with the averages obtained during the past eight years.

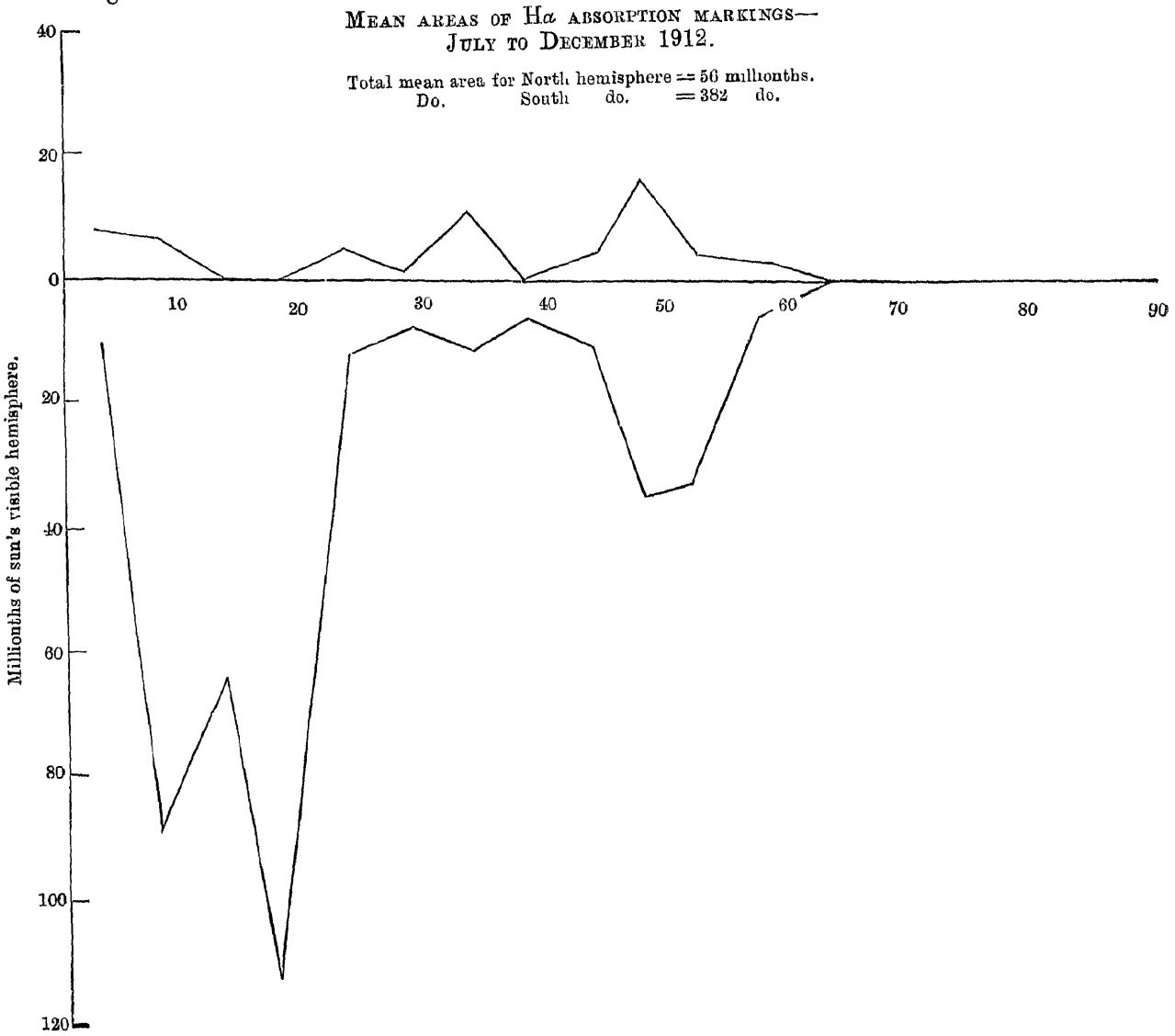
Prominences projected on the disc as absorption markings.

The sun's disc was photographed in *Hα* light on 63 days and on 29 of the plates absorption markings are seen. The distribution in latitude of these are given in the accompanying diagram in which the mean areas, corrected for foreshortening, are given for each zone of 5° of latitude. This curve differs markedly from those obtained for the periods 1911 April to December, and 1912 January to June. The greatest development of markings is here found to be in low latitudes in the southern hemisphere between the limits 5° and 20°, whilst there are secondary maxima at —45° to —55° and + 45° to + 50° corresponding with the prominence maxima in those zones. On referring to the prominence curve on page 9 there is seen to be a secondary maximum in the zone — 15° to — 20° which does not occur in the previous periods; the prominences in this

new zone of activity seem to have been accompanied by a larger proportion of absorption markings than those in other regions.

MEAN AREAS OF Hα ABSORPTION MARKINGS—
JULY TO DECEMBER 1912.

Total mean area for North hemisphere = 56 millionths.
Do. South do. = 382 do.



The mean areas in millionths of the sun's visible hemisphere and the mean numbers are compared in the following table with the previous six months :—

	1912 January to June.		1912 July to December.	
	Areas	Numbers.	Areas.	Numbers.
North	81	0·39	56	0·32
South	252	1·07	382	1·28
Total ..	333	1·46	438	1·60

From this it is seen that there has been a decrease in the northern hemisphere which has been more than compensated by an increase in the south, so that on the whole there has been a considerable increase of area. This is entirely due to the development of markings in the zone — 5° to — 20°.

The distribution east and west of the central meridian of the sun shows a distinct preponderance of east over west, the figures are :—

	Total areas.	Total numbers.
East	1047	58
West	714	42

Only four out of one hundred absorption markings were associated with sunspot disturbances, this is due to the paucity of spots, only three spots appearing on the plates during this period.

THE OBSERVATORY, KODAIKANAL,
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