

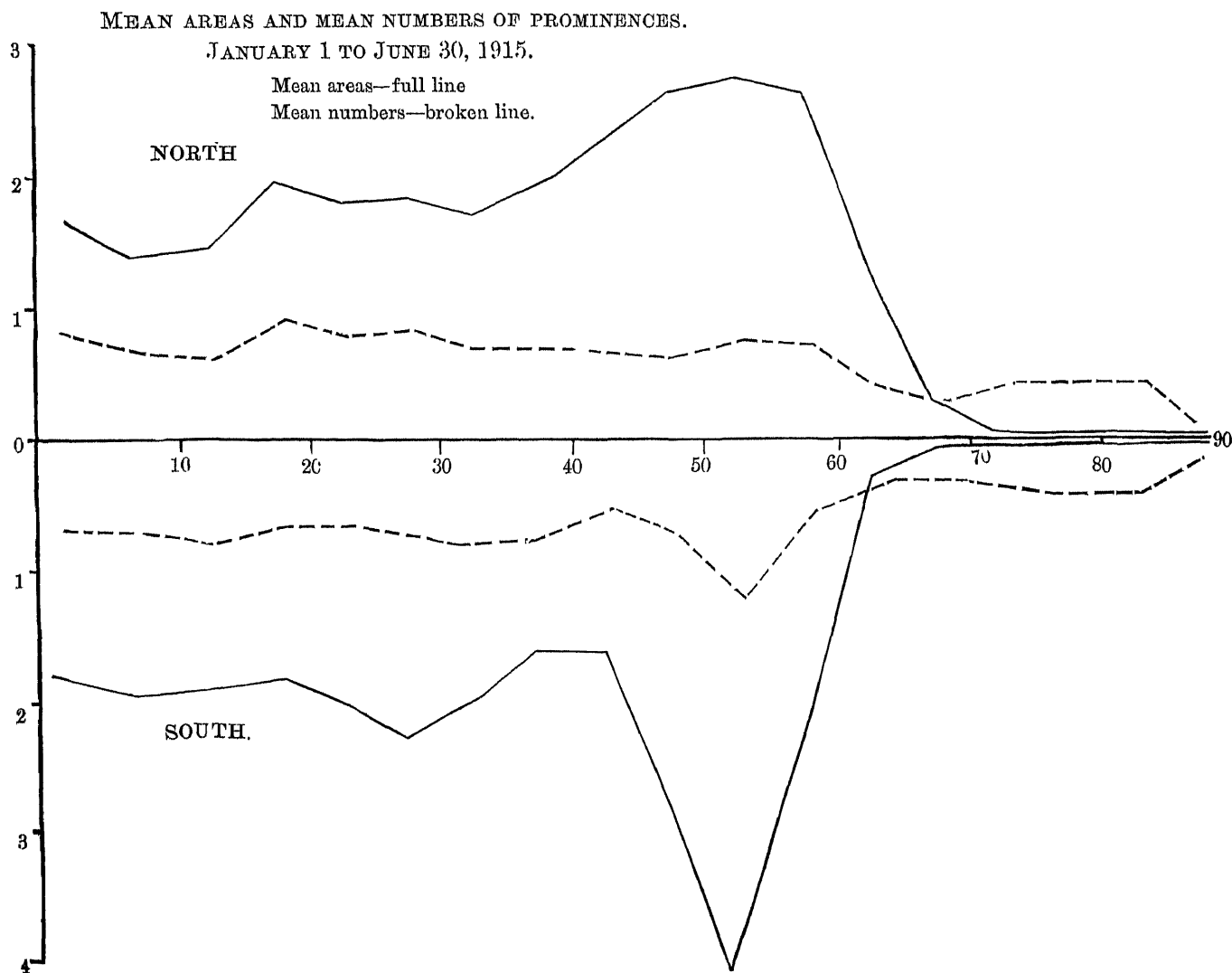
Kodaikanal Observatory.

BULLETIN No. XLVII.

SUMMARY OF PROMINENCE OBSERVATIONS FOR THE FIRST HALF OF THE YEAR 1915.

Visual observations of prominences were practically confined to displacements of the hydrogen lines and to metallic prominences and the photographs were relied on for position angles, heights, and areas of prominences.

The distribution of prominences observed and photographed during the half-year ending June 30, 1915, is represented in the accompanying diagram. The full line gives the mean daily areas, and the broken line the mean daily numbers for each zone of 5° of latitude. The ordinates represent tenths of a square minute of arc for the full line and numbers for the broken line. The means are corrected for partial or imperfect observations, the total of 173 observing days being reduced to 163 effective days.



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

| | | | | | Mean daily areas (square minutes). | Mean daily numbers. |
|-------|-----|-----|-----|-------|---------------------------------------|------------------------|
| North | ... | ... | ... | ... | 2.59 | 10.83 |
| South | ... | ... | ... | ... | 2.68 | 10.60 |
| | | | | Total | 5.27 | 21.43 |

The mean daily area is the largest recorded since 1908. Compared with the previous six months the mean areas have increased 59 per cent, and the mean numbers 19 per cent. The distribution in prominences is similar to that obtaining last year; there is a belt of great activity between 45° and 55° beyond which the activity diminishes towards the poles and remains nearly constant to the equator.

The monthly, quarterly and half-yearly frequencies and the mean height and extent are given in the following table. The frequencies are derived from the number of effective days.

Abstract for the first half of 1915.

| Month. | Number of days of observation. | | Number of prominences. | Mean daily frequency. | Mean height. | Mean extent. |
|---------------------|--------------------------------|-----------|------------------------|-----------------------|--------------|--------------|
| | Total | Effective | | | | |
| 1915. | | | | | " | ° |
| January . . . | 28 | 27 | 557 | 20.6 | 32.3 | 3.04 |
| February | 28 | 27 | 581 | 21.5 | 29.3 | 3.29 |
| March | 31 | 30 | 651 | 21.7 | 30.1 | 4.28 |
| April | 30 | 30 | 655 | 21.8 | 31.7 | 3.68 |
| May | 31 | 30 | 637 | 21.2 | 31.5 | 3.63 |
| June | 25 | 19 | 431 | 24.8 | 31.1 | 2.99 |
| First quarter ... | 87 | 84 | 1739 | 21.3 | 30.5 | 3.57 |
| Second quarter | 86 | 79 | 1723 | 21.8 | 31.5 | 3.49 |
| First half-year ... | 173 | 163 | 3512 | 21.5 | 31.0 | 3.53 |

The steady increase recorded during 1914 has therefore been maintained during the first half of 1915; there is however now an increase in frequencies as well as in areas; the mean height is the same as in the second half of 1914 but there is an increase of 89 per cent. in the mean extent.

Distribution east and west of the sun's axis.

Prominence numbers show a slight and areas a large decrease in the percentage at the eastern limb; in areas there is a preponderance at the western limb which was most marked during May and June. The distribution was as follows :—

| 1915 January to June. | East. | West. | Percentage east |
|--|-------|-------|-----------------|
| Numbers observed | 1766 | 1744 | 50.31 |
| Total areas in square minutes of arc | 4183 | 4410 | 48.68 |

Metallic prominences.

The following metallic prominences were recorded in the half-year :—

TABLE I.—LIST OF METALLIC PROMINENCES. JANUARY—JUNE, 1915

| Date. | Hour I S T. | Base. | Latitude | | Limb. | Height. | Lines reversed. | |
|----------|----------------|-------|----------|--------|-------|---------|-----------------|---|
| | | | North. | South. | | | | |
| 1915. | H. M. | ° | ° | ° | | " | | |
| January | 1 | 8 54 | 2 | 22 | ... | W | 15 | D ₁ , D ₂ , 5316·8, b ₁ , b ₂ , b ₃ , b ₄ , 4924·1. |
| | 3 | 8 34 | ... | 20 | ... | W | 25 | D ₁ , D ₂ , b ₁ , b ₂ , b ₃ , b ₄ , bright over 5° |
| | 6 | 8 9 | 19 | 21·5 | ... | W | 125 | D ₁ , D ₂ , b ₁ , b ₂ , b ₃ , b ₄ , 6677 and 5316·8 very bright at base. |
| | 13 | 9 30 | 5 | 19·5 | .. | W | 25 | D ₁ , D ₂ , b ₁ , b ₂ , b ₃ , b ₄ , 5316·8. |
| | 15 | 8 50 | 4 | 53 | . | E | 40 | D ₁ , D ₂ , b ₁ , b ₂ , b ₃ , b ₄ . |
| | | 10 8 | | 26 | . | E | ... | Two bright points in chromosphere. D ₁ , D ₂ , b ₁ , b ₂ , b ₃ , b ₄ , 6677, 7065 bright, last two being conspicuous. |
| February | 7 | 9 5 | 6 | 23 | ... | E | 60 | D ₁ , D ₂ , b ₁ , b ₂ , b ₃ , b ₄ . |
| | 8 | 9 30 | 4 | 25 | ... | E | 55 | D ₁ , D ₂ , b ₁ , b ₂ , b ₃ , b ₄ , 6677, 5316·8, 5283·8 prominence seen in 6677 and D's and b's. |
| | 9 | 8 48 | ... | 19 | .. | E | 25 | D ₁ , D ₂ , b ₁ , b ₂ , b ₃ , b ₄ , 5316·8, 6677. |
| | 13 | 9 10 | 3 | ... | 21·5 | W | 50 | D ₁ , D ₂ , b ₁ , b ₂ , b ₃ , b ₄ . |
| | 14 | 8 45 | ... | ... | 26 | W | 60 | D ₁ , D ₂ , b ₁ , b ₂ , b ₃ , b ₄ , 6677, 5316·8, 4924·1, 5283·8, 5231·9. |
| | 19 | 9 4 | ... | .. | 18 | W | 10 | D ₁ , D ₂ , b ₁ , b ₂ , b ₃ , b ₄ , 6677, 5316·8, 4924·1, 5535·06. |
| | 21 | 8 22 | 5 | 20·5 | ... | W | 30 | D ₁ , D ₂ , b ₁ , b ₂ , b ₃ , b ₄ , 6677, 5535·06, 5316·8, 5361·8, 5284·3, 5276·2 very bright. |
| | 26 | 9 2 | 12 | ... | 23 | E | 135 | D ₁ , D ₂ , b ₁ , b ₂ , b ₃ , b ₄ . |
| March | 8 | 8 42 | 10 | 22·5 | .. | W | 45 | D ₁ , D ₂ , b ₁ , b ₂ , b ₃ , b ₄ , 6677, 5316·8, 4924·1, whole prominence seen in D's and b's. |
| | 14 | 8 33 | ... | .. | 19·5 | E | . | D ₁ , D ₂ , b ₁ , b ₂ , b ₃ , b ₄ . |
| | 18 | 9 20 | ... | 17·5 | . | W | 60 | D ₁ , D ₂ , bright near base. |
| April | 2 | 8 20 | 7 | 23·5 | ... | E | 45 | D ₁ , D ₂ , b ₁ , b ₂ , b ₃ , b ₄ , 5316·8. |
| | 4 | 8 45 | 9 | 24·5 | ... | W | 25 | D ₁ , D ₂ , b ₁ , b ₂ , b ₃ , b ₄ , 5316·8. |
| | 11 | 8 40 | 8 | 15 | ... | W | 30 | D ₁ , D ₂ , b ₁ , b ₂ , b ₃ , b ₄ , 5316·8, 4924·1. |
| | 12 | 8 26 | 19 | 30·5 | ... | W | 60 | D ₁ , D ₂ , b ₁ , b ₂ , b ₃ , b ₄ , 5316·8, 5276·2, 4924·1, 6677, 7065. Prominence was 20" high at + 31° W in D's and b's. |
| | 17 | 9 0 | 3 | .. | 20·5 | W | 15 | 4924·1, 5018·6, b ₁ , b ₂ , b ₃ , b ₄ , 5188·0, 5197·8, 5204·8, 5206·2, 5208·7, 5226·7, 5227·4, 5234·7, 5265·0, 5269·7, 5276·2, 5284·2, 5316·8, 5363·0, 5535·0, D ₁ , D ₂ , 6677. |
| | 27 | 8 20 | 13 | 13·5 | ... | E | 20 | D ₁ , D ₂ , b ₁ , b ₂ , b ₃ , b ₄ , 5316·8. |
| May | 8 | 8 30 | 8 | 17 | ... | W | 105 | D ₁ , D ₂ , b ₁ , b ₂ , b ₃ , b ₄ . |
| | 20 | 7 55 | ... | 51·5 | .. | W | 30 | D ₁ , D ₂ , b ₁ , b ₂ , b ₃ , b ₄ , bright at base. |
| | 21 | 8 57 | ... | 20 | . | E | 55 | D ₁ , D ₂ , b ₁ , b ₂ , b ₃ , b ₄ , 5316·8, 5276·2, 6677, 7065, 5016. Prominence seen over a height of 25" in b ₁ , b ₂ and b ₃ , and over 15" in the other lines. |
| | 22 | 8 52 | ... | 18 | .. | E | 60 | } Two bright portions at these points were visible in D ₁ , D ₂ , b ₁ , b ₂ , b ₃ , b ₄ , 6677 and 7065. |
| | | 52 | ... | 25 | . | E | 60 | |
| June | 4 | 8 35 | ... | 17 | .. | W | 60 | D ₁ , D ₂ , b ₁ , b ₂ , b ₃ , b ₄ , 6677, 7065, visible over 25" in the first five lines. |
| | 6 | 8 45 | ... | 18·5 | . | W | .. | D ₁ , D ₂ , b ₁ , b ₂ , b ₃ , b ₄ . |

Displacements of the hydrogen lines.

Particulars of these disturbances are given in the following table :—

TABLE II.—DISPLACEMENT OF THE C LINE IN PROMINENCES. JANUARY—JUNE, 1915.

| Date. | Hour. I S.T. | Latitude. | | Limb. | Amount of displacement. | | | Remarks. |
|----------|-----------------|-----------|------|-------|-------------------------|-----------------|------------|---|
| | | N. | S. | | Red. | Violet. | Both ways. | |
| 1915. | H. M. | ° | ° | | ° | Å. | Å. | |
| January | 1 | 8 54 | 23 | W | A. | 2 | | |
| | 2 | 8 43 | 50 | E | 2 | Slight | | |
| | | 48 | 59.5 | W | Slight | | | |
| | | 55 | 83.5 | W | | 0.5 | | |
| | 3 | 8 44 | 65 | W | 2 | | | |
| | | 34 | 20 | W | Slight | | | |
| | | 25 | 76.5 | W | | Slight | | |
| | 4 | 9 2 | 21.5 | E | | 0.5 | | At top of prominence. |
| | | 12 | 22 | W | | | Slight | No prominence. |
| | 6 | 8 44 | 37.5 | W | Slight at top | Slight at base | | 1.5 Å to red at top at 9h 25m |
| | | 44 | 28 | W | 2 | | | 2 Å to red and 2 Å to violet at 9h 52m; about 3 Å to violet over the streamers at 8h 57m, 4 Å to red at 9h 4m. At 9h 24m top of streamers displaced to red for about 1.5 Å, bottom to violet. |
| | 7 | 9 5 | 79 | W | 0.3 | | | No prominence. |
| | | 10 | 30 | W | | Slight | | Over whole prominence. |
| | | 17 | 28.5 | W | | 3 | | No prominence. |
| | 9 | 8 30 | 23 | W | 1 | | | Do. |
| | 10 | 10 10 | 73.5 | E | 0.2 | | | |
| | 12 | 8 53 | 38 | E | 1.5 | | | |
| | | 50 | 70.5 | E | | 1 | | |
| | 13 | 9 20 | 16.5 | W | | 2.5 | | At top of prominence. |
| | | 30 | 20 | W | 1.5 | | | |
| | 14 | 9 20 | 18 | E | 1 | | | At base of prominence. |
| | | 45 | 8.5 | W | 2 | | | |
| | 15 | 10 3 | 76 | E | Slight | | | |
| | | 8 59 | 53 | E | Slight at base | Slight at top * | | * At + 51° E, and + 56° E. |
| | | 10 8 | 25.5 | E | Slight | 0.5 | | At two different points in chromosphere |
| | | 11 18.5 | | E | Do. | | | No prominence. |
| | | 11 15.5 | | E | Do. | | | |
| | | 20 | 35.5 | E | | | | |
| | | 9 53 | 81.5 | W | | 0.5 | | |
| | 18 | 8 42 | 44 | E | | Slight | | At base of prominence. |
| | 23 | 8 25 | 80.5 | E | Slight | | | |
| | | 25 | 78.5 | E | | Slight | | |
| | | 42 | 37 | E | | 0.5 | | At base of prominence. |
| | | 45 | 5.5 | E | Slight | 0.5 | | No prominence. |
| | 26 | 8 45 | 50 | W | Do. | | | |
| | | 48 | 57 | W | 0.3 | | | |
| | 28 | 8 45 | 65 | W | 0.5 | | | At base of prominence. |
| | 29 | 8 50 | 75 | E | | | | |
| | 30 | 9 0 | 15.5 | E | | 1 | | |
| | | 0 | 19.5 | E | | 1 | | |
| | 31 | 8 30 | 20.5 | E | | 1.5 | | |
| | | 30 | 27.5 | E | | 1.5 | | |
| February | 1 | 8 41 | 22 | E | | Slight | | |
| | | 24 | 29 | W | Slight | | | At top. |
| | 3 | 8 29 | 4.5 | E | | 0.3 | | Do. |
| | | 27 | 49 | E | | 0.5 | | |
| | | 27 | 53 | E | Slight | | | |
| | | 45 | 75.5 | W | | 0.4 | | Amount 1.0 Å at 8h 46m. |
| | 4 | 8 35 | 83 | E | | 0.5 | | |
| | | 9 13 | 13.5 | E | 0.5 | | | |
| | | 8 51 | 27 | W | | 0.2 | | |
| | | 44 | 65 | W | | 0.5 | | |
| | 5 | 10 50 | 13.5 | E | | | 0.4 | |
| | | 11 0 | 57.5 | W | | Slight | | |
| | 6 | 8 59 | 34 | W | | 0.5 | | |
| | 7 | 9 2 | 23 | E | | 2 | | |
| | 8 | 9 30 | 25 | E | 3 | | | |
| | | 2 | 54.5 | E | | 1 | | |

| Date. | Hour. I.S.T. | | Latitude | | Lumb. | Amount of displacement. | | | Remarks. |
|------------|-----------------|----|----------|------|-------|-------------------------|----------------|------------|---|
| | | | N. | S. | | Red. | Violet. | Both ways. | |
| 1915. | H. | M. | ° | ° | | Å. | Å. | Å. | |
| February 9 | 8 | 50 | 43 | | E | | 0.3 | | At top (75"). |
| | | 40 | 10 | | E | 0.5 | 1 | | |
| | | 32 | | 45.5 | E | | 2 | | At top (15"). |
| 11 | 8 | 53 | 61 | | E | Slight | | | |
| | | 56 | 28.5 | | E | Do. | | | |
| | | 37 | 66.5 | | W | Do. | | | Gone at 8h 38m. |
| 12 | 9 | 42 | 61.5 | | E | Do. | | | |
| | | 35 | | 61 | E | Do. | | | |
| 13 | 9 | 10 | | 21 | W | 1 at base | Slight at top | | Slightly changing in shape and amount. |
| 14 | 8 | 35 | 22.5 | | W | 0.5 | 1 | | |
| | 8 | 40 | 55 | | E | | Slight | | |
| | | 35 | 4.5 | | E | | Do. | | |
| | | 35 | 2.5 | | E | | Do. | | |
| | | 45 | | 26 | W | 0.5 | 0.5 | | |
| | | 58 | | 21 | W | 3 | | | Displaced portion detached from C line at 8h 59m. |
| 15 | 9 | 4 | 21 | | W | 1.5 | | | At top (about 25"). |
| 16 | 8 | 30 | | 17.5 | E | | Slight | | |
| 18 | 8 | 25 | 82.5 | | E | 0.2 | | | |
| 19 | 8 | 36 | | 18 | W | 1 | 1 | | 1.5 Å to violet at 8h 38m. |
| 20 | 9 | 2 | 63 | | E | Slight | | | |
| | 8 | 58 | 6.5 | | E | | 0.2 | | |
| | | 58 | 12 | | E | 0.2 | | | |
| | | 48 | | 49.5 | W | Slight | | | |
| 21 | 8 | 22 | 20.5 | | W | 0.5 | | | |
| | | 20 | 29 | | W | | Slight | | At top (30"). |
| 22 | 9 | 12 | | 32.5 | E | 2 | | | |
| 25 | 8 | 40 | 35.5 | | E | 0.5 | | | |
| March 2 | 10 | 39 | 47 | | W | Slight at base | | | |
| 4 | 9 | 13 | 82.5 | | E | 0.5 | 0.5 | | |
| | 9 | 17 | 78 | | E | | Slight | | |
| | | 17 | 72 | | E | 3 | 4 | | Amounts much smaller at 8h 19m. |
| | | 17 | 69 | | E | Slight | | | |
| | 8 | 59 | 65.5 | | E | Do. | 0.5 | | |
| | | 41 | | 51 | E | Do. | | | |
| 5 | 9 | 3 | | 25.5 | W | Do. | | | |
| | 8 | 40 | 57 | | E | | Slight | | |
| | | 40 | 55 | | E | | Slight | | |
| 7 | 9 | 16 | 82.5 | | W | | 1.5 | | |
| | | 4 | 78 | | E | | 1 | | |
| | 9 | 18 | 61 | | E | 1 at base | | Slight | |
| | 9 | 0 | 28.5 | | E | | | Slight | |
| | 8 | 45 | | 15 | E | | Slight | | |
| | | 44 | 30 | | E | Slight | | | |
| | | 42 | 60 | | E | | Slight | | |
| | | 38 | 68 | | W | | 0.5 | | |
| | 9 | 11 | 18 | | W | | 2 | | At top (26"). |
| | | 14 | 36.5 | | W | | 1.5 | | |
| | 8 | 45 | 26 | | W | 0.5 | | | |
| 8 | 8 | 42 | 30.5 | | W | 0.5 | 2 | | |
| 9 | 8 | 25 | | 50.5 | E | | 1 | | At top (40"). |
| | | 46 | | 1 | W | | 1.5 | | |
| 10 | 8 | 59 | 64 | | E | | Slight | | |
| | | 55 | | 52 | W | | 1 | | At top (50"). |
| | 9 | 4 | 32.5 | | W | Slight | | | At top (30"). |
| 11 | 8 | 38 | 82.5 | | E | 0.5 | | | |
| | | 33 | 80 | | E | | Slight | | At several places { Rapidly changing. |
| | | 30 | 46 | | E | 0.3 | | | At 8h 38m 0.3 Å to violet. |
| | 9 | 8 | 27 | | E | | Slight at base | | |
| | | 27 | 70.5 | | E | 0.5 | | | |
| | | 27 | 72.5 | | E | | 1 | | } Gone at 8h 30m. |
| | 8 | 55 | 34.5 | | W | | | 1 at base | |
| | | 52 | | 5 | W | | | Slight | |
| | | 49 | 13.5 | | W | | Slight | | At top (60"). |
| | | 43 | 51.5 | | W | | 1 | | |
| | | 43 | 54.5 | | W | | 1 | | |
| | | 40 | 79.5 | | W | | Slight | | |

| Date. | Hour I S.T. | | Latitude. | | Limb. | Amount of displacement. | | | Remarks. |
|----------|----------------|----|-----------|-------|-------|-------------------------|--------------------|------------|---|
| | | | N. | S. | | Red. | Violet. | Both ways. | |
| 1915. | H | M | ° | ' | | ° | ° | ° | |
| March 13 | 8 | 30 | | 52 | W | Slight | | | At several points. |
| | | 38 | | 21 | W | Slight at base | | | |
| 14 | 8 | 33 | | 19.5 | E | | 1 | | At two points. |
| | | 24 | | 22 | W | | Slight at base | | |
| | | 21 | | 4.5 | W | 0.5 | | | |
| 16 | 8 | 40 | 22 | | E | | Slight | | |
| | | 32 | | 60 | E | Slight | | | |
| | | 32 | | 58 | E | | Slight | | |
| | | 52 | 17 | | W | Slight | | | In two places. |
| 18 | 8 | 26 | 75.5 | | E | | 0.5 | | |
| | | 8 | 42 | | E | 1 | | | |
| | | 58 | | 78.5 | W | | Slight | | |
| | | 14 | | 54 | W | Slight | | | |
| 19 | 8 | 50 | 78 | | E | | 2 | | At top (40"). Nothing at 8h 54m. |
| | | 58 | 14 | | E | | 1 at base 2 at top | | |
| | | 58 | | 47.50 | W | 0.3 | | | |
| | | 58 | | 62 | W | 0.3 | | | |
| | | 36 | 15.5 | | W | | | Slight | |
| | | 34 | 54 | | W | | 0.4 | | At top (30") |
| 20 | 8 | 20 | | 45.5 | E | | 1.5 | | |
| 21 | 8 | 4 | 28 | | E | Slight | | | |
| | | 25 | | 52.5 | W | Slight at top | | | |
| 23 | 8 | 21 | 88 | | E | | Slight at base | | Slight |
| | | 27 | | 36 | W | 0.5 | | | |
| | | 24 | 42.5 | | W | Slight at base | | | |
| 24 | 8 | 30 | | 53.5 | E | | Slight at base | | |
| 25 | 8 | 37 | 13 | | E | | Slight | | Over 3°. |
| | | 33 | | 21 | E | 0.5 | | | |
| | | 28 | | 47.5 | E | | 1 | | |
| | | 53 | 70.5 | | W | | | Slight | |
| 26 | 9 | 5 | 22 | | W | | 2.5 | | At top (45"). |
| 27 | 8 | 56 | | 55 | W | 2 | | | At top (30"). |
| | | 32 | 27 | | W | | Slight | | |
| 29 | 8 | 42 | 34.5 | | E | | Do. | | |
| April 1 | 8 | 40 | | 48 | E | 0.5 at top | 0.5 at base | | |
| | | 2 | 43 | | W | | Slight | | |
| 4 | 8 | 30 | 62 | | E | | Do. | | |
| | | 29 | 55 | | E | 1 | | | |
| | | 4 | | 25 | E | | Slight | | |
| | | 7 | | 72 | E | | Do. | | |
| | | 56 | | 41.5 | W | | 1 | | |
| | | 47 | 19 | | W | 0.5 at base | | | |
| | | 38 | 48.5 | | W | 0.5 | | | |
| | | 34 | 78 | | W | 3 | | | |
| 5 | 8 | 27 | 32 | | E | | 1 | | |
| | | 23 | 4 | | E | | | 0.5 | Slight |
| | | 39 | | 70 | E | | | Do. | |
| | | 41 | | 82.5 | W | | 0.5 | | |
| | | 17 | | 74.5 | W | | 1 | | |
| | | 36 | 30.5 | | W | | | | |
| 6 | 8 | 33 | 56.5 | | E | Slight at base | | | |
| | | 37 | 49.5 | | E | | 0.5 | | |
| 7 | 8 | 40 | 42 | | E | | Slight at base | | |
| | | 36 | | 62 | E | | | | Slight |
| 8 | 8 | 37 | 56 | | E | Slight at base | 1 | | |
| 10 | 8 | 59 | 56 | | E | | 2 | | |
| | | 57 | 44.5 | | E | | 0.5 | | |
| | | 57 | 42.5 | | E | 0.5 | | | |
| 11 | 8 | 17 | | 59 | W | | 1 | | |
| | | 38 | | 14 | W | Slight at base | Slight at top | | |
| | | 20 | 15 | | W | 1 | | | At top of prominence C displaced to red by amount ranging from 8 Å to 4 Å from + 17 W to + 27 W; C was also displaced to violet for 2 Å at + 19 W; no displacement to red at 8h 2m. |

| Date. | Hour. I.S.T. | | Latitude | | Limb | Amount of displacement. | | | Remarks. |
|-------|-----------------|---------|----------|------|------|-------------------------------|-----------------------------|-----------|--------------------------------------|
| | | | N. | S. | | Red. | Violet. | Both ways | |
| 1915. | H. | M. | ° | ° | | Å. | Å. | Å. | |
| April | 12 | 9 0 | 18 | | W | Slight | 1 | | |
| | | 0 0 | 16 | | W | Do. | | | |
| | 13 | 8 22 | 52.5 | | W | | 0.3 | | |
| | | 8 24 | 60 | | E | Slight | | | |
| | | 18 33 | 78.5 | 19 | E | | Slight | | |
| | 14 | 8 26 | 62 | | W | 0.3 | | | |
| | | 24 33 | 60 | | E | 0.5 | | | |
| | | 13 28 | 7.5 | | W | | Slight | | |
| | 16 | 9 13 | | 57.5 | W | | 0.5 at base | | |
| | | 8 33 | | 31 | W | Slight | Slight | | Over upper half of prominence (25"). |
| | 17 | 8 38 | | 22 | W | 0.5 | | | Displaced 1 Å to red at 9h 0m. |
| | 18 | 8 38 | 60.5 | 19 | W | | Slight | | Over whole prominence. |
| | | 18 8 | | 50.5 | E | Slight | 0.3 | | |
| | 19 | 8 40 | | 60.5 | W | | Slight | | |
| | | 42 25 | | 22.5 | E | | 2 | | |
| | 20 | 7 58 | 84.5 | | W | 1 | | | |
| | | 8 20 | | 50 | W | 0.2 | | | |
| | | 40 40 | | 67.5 | E | Slight | | | |
| | 21 | 8 50 | | 63.5 | E | 2.5 | 0.5 | | |
| | 22 | 8 10 | 76.5 | | E | | 2 at top | | Disappeared at 9h 1m. |
| | | 39 41 | 23.5 | | E | Slight | Slight | | |
| | | 48 27.5 | 19 | | E | 1 | 1 | | |
| | | 52 67 | | | W | over upper half of prominence | near base | | |
| | | 30 8 | | | W | 1 | | | |
| | | 28 19 | | | W | Slight | 0.5 | | |
| | | 20 59.5 | | | W | | 1 | | |
| | | 17 72 | | | W | | 0.5 | | |
| | 23 | 8 22 | 75.5 | | W | | 0.5 | | |
| | | 30 24 | | 51 | E | | Slight | | Over the streamer. |
| | | 35 21 | | | W | | 0.5 | | Over the whole height (35"). |
| | | 39 60.5 | | | W | | 1 | | |
| | | 24 75 | | | E | 1 | | | Gone at 8h 25m. |
| | | 21 72 | | | E | | 1 | | |
| | 25 | 8 52 | | 30 | E | Slight | | | Over the streamer. |
| | | 33 21 | | | W | | | Slight | |
| | | 30 41.5 | | | W | | 1 | | |
| | 26 | 8 40 | 68.5 | | E | | Slight | | |
| | | 31 53 | | | E | Slight | | | |
| | | 30 37 | | | E | 1 | | | |
| | | 28 20.5 | | | E | | 1.5 | | |
| | | 28 16 | | | E | | Slight | | |
| | | 30 2 | | 19 | E | 1 | 1 | | |
| | 28 | 8 30 | | 27 | W | Slight | | | |
| | | 35 18 | | | E | | 1.5 | | |
| | 30 | 8 42 | 72.5 | | W | 0.5 | 1.5 | | |
| | | 0 71.5 | | | E | | 1.5 | | |
| | | 33 48 | | | E | | | 0.5 | |
| | | 38 40 | | | E | | 0.5 | | |
| | | 9 1 21 | | | E | 0.5 | 1 | | |
| | | 10 75.5 | | | E | Slight | | | |
| | | 12 81.5 | | | W | 0.5 | | | |
| | | 47 61 | | | W | 0.5 | | | |
| May | 2 | 8 9 | 55 | | E | Slight | | | |
| | 3 | 8 44 | 77.5 | | E | Do. | 1 | | 0.5 Å both ways at 8h 45m. |
| | 6 | 8 47 | 82.5 | | W | | 1 | | At two points. |
| | 7 | 8 27 | 80 | | E | Slight | on upper part of prominence | | Nothing at 8h 40m. |
| | | 44 23.5 | | | E | | 1 at base | | |

| Date | Hour. I.S.T. | | Latitude. | | Limb | Amount of displacement. | | | Remarks. |
|-------|-----------------|------------------|------------|-------------------|-------------|---|---|-----------------------------|---|
| | | | N. | S. | | Red | Violet | Both ways | |
| 1915. | H. | M. | ° | ° | | Å | Å | Å | |
| May | 7 | 8 47 47 54 | 16 | 8 44 | E E E | Slight 0.5 southern part of promi- nence. Slight | 1 0.5 northern part of promi- nence Slight Do. Do. | | Northern end |
| | | 59 35 | | 86 87 | W W | | | | |
| | | 8 28 23 | | 68 78 | E W W | Slight | | | |
| | 10 | 8 27 33 | 14.5 70 | | E W | | 0.5 1 | | Over the whole of northern prominence. |
| | 13 | 11 0 | | 85 | E | | Slight | | |
| | 14 | 10 8 22 | | 85.5 34 | W W | Slight | | 0.5 0.5 | |
| | | 8 51 45 | 49 60.5 | | W E W | Slight | | 1 1 | |
| | 17 | 9 2 8 42 | | 85 73.5 2.5 | W W E | 1 | | 1.5 1 | |
| | 20 | 8 28 48 | 26 17.5 | | E E E | Slight | | Slight Do. | |
| | | 39 35 28 | | 68 82 56 | E E W | | | | |
| | 21 | 8 55 57 | 77 25 | | E E | Slight 1 | | | Over the whole height (55"). |
| | | 9 5 7 | | 8 2.5 | E E | Slight at top. | | Slight Slight at base | |
| | | 11 13 | | 52.5 78.5 | E W | 0.5 | | Slight | |
| | | 8 49 43 | | 50.5 | W W | 0.5 | | | |
| | 22 | 8 50 | 11.5 16 | | E | 0.5 | | 1 | Over the whole height (60"). |
| | | 48 44 | 3.5 | 52.5 | E | 0.5 | | 0.5 | |
| | | 42 39 | | 60.5 77.5 | E W | Slight 1 | | | |
| | | 9 5 8 57 | 17 20.5 | | W E | | | 1 | Over the streamer. |
| | 23 | 9 3 6 | | 35 80 | E W | 1 | | Slight 1.5 | |
| | | 8 25 | 35-39 | | W | 4 over whole height. | | | Slightly displaced to violet over the rest of the arch. |
| | 24 | 9 15 1 | 85.5 83 | | E E | Slight 2.5 | | | Nothing at 9h 15m. |
| | | 8 55 52 | | 35 49 | E E | Slight | | 0.5 at base. Slight | |
| | | 46 45 | | 63.5 55.5 | W W | Slight Do. | | | |
| | 27 | 9 11 | 16-22 | | W | | | 1 | |
| | 28 | 8 35 43 | 68 85 | | E E | | | | |
| | | 35 34 | | 56 71 | E E | | | Slight Do. | |
| | | 48 50 | | 28 17 | W W | Slight | | | |
| | | 54 55 | 56 86 | | W W | | | 0.5 0.5 | |
| | 31 | 8 58 52 | 40 | | E W | Slight | | Slight Do. | |
| | | 45 43 | 17 61.5 | | W W | Slight | | 0.5 | |
| June | 2 | 8 48 | | 57 | E | | | | |
| | 4 | 8 52 | | 78 | W | Slight | | | At two points at the base. |

| Date. | Hour. I.S.T. | | Latitude | | Limb. | Amount of displacement. | | | Remarks. |
|--------|-----------------|----|----------|------|-------|-------------------------|----------|------------|---|
| | | | N. | S. | | Red. | Violet. | Both ways. | |
| 1915. | H. | M. | ° | ° | | Å | Å. | Å. | |
| June 4 | 8 | 35 | 22.5 | | W | | 0.5 | | |
| | | 28 | 20 | | W | | 1.5 | | |
| | | 28 | 24 | | W | | 1 | | |
| 6 | 8 | 37 | 85.5 | | E | | Slight | | |
| | | 39 | | 55 | W | | Do. | | |
| | | 43 | 18.5 | | W | 2 | 1 | | Only slightly to violet and nothing to red at 8h 45m. |
| 8 | 8 | 25 | | 40.5 | E | | Slight | | |
| 11 | 8 | 42 | | 27.5 | E | | 0.5 | | Gone at 8h 44m. |
| 12 | 10 | 5 | 2 | | E | | Slight | | |
| | | | | | | | at base. | | |
| 14 | 8 | 52 | 19.5 | | E | 1.5 | | | |
| | | 38 | 48 | | W | Slight | | | |
| 18 | 8 | 50 | 52.5 | | E | 0.5 | | | On the detached part of prominence. |
| | | 48 | 14.5 | | E | Slight | | | |

There was a large increase in the number of displacements compared with the previous half-year. In the northern hemisphere there were 184, in the southern 141; in the eastern hemisphere there were 178, in the western 147. One hundred and eighty-five displacements were to the violet, one hundred and fifty-two to the red and sixteen both ways simultaneously.

Between 0° and 30° of latitude there were one hundred and twenty-five displacements, between 31° and 60° one hundred and one, and between 61° and 90° ninety-nine. It is noteworthy that during the past spot minimum the greatest number occurred between 61° and 90° .

Reversals and Displacements of the C line on the Disc.

Two hundred and eleven reversals of the C line, sixty-six darkenings of the D_3 line, and one hundred and five displacements of the C line were observed near spots. This is a large increase on the previous half-year. The following table gives their distribution east and west of the central meridian:—

| | East. | West. |
|---------------------------|-------|-------|
| Reversals of C near spots | 106 | 105 |
| Darkenings of D_3 | 37 | 29 |
| Displacement of C | 51 | 54 |

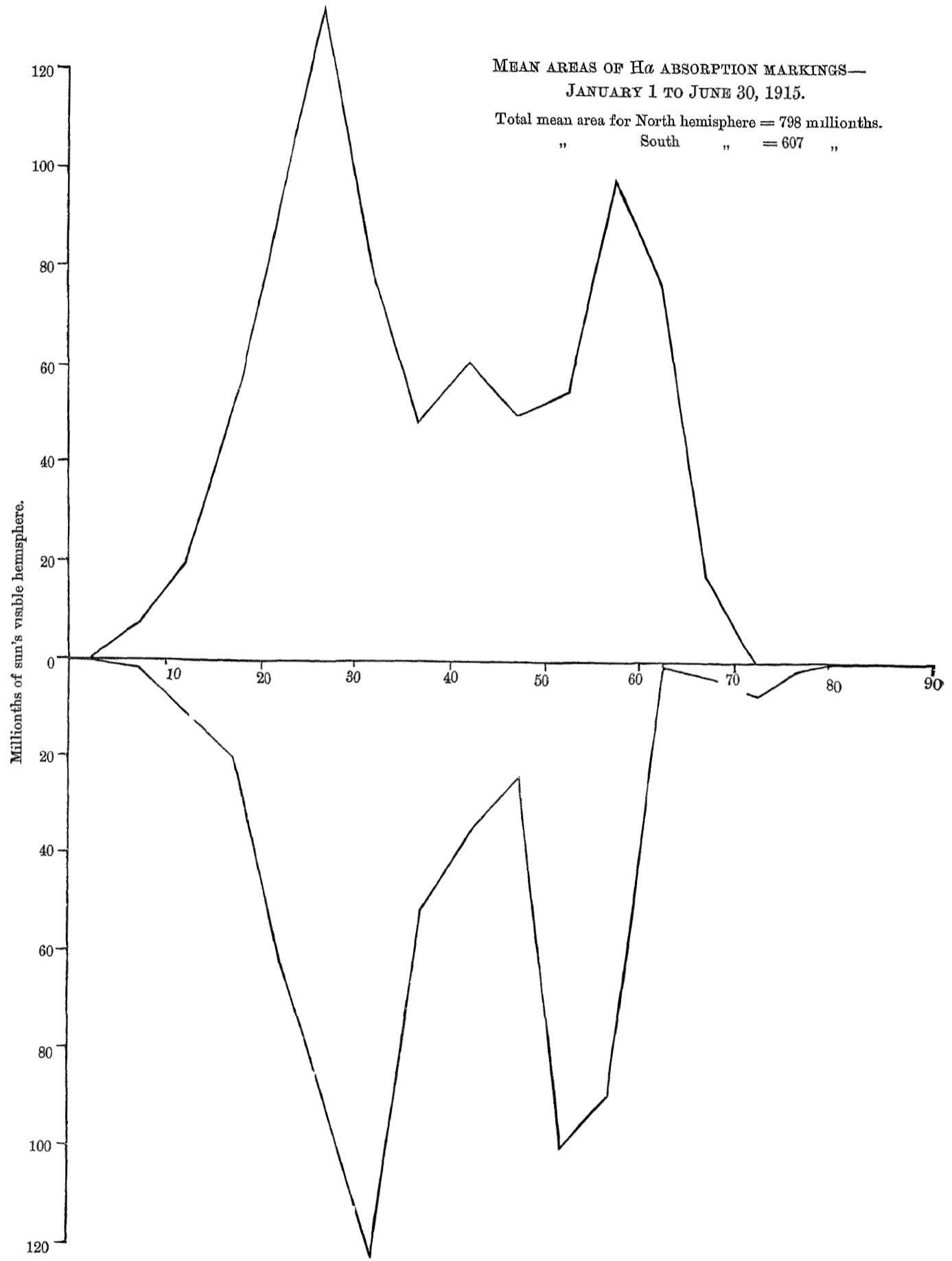
There was a large preponderance of displacements to the red, 72 being towards the red as against 23 to the violet.

Prominences projected on the Disc as Absorption Markings.

The grating spectroheliograph for photographing the absorption markings in hydrogen light was in regular use during the six months. Photographs were obtained on 123 days which were counted as 105 effective days. There has been a large increase in the number of absorption markings observed; this increase began in the second half of 1914. The mean daily areas in millionths of the sun's visible hemisphere corrected for foreshortening and for imperfect observations and the mean daily numbers are compared in the following table with the recent half-years for which complete information is available:—

| | 1912 Jan.—June | | 1912 July—Dec. | | 1913 Jan.—June | | 1913 July—Dec. | | 1915 Jan.—June. | |
|--------------|----------------|----------|----------------|----------|----------------|----------|----------------|----------|-----------------|----------|
| | Areas. | Numbers. | Areas. | Numbers. | Areas. | Numbers. | Areas. | Numbers. | Areas. | Numbers. |
| North | 81 | 0.39 | 56 | 0.32 | 44 | 0.24 | 24 | 0.28 | 768.2 | 3.8 |
| South | 262 | 1.07 | 382 | 1.28 | 84 | 0.56 | 36 | 0.80 | 607.4 | 3.4 |
| Total | 333 | 1.46 | 438 | 1.60 | 128 | 0.80 | 60 | 0.58 | 1375.6 | 7.2 |

Their distribution in latitude is shown in the accompanying diagram :—



Besides the usual maximum between 50° and 60° corresponding with the prominence maximum there is a pronounced maximum near 30° both north and south due to prominences in sunspot latitudes ; this maximum occurs at about 10° higher than the spot maximum, but the activity tends to vanish towards the equator in agreement with spot activity. The occurrence of a prominence maximum near 50° and almost complete absence of increased activity near 30° is not due to any essential difference in the nature of dark $H\alpha$ markings in these two regions, but the predominance of the prominence maximum at 50° is well accounted for by the two facts that in these latitudes the $H\alpha$ markings form a belt approximately parallel to the equator and that the speed of rotation of the sun is slower ; both of these facts make the prominence due to an $H\alpha$ marking in these latitudes endure for a larger number of days.

There was a preponderance of $H\alpha$ markings on the eastern side of the central meridian, the percentage east being 56.50 in areas and 54.62 in numbers.

THE OBSERVATORY, KODAIKANAL,
18th August 1915.

T. ROYDS,
Assistant Director.