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63-4-5

Classification of Solar Prominences for Sunspot Cycle No. 19 - 1959

BY

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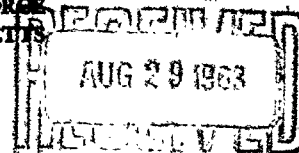
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August 1963

Prepared for

AIR FORCE CAMBRIDGE RESEARCH LABORATORIES
OFFICE OF AEROSPACE RESEARCH
UNITED STATES AIR FORCE
BEDFORD, MASSACHUSETTS



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CLASSIFICATION OF SOLAR PROMINENCES FOR
SUNSPOT CYCLE NO. 19 - 1959

by Donald H. Menzel and F. Shirley Jones

ABSTRACT

This report contains a tabulation and analysis of the behavior classification of prominences observed during 1959 at the Sacramento Peak Observatory, Sunspot, New Mexico.

Similar studies for the years 1955 through 1958 have appeared under this contract as Scientific Reports No. 13, 16, 17, and 20, respectively. A summary report for the analysis of the preceding cycle was issued as Scientific Report No. 12, "Classification of Solar Prominences--XII--Summary for 1944 to 1954."

The research reported in this paper has been sponsored by the Air Force Cambridge Research Laboratories, Office of Aerospace Research, under Contract AF19(604)-4962.

INTRODUCTION

The observations used in this research consist of the complete set of prominence surveys made at the Sacramento Peak Observatory, Sunspot, New Mexico, during 1959. Because of instrumental difficulties, no observations were made after October 15 of that year. We are grateful to Dr. John W. Evans, Director of the Sacramento Peak Observatory, for permitting us to use the original survey films.

Table I contains the measures of position and area, the intensity estimates, and the classification according to the Menzel and Evans scheme (1953) with the addition of the classes ASA (coronal rain in spot areas) and ANe (suspended clouds not associated with sunspots), of all prominences in the survey.

Column 1 gives the date of the observations. Column 2 indicates the amount of spread, in terms of the position angles marked by the beginning and end of each prominence. A spread of 1° indicates the position only of each of the narrower prominences, some of which are less than 0.5° in width. Column 3 gives the latitude of the center of intensity.

Column 4 indicates the "importance" of the prominence by an assigned letter giving a rough measure of the total intensity, from D- for the most insignificant through A+ for the most impressive prominences. Column 5 records the area of the prominence, expressed in standard prominence units.

Column 6 contains the class. Doubtful classifications are followed by a question mark. Non-spot prominences so adjacent to spot prominences as to suggest association with the spot are noted by asterisks. Column 7 gives additional comments.

Table II gives the classifications for the prominences in the motion picture films. The columns show date, position angle of the center of the frame, classification, and additional comments.

TABLE I

1959 SACRAMENTO PEAK PROMINENCE SURVEYS

| Date | Spread | Lat. of Center of Intensity ^o | Impor- tance | Area in p.u. | Class | Comments |
|---------|---------|--|-----------------|-----------------|--------|---------------------|
| 1959 | | | | | | |
| Jan. 8 | 346-358 | N82 | C+ | 400 | ANd | |
| | 20-24 | N67 | D- | 20 | BNs, s | |
| | 25-30 | N61 | D | 55 | ANm | |
| | 46-49 | N41 | D | 35 | BSs | |
| | 40-70 | N33 | B | 750 | ANd* | |
| | 78-90 | N6 | C | 225 | ANd* | |
| | 80-86 | N6 | D+ | 125 | ASf | |
| | 101-134 | S31 | A | 2200 | ANd | Streamers |
| | 153-155 | S65 | D | 20 | ANm | |
| | 217-219 | S51 | D- | 20 | ANm | Poor seeing |
| | | | | 200 | ANd | " |
| | | | | 25 | BSs | " |
| | 252-266 | S10 | C+ | 300 | ANd | " " |
| | 277-307 | N26 | A | 2100 | ANd | " " Streamers |
| Jan. 9 | 346-353 | N82 | C+ | 315 | ANd | |
| | 356-29 | N77 | D- | 50 | BNs's | |
| | 46-56 | N38 | C | 275 | ANd | |
| | 68-71 | N18 | D | 65 | ANd? | |
| | 108-131 | S32 | B- | 550 | ANd | |
| | 215-225 | S48 | D- | 30 | BNs's | |
| | 232-239 | S31 | D | 100 | ANd | Streamer |
| | 249-250 | S14 | D | 110 | ANd* | Poor seeing |
| | 256-273 | S3 | C | 150 | ASa | " " |
| | 271-277 | N6 | D | 100 | ASf? | " " |
| | 278-311 | N27 | B+ | 1350 | ANd | " " |
| Jan. 19 | 341-344 | N78 | D | 60 | ANm | Poor seeing all day |
| | 350-351 | N86 | D- | 10 | BNs | |
| | 7-25 | N67 | B | 800 | ANd | |
| | 42-44 | N41 | D- | 25 | ANm | |
| | 47-48 | N36 | D- | 10 | ANm | |
| | 62-88 | N24 | C | 350 | ASa | |
| | 69-80 | N12 | D | 90 | BS's's | |
| | 92-130 | S29 | A- | 1700 | ANd | |
| | 136-137 | S53 | D- | 15 | ANm | |
| | 207-210 | S56 | D | 40 | ANm | |
| | 226-228 | S37 | D | 35 | ANm | |
| | 242-246 | S20 | D- | 10 | BNs's | |
| | 256-262 | S5 | D | 95 | ANd | |
| | 261-268 | N1 | C+ | 300 | ANb | |
| | 275-287 | N18 | D+ | 115 | ANd | |
| | 293-298 | N31 | D | 60 | ANd | |
| | 299-325 | N51 | B | 900 | ANd | Streamers |
| Jan. 21 | 332-343 | N74 | C | 280 | ANd | |
| | 5-21 | N70 | D- | 600 | ANd | |
| Cont. | 23-26 | N59 | D- | 75 | BNs | |

| Date | Spread | Year of Collection | Depth Feet | Area in sq. | Class | Comment |
|---------|----------|-----------------------|---------------|----------------|-------|----------|
| 1959 | | | | | | |
| Jan. 21 | 36-37 | 1917 | D- | 15 | BNs | |
| Cons | 40-42 | 1912 | D- | 50 | ESs | |
| | 40-45 | 1911 | D | 40 | ANd* | |
| | 51-63 | 1923 | D | 25 | ESs's | |
| | 57-67 | 12 | D | 20 | ASa | |
| | 68-80 | | B | 100 | ANd* | |
| | 81-90 | | C | 100 | ANd | |
| | 91-100 | | D | 100 | ANa | |
| | 101-110 | | D | 100 | ANd* | Streamer |
| | 111-120 | | D | 100 | BSs | |
| | 121-130 | | D | 250 | ANd | |
| | 131-140 | | D | 20 | BNs | |
| | 141-150 | | D | 25 | BNs | |
| | 151-160 | | D | 20 | BNs | |
| | 161-170 | | | | ANd | |
| | 171-180 | | | | ANd | |
| | 181-190 | | | | ANd | |
| | 191-200 | | | | ANd | |
| | 201-210 | | | | ANd | |
| | 211-220 | | | | ANd | |
| | 221-230 | | | | ANd | |
| | 231-240 | | | | ANd | |
| | 241-250 | | | | ANd | |
| | 251-260 | | | | ANd | |
| | 261-270 | | | | ANd | |
| | 271-280 | | | | ANd | |
| | 281-290 | | | | ANd | |
| | 291-300 | | | | ANd | |
| | 301-310 | | | | ANd | |
| | 311-320 | | | | ANd | |
| | 321-330 | | | | ANd | |
| | 331-340 | | | | ANd | |
| | 341-350 | | | | ANd | |
| | 351-360 | | | | ANd | |
| | 361-370 | | | | ANd | |
| | 371-380 | | | | ANd | |
| | 381-390 | | | | ANd | |
| | 391-400 | | | | ANd | |
| | 401-410 | | | | ANd | |
| | 411-420 | | | | ANd | |
| | 421-430 | | | | ANd | |
| | 431-440 | | | | ANd | |
| | 441-450 | | | | ANd | |
| | 451-460 | | | | ANd | |
| | 461-470 | | | | ANd | |
| | 471-480 | | | | ANd | |
| | 481-490 | | | | ANd | |
| | 491-500 | | | | ANd | |
| | 501-510 | | | | ANd | |
| | 511-520 | | | | ANd | |
| | 521-530 | | | | ANd | |
| | 531-540 | | | | ANd | |
| | 541-550 | | | | ANd | |
| | 551-560 | | | | ANd | |
| | 561-570 | | | | ANd | |
| | 571-580 | | | | ANd | |
| | 581-590 | | | | ANd | |
| | 591-600 | | | | ANd | |
| | 601-610 | | | | ANd | |
| | 611-620 | | | | ANd | |
| | 621-630 | | | | ANd | |
| | 631-640 | | | | ANd | |
| | 641-650 | | | | ANd | |
| | 651-660 | | | | ANd | |
| | 661-670 | | | | ANd | |
| | 671-680 | | | | ANd | |
| | 681-690 | | | | ANd | |
| | 691-700 | | | | ANd | |
| | 701-710 | | | | ANd | |
| | 711-720 | | | | ANd | |
| | 721-730 | | | | ANd | |
| | 731-740 | | | | ANd | |
| | 741-750 | | | | ANd | |
| | 751-760 | | | | ANd | |
| | 761-770 | | | | ANd | |
| | 771-780 | | | | ANd | |
| | 781-790 | | | | ANd | |
| | 791-800 | | | | ANd | |
| | 801-810 | | | | ANd | |
| | 811-820 | | | | ANd | |
| | 821-830 | | | | ANd | |
| | 831-840 | | | | ANd | |
| | 841-850 | | | | ANd | |
| | 851-860 | | | | ANd | |
| | 861-870 | | | | ANd | |
| | 871-880 | | | | ANd | |
| | 881-890 | | | | ANd | |
| | 891-900 | | | | ANd | |
| | 901-910 | | | | ANd | |
| | 911-920 | | | | ANd | |
| | 921-930 | | | | ANd | |
| | 931-940 | | | | ANd | |
| | 941-950 | | | | ANd | |
| | 951-960 | | | | ANd | |
| | 961-970 | | | | ANd | |
| | 971-980 | | | | ANd | |
| | 981-990 | | | | ANd | |
| | 991-1000 | | | | ANd | |

| Date | Spread | Lat. of Center of Intensity ^o | Importance | Area in p.u. | Class | Comment |
|--------|---------|--|------------|--------------|-------|--------------|
| 1959 | | | | | | |
| Feb. 4 | 9-12 | N66 | D- | 30 | ANd | |
| | 45-53 | N29 | D | 60 | ASa | |
| | 46-52 | N29 | D | 60 | BSs's | |
| | 57-66 | N15 | D+ | 130 | ASa | |
| | 65-68 | N10 | D- | 15 | BSs | |
| | 71-78 | N3 | D | 80 | ANc | Streamer |
| | 83-84 | S7 | D- | 15 | ? | |
| | 90-91 | S13 | D- | 20 | ANe? | |
| | 95-129 | S35 | A | 1350 | ANd | |
| | 135-146 | S63 | C | 250 | ANd | |
| | 151-152 | S77 | D- | 30 | BNs's | |
| | 211-213 | S45 | D- | 40 | ANe | |
| | 223-236 | S30 | D+ | 160 | ANd | Streamer |
| | 240-253 | S72 | D | 100 | ANd | |
| | 258-302 | N23 | A+ | 3700 | ANd | Fine example |
| | | | | 30 | BSs's | |
| Feb. 5 | 319-341 | S39 | D- | 30 | BNs's | |
| | 342-343 | S41 | D- | 70 | ANd | |
| | 35-44 | N41 | D- | 25 | BNs's | |
| | 43-46 | N32 | D- | 20 | ASa | |
| | 44-53 | N29 | C- | 175 | ANd | |
| | 54-67 | N17 | D | 65 | BSs's | |
| | 55-72 | N11 | D | 110 | ASa | |
| | 68-76 | N4 | D+ | 165 | ANd | |
| | 82-126 | S30 | A+ | 2800 | ANd | |
| | 134-144 | S63 | C- | 320 | ANd | |
| | 150-162 | S78 | D- | 20 | BNs's | |
| | 167-168 | S84 | D- | 20 | BNs? | |
| | 207-209 | S48 | D- | 30 | ANd | |
| | 233-236 | S21 | D | 65 | ANm | |
| | 241-246 | S11 | D- | 20 | BNs's | |
| | 256-297 | N20 | A+ | 3850 | ANd | Fine example |
| | 327-335 | N74 | D | 90 | ANd | |
| Feb. 6 | 329-340 | N74 | C | 215 | ANd | |
| | 348-352 | N83 | D | 70 | ANd | |
| | 6-8 | N86 | D- | 15 | ANd | |
| | 37-42 | N37 | D- | 30 | ANd | |
| | 48-54 | N78 | C | 200 | ANd's | |
| | 56-59 | N49 | D | 65 | ASa | |
| | 63-64 | N12 | D- | 20 | ASa | |
| | 77-88 | S7 | C+ | 275 | ANd | |
| | 79-94 | S11 | B | 1000 | ANa | |
| | 92-93 | S17 | D- | 15 | BSs | |
| | 94-127 | S30 | B+ | 1600 | ANd's | |
| | 123-124 | S47 | D- | 15 | ? | |
| | 127-129 | S32 | D | 50 | ANm | |
| | 135-140 | S41 | D+ | 135 | ANd | |
| | 199-206 | S53 | C | 230 | ANd | |
| | 256-263 | N3 | D | 125 | ANc? | |
| | 271-273 | N16 | D | 25 | BSs | |
| | 278-290 | N29 | C | 270 | ANd's | |
| | 281-286 | N26 | D | 50 | BSs | |

| Date | Spread | Lat. of Center of Intensity ^o | Impor- tance | Area in p.u. | Class | Comments |
|---------|---------|--|-----------------|-----------------|--------------------|---------------------|
| 1959 | | | | | | |
| Feb. 10 | 331-334 | N76 | D | 55 | ANm | |
| | 338-345 | N83 | D+ | 160 | ANd | |
| | 350-1 | N78 | D- | 15 | BNs ¹ s | |
| | 3-6 | N70 | D | 70 | ANd | |
| | 12-21 | N58 | D- | 35 | BNs ¹ s | |
| | 23-31 | N49 | D | 75 | ANd | |
| | 35-49 | N34 | C+ | 285 | ANd | |
| | 53-58 | N20 | D+ | 110 | ANd* | |
| | 60-63 | N14 | D | 40 | BSs | |
| | 64-70 | N9 | C | 215 | BSs | |
| | 66-73 | N7 | C+ | 375 | AS1 | |
| | 75-80 | S3 | E+ | 500 | BSs | |
| | 80-93 | S10 | C+ | 400 | ASa | |
| | 80-94 | S10 | C+ | 325 | ANd* | |
| | 118-126 | S43 | D | 100 | ANd | |
| | 130-139 | S59 | D- | 25 | BNs ¹ s | |
| | 196-202 | S5 | C | 250 | ANs | or ANb? |
| | 231-232 | S23 | D+ | 40 | ASa? | |
| | 234-239 | S20 | D | 80 | BSs | or ANd? |
| | 253-270 | N9 | B | 700 | ASf | |
| | 270-280 | N21 | C+ | 450 | ANd* | |
| | 281-281 | N2 | D | 30 | BSs | |
| | 285-288 | N32 | D- | 30 | BSs? | |
| 295-297 | N42 | D | 50 | ANm | | |
| 315-316 | N65 | D- | 25 | ANc | | |
| Feb. 22 | 358-5 | N08 | C- | 165 | ANd | Poor seeing all day |
| | 35-55 | N25 | C | 275 | ANd | |
| | 60-72 | N5 | C+ | 300 | ANd | |
| | 81-85 | S12 | D- | 10 | BNs ¹ s | |
| | 210-211 | S43 | D- | 75 | ANd | |
| | 221-222 | S28 | D- | 10 | ? | |
| | 228-231 | S21 | D | 60 | ANm | |
| | 244-245 | S5 | D | 60 | ANm | |
| | 261-265 | N13 | C- | 150 | ANb* | |
| | 264-270 | N16 | D+ | 130 | ASa? | |
| | 292-295 | N44 | D | 90 | BSs? | |
| | 300-307 | N54 | D+ | 140 | ANd | |
| | 325-335 | N71 | C- | 175 | ANd | |
| Feb. 24 | 353-5 | N69 | C- | 400 | ANd | |
| | 31-33 | N38 | D- | 60 | ANm | |
| | 45-50 | N22 | D- | 30 | BSa? | |
| | 54-73 | N6 | B- | 550 | ANd* | |
| | 98-101 | S29 | D- | 265 | BSs | |
| | 129-136 | S63 | D | 225 | ANd | |
| | 183-189 | S65 | D- | 10 | BNs | |
| | 197-207 | S50 | D | 70 | ANd | |
| | 207-211 | S42 | D | 70 | ANm | |
| | 216-218 | S33 | D- | 5 | ? | |
| | 234-235 | S15 | D- | 10 | BSs | |
| | 237-252 | S3 | ? | 200 | ASf | |
| | 242-247 | S6 | D- | 110 | BSs | |
| Cont | 245-249 | S1 | C | 60 | ANd* | |

| Date | Spread | Lat. of Center of Intensity° | Importance | Area in p.u. | Class | Comment |
|------------------|---------|------------------------------------|------------|-----------------|--------------------|---------------------|
| 1959 | | | | | | |
| Feb. 24 Cont. | 269-277 | N25 | D+ | 125 | ASf | |
| | 273-284 | N29 | D+ | 170 | ASa | |
| | 276-281 | N28 | D | 90 | ANd* | |
| | 285-291 | N39 | C | 165 | ANm | |
| | 291-300 | N46 | D+ | 110 | ANd | |
| | 316-320 | N67 | D | 75 | ANd | |
| | 323-328 | N73 | D- | 20 | BNs, s | |
| | 329-331 | N80 | D | 90 | ANb | |
| Mar. 2 | 316-349 | N43 | B | 850 | ANd | Arching streamers |
| | 351-358 | N62 | C | 180 | ANm | |
| | 5-26 | N79 | D- | 20 | BNs ⁺ s | |
| | 28-41 | N75 | B | 750 | ANd | |
| | 50-52 | N61 | D- | 25 | ASa | |
| | 56-66 | N50 | D | 85 | BSs ⁺ s | or ANd? |
| | 70-91 | N35 | B | 625 | ANd | |
| | 111-118 | S2 | D+ | 120 | ANd | |
| | 123-128 | S14 | D | 35 | BSs | |
| | 129-136 | S19 | D | 85 | ANd | |
| | 143-160 | S38 | D- | 35 | BNs | |
| | 180-198 | S80 | E- | 1500 | ANb | |
| | 207-212 | S83 | E | 90 | ANm | |
| | 223-227 | S67 | D | 120 | ASi? | |
| | 227-235 | S63 | C+ | 235 | BSs | |
| | 256-257 | S35 | D- | 15 | BSs | |
| | 262-274 | S24 | E- | 125 | BSe? | Flare? |
| | 277-281 | S13 | D- | 45 | BSs | |
| | 286-301 | 0 | C+ | 325 | ANd* | |
| | 287-299 | N4 | D+ | 125 | ASf | |
| 320-322 | N29 | D | 65 | BSs | | |
| Mar. 14 | 357-359 | N63 | D- | 45 | ANc | Poor seeing all day |
| | 32-40 | N77 | B | 100 | ANd | |
| | 38-39 | N76 | D- | 20 | ANa? | |
| | 51-53 | N62 | D- | 15 | ANm | |
| | 57-65 | N53 | D | 100 | ANd | |
| | 74-82 | N37 | C | 250 | ANa | |
| | 80-94 | N25 | B+ | 950 | ANc | Streamers |
| | 93-100 | N18 | D | 90 | ANd | |
| | 107-115 | N2 | C | 260 | ANd | |
| | 189-192 | S75 | D | 70 | ANd | |
| | 206-214 | S81 | C | 215 | ANd | |
| | 215-223 | S74 | C- | 175 | ANd | |
| | 224-233 | S67 | D+ | 155 | ASf | |
| | 228-240 | S57 | C | 260 | ANd* | |
| | 289-298 | S1 | C+ | 380 | ANd | |
| | 321-335 | N31 | D- | 300 | ANd | |

| Date | Spread | Lat. of Center of Intensity ^o | Impor- tance | Area in p.u. | Class | Comment |
|--------------------------|---------|--|-----------------|-----------------|--------------------|---------------------|
| 1959 | | | | | | |
| Mar. 23 | 353-1 | N66 | D | 105 | ANd | Poor seeing all day |
| | 26-54 | N33 | B | 850 | ANd | |
| | 64-66 | S1 | D | 20 | ANm | |
| | 76-80 | S14 | D | 50 | ANc | |
| | 230-245 | S5 | B- | 450 | ANd* | Streamer |
| | 243-254 | N3 | C+ | 400 | AS1.1 | |
| | 252-262 | N16 | B | 750 | AS1 | |
| | 276-300 | N44 | B | 775 | ANd* | |
| | 282-286 | N39 | D | 65 | ASa | |
| | 322-331 | N81 | D- | 45 | BNs ^o s | |
| Mar. 24 16:55 J.M. | 352-300 | N69 | C- | 185 | ANd | Poor seeing all day |
| | 25-34 | N36 | C+ | 320 | ANd | |
| | 39-44 | N22 | D | 75 | ANd* | |
| | 43-50 | N17 | D | 90 | ASa | |
| | 57-71 | 0 | C | 250 | ANd | |
| | 79-97 | S22 | D+ | 180 | ANd | |
| | 121-122 | S58 | D- | 15 | ANm? | |
| | 191-192 | S52 | D- | 20 | ? | |
| | 208-209 | S36 | D- | 15 | ANm | Omitted |
| | 220-241 | S8 | B- | 625 | ANd* | in the |
| | 230-253 | S1 | B+ | 900 | ASf | Analysis |
| | 250-264 | N12 | C- | 200 | AS1 | |
| | 261-267 | N20 | D | 65 | BSs | |
| | 268-282 | S32 | C+ | 200 | BSs ^o b | |
| | 271-281 | N35 | D | 90 | BSs | |
| | 277-281 | N37 | D+ | 150 | ASa | |
| | 293-297 | S30 | D- | 20 | BSs | |
| | 297-304 | N57 | C | 260 | ANd* | |
| | 314-318 | N70 | D- | 10 | BNs | |
| | 322-325 | N73 | D- | 20 | BNs ^o c | |
| Mar. 21 22:40 J.M. | 351-359 | N69 | C- | 175 | ANd | |
| | 22-35 | N36 | C+ | 380 | ANd | |
| | 39-44 | N23 | D | 100 | ANd | |
| | 55-57 | N8 | D- | 20 | BSs | |
| | 60-63 | N3 | D- | 30 | ASa | |
| | 64-70 | S8 | D | 40 | ANd | |
| | 80-85 | S18 | D | 90 | ANd | |
| | 86-87 | S22 | D | 20 | ANa | |
| | 89-90 | S26 | D | 30 | ESp? | |
| | 142-149 | S79 | D | 100 | ANd | |
| | 207-208 | S37 | D- | 15 | ? | |
| | 229-240 | S10 | B | 500 | ANd* | Arching streamer |
| | 231-253 | N3 | B+ | 950 | ASf | |
| | 248-261 | N14 | C+ | 425 | ASa | |
| | 253-257 | N11 | C | 200 | ASf | |
| | 258-266 | N19 | C | 210 | BSs | |
| | 262-267 | N20 | D | 85 | ANd* | |
| | 271-280 | N32 | D | 90 | BSs | |
| | 276-277 | N32 | D | 80 | ASa | |
| | 281-287 | N40 | C | 270 | AS1 | |
| | 297-308 | N57 | D | 120 | ASa | |
| | 299-304 | N50 | D | 75 | ANd* | |

| Date | Spread | Dist. of Center of Intensity ^o | Importance | Area in p.u. | Class | Comment |
|-------------------------|---------|---|------------|--------------|----------------------|-----------|
| 1959 | | | | | | |
| Apr. 9 14:10 U.T. | 338-340 | N82 | D | 30 | ANc | |
| | 350-355 | N71 | C | 140 | ANm | |
| | 359-13 | N60 | D- | 15 | BNs ^o s | |
| | 24-26 | N39 | D- | 20 | BSs | |
| | 29-45 | N29 | D+ | 150 | ASa | |
| | 40-51 | N18 | C- | 165 | ANd | |
| | 50-55 | N11 | D | 120 | ASa | |
| | 59-71 | S4 | C | 200 | ANd* | Streamers |
| | 76-80 | S10 | D- | 30 | ANd | |
| | 81-88 | S20 | D+ | 140 | AS1? | |
| | 87-89 | S24 | D | 25 | BSs | |
| | 91-10 | S31 | C | 170 | ANd | |
| | 105-113 | S48 | D | 70 | ANd | |
| | 125-127 | S62 | D | 25 | ANc | |
| | 130-13 | S7 | D- | 10 | BNs | |
| | 140-15 | S22 | D | 130 | ANd | |
| | 196-21 | S48 | D- | 25 | ASa? | ANa? |
| | 209-21 | S23 | C | 370 | ANd | |
| | 228-229 | S15 | D- | 5 | BNs | |
| | 248-249 | N5 | D- | 5 | BNs | |
| 277-28 | N40 | C- | 190 | ASa | | |
| 280-282 | N37 | D | 40 | BSs | | |
| Total Area 3150 missing | | | | | | |
| Apr. 15 | 339-344 | N80 | D- | 15 | BNs ^o s | |
| | 346-357 | N71 | C | 290 | ANd | |
| | 13-14 | N50 | D- | 5 | BNs | |
| | 19-35 | N38 | B- | 600 | ANd | |
| | 41-44 | N22 | D- | 10 | ASa | |
| | 52-53 | N12 | D- | 10 | BNs | |
| | 61-63 | N2 | D | 10 | ANm | |
| | 76-78 | S13 | D+ | 35 | ? | |
| | 99-103 | S37 | D | 65 | BSs | |
| | 121-126 | S09 | D | 60 | ANd | |
| | 188-189 | S55 | D | 15 | BNs, s | |
| | 219-220 | S24 | D- | 10 | BNs, s | |
| | 226-231 | S16 | D- | 35 | ANc? | Streamer |
| | 233-240 | S8 | D+ | 160 | ANe | |
| | 238-242 | S4 | D | 60 | ANd? | |
| 253-270 | N17 | C+ | 375 | ANd* | Streamer | |
| 266-272 | N29 | C | 250 | ASf | Loop-shaped streamer | |
| 281-290 | N11 | D | 90 | ANd | Streamer | |
| 321-333 | N75 | C- | 160 | ANd | | |
| Apr. 20 | 332-356 | N79 | B- | 550 | ANd | |
| | 13-14 | N51 | D- | 10 | BNs | |
| | 23-24 | N40 | D- | 15 | BNs? | |
| | 32-39 | N29 | D+ | 130 | ANd | |
| | 43-44 | N21 | D- | 25 | ASa | |
| | 46-47 | N13 | D- | 15 | BSs? | |
| | 52-57 | N9 | D- | 150 | ANd* | |
| | 61-67 | N1 | D | 100 | ASa | |
| Cont | 67-81 | S12 | B- | 500 | ANd* | |

| Date | Spread | Lat. of Center of Intensity ^o | Importance | Area in p.u. | Class | Comment |
|---------|---------|--|------------|-----------------|----------------|-----------|
| 1959 | | | | | | |
| Apr. 20 | 90-95 | S28 | D+ | 120 | BSs? | or ANc*? |
| Cont. | 95-98 | S32 | D- | 40 | BSs | |
| | 115-121 | S54 | D- | 35 | BNs's | |
| | 189-190 | S51 | D- | 5 | BNs | |
| | 204-206 | S39 | D | 50 | ANb | |
| | 229-241 | S12 | C | 250 | ASa | |
| | 239-249 | N1 | D | 100 | ANd* | Streamer |
| | 253-256 | N11 | D- | 25 | ASa | |
| | 255-260 | N13 | D | 100 | ANd* | |
| | 257-264 | N18 | D | 95 | AS1 | |
| | 257-269 | N24 | D- | 40 | BSs | |
| | 272-278 | N31 | D+ | 180 | AS1 | |
| | 326-332 | N82 | C | 225 | ANc | Streamer |
| Apr. 21 | 31-37 | N2 | D | 250 | ANd | |
| | 35-41 | N63 | D- | 20 | BNs's | |
| | 41-43 | N46 | D- | 35 | BNs's | |
| | 25-37 | N34 | C | 190 | ANd | |
| | 40-42 | N23 | D | 35 | BSs | |
| | 42-47 | N19 | D | 40 | ASa | |
| | 49-50 | N14 | D | 20 | BSs | |
| | 52-60 | N7 | C | 250 | AS1 | |
| | 63-85 | N14 | B+ | 850 | ANd* | Streamers |
| | 91-98 | S30 | D+ | 130 | BSs | |
| | 98-108 | S39 | C | 300 | ANd* | Streamers |
| | 136-157 | N70 | D- | 35 | BNs's | |
| | 164-191 | S67 | D- | 45 | BNs's | |
| | 197-206 | N43 | D- | 25 | BNs's | |
| | 215-224 | S24 | D- | 30 | BNs's? or ANd? | |
| | 226-245 | S11 | C- | 325 | AS1 | |
| | 237-243 | S4 | D+ | 150 | BSs | |
| | 257-258 | N14 | D- | 15 | ASa | |
| | 267-276 | N30 | D+ | 160 | ASa | |
| | 270-279 | N29 | D | 110 | BSs | |
| | 273-278 | N32 | D | 90 | AS1 | |
| | 284-288 | N42 | D | 60 | ANd | |
| | 295-296 | N52 | D- | 10 | BNs | |
| | 299-305 | N58 | D | 70 | ANd | |
| May 9 | 334-335 | N86 | D- | 10 | BNs | |
| | 346-0 | N75 | C- | 190 | ANd | |
| | 9-11 | N57 | D- | 25 | ANc | |
| | 16-27 | N45 | D- | 20 | BNs's | |
| | 35-37 | N31 | D- | 25 | ANc | |
| | 42-44 | N24 | D | 70 | BSs | |
| | 42-45 | N24 | D- | 60 | ASa | |
| | 45-51 | N19 | D+ | 125 | ANd* | Streamers |
| | 52-67 | N7 | C+ | 450 | AS1 | |
| | 60-88 | S6 | C+ | 400 | ANd* | |
| | 92-110 | S33 | D- | 35 | BNs's | |
| Cont. | 124-131 | N60 | D- | 130 | ANd | |

| Date | Spread | Number of stars | mag limit | area in sq. a. | Class | Comment |
|----------------|----------------|--------------------|--------------|--------------------|--------------------|-------------------|
| 1959 | | | | | | |
| May 9 Contd | 135-147 | 874 | D- | 15 | BNs ¹ s | |
| | 163-192 | 868 | C | 35 | BNs ² s | |
| | 193-197 | 842 | D | 70 | ANd | |
| | 201-21 | 833 | C | 130 | SSs? | or ANm? Flare! |
| | 229-240 | 810 | C | 200 | ANd | |
| | 259-244 | 85 | D- | 15 | ASa | |
| | 245-248 | 82 | D- | 15 | SSs | |
| | 246-249 | 82 | C | 190 | ANd ¹ | |
| | 251-254 | 83 | D- | 40 | ANe | |
| | 257-271 | 820 | D | 80 | ANd | |
| | 270-291 | 838 | C | 100 | ANd | |
| | 295-305 | 851 | D | 100 | ANd | |
| | 311-327 | 870 | D | 55 | ANd | |
| May 9 Contd | 331-341 | 876 | D | 120 | ANd | |
| | 342-351 | 850 | D | 50 | ANd | Grinding streamer |
| | 41-51 | 821 | C | 235 | ANd | |
| | 53-57 | 812 | D- | 15 | BNs ¹ s | |
| | 60-70 | 81 | D | 150 | ASa | |
| | 73-79 | 810 | D | 100 | ANd ¹ | |
| | 87-91 | 827 | C | 5 | BNs | |
| | 102-111 | 808 | C | 1- | ANd | |
| | 115-117 | 819 | C | 1- | ANe | |
| | 127-131 | 862 | D | 1- | ANd | |
| | 173-174 | 875 | D- | 20 | ANm | |
| | 175-191 | 852 | C | 70 | RNe ¹ s | |
| | 212-217 | 831 | D | 15 | ANm | |
| | 226-231 | 820 | C | 80 | ANd | |
| | 235-238 | 810 | C | 35 | ANd | |
| | 243-247 | 817 | D | 60 | ANd ¹ | |
| | 252-257 | 817 | C | 50 | ASa | |
| | 257-267 | 816 | C | 275 | ANd | |
| | 274-29 | 837 | D- | 350 | ANd | |
| | 296-300 | 852 | D- | 150 | ANd | |
| | 315-327 | 870 | D | 25 | RNe | |
| | 344-351 | 877 | D | 50 | ANd | |
| | May 9 Contd | 352-357 | 871 | C | 11 | ANd |
| 358-361 | | 871 | C | 17 | BNs ¹ s | |
| 362-365 | | 850 | D- | 10 | BNs ¹ s | |
| 365-368 | | 850 | C | 185 | ANd ¹ | Streamers |
| 415-433 | | 822 | C | 50 | ASa | |
| 53-57 | | 810 | C | 300 | ASr | |
| 97-107 | | 820 | C | 15 | ANd | |
| 113-112 | | 849 | C | 100 | ANd | |
| 127-131 | | 850 | C | 35 | ANd | |
| 133-137 | | 873 | C- | 25 | BNs ¹ s | |
| 164-169 | 871 | D | 31 | BNs ² s | | |

| Date | Spread | Lat. of Center of Intensity ^o | Importance | Area in p.u. | Class | Comment |
|-----------------|---------|--|------------|-----------------|----------------|------------|
| 1959 | | | | | | |
| May 17 Cont. | 203-214 | S41 | C | 300 | ANd | |
| | 215-220 | S32 | D | 120 | BSs? | or ANm? |
| | 225-231 | S21 | C | 230 | ASf | |
| | 231-237 | S15 | D | 100 | ANd* | |
| | 233-246 | S13 | D | 250 | ASa | Very faint |
| | 266-272 | N20 | D | 100 | ANd | |
| | 285-289 | N37 | D- | 50 | ANc | |
| | 294-317 | N54 | C | 300 | ANd | Streamers |
| | 323-327 | N76 | D- | 25 | BNs | |
| May 21 | 344-354 | N83 | C | 230 | ANd | |
| | 353-9 | N66 | C | 240 | ANd | |
| | 15-27 | N79 | D- | 170 | ASa | |
| | 31-37 | N7 | D- | 100 | BSs's | |
| | 37-47 | N15 | D- | 25 | BSs | |
| | 47-57 | S10 | D | 100 | ANd*? | |
| | 105-111 | S37 | D | 35 | BSs | |
| | 112-113 | S42 | D- | 10 | ? | |
| | 125-126 | S56 | D | 50 | ANm | |
| | 130-155 | S71 | D- | 35 | BNs's | |
| | 170-186 | S72 | D- | 20 | BNs's | |
| | 198-200 | S52 | D- | 15 | ANm | |
| | 219-222 | S31 | D- | 10 | BNs's | |
| | 245-250 | S4 | D- | 20 | ANd? | |
| | 260-272 | N12 | D | 280 | ANc | Very faint |
| | 262-271 | S16 | C | 250 | ANd* | |
| | 269-270 | N21 | D | 100 | ASa | |
| | 275-281 | N25 | D | 60 | BSs | |
| | 280-291 | N34 | C | 215 | ANd* | |
| | 299-307 | S50 | C- | 150 | ANd | |
| May 22 | 333-7 | N79 | B | 850 | ANd | |
| | 15-16 | N55 | D- | 10 | BNs | |
| | 22-24 | N48 | D- | 20 | BNs | |
| | 30-35 | N39 | D- | 10 | BNs's | |
| | 39-56 | N21 | D | 110 | ANd* | |
| | 53-58 | N13 | D- | 50 | ASa | |
| | 58-66 | N3 | D- | 25 | BSs's | |
| | 77-90 | S16 | C | 225 | ANd | |
| | 92-104 | S25 | D- | 15 | BNs's | |
| | 107-118 | S44 | D- | 140 | BSs's? or ANd? | |
| | 128-132 | S58 | D- | 60 | ANc | |
| | 137-158 | S76 | D- | 30 | BNs's | |
| | 168-190 | S74 | D- | 20 | BNs's | |
| | 195-200 | S53 | D | 90 | ANd | |
| | 208-217 | S39 | D- | 15 | BNs's | |
| | 216-225 | S28 | D | 65 | ANd | |
| | 244-266 | N4 | D- | 20 | BNs's | |
| | 262-279 | N23 | B- | 600 | ASa* | |
| | 266-271 | N17 | C | 260 | ANb* | |
| | 276-283 | N28 | D | 75 | ANd* | |
| 299-305 | N52 | D | 50 | BNs's? | | |

| Date | Spread | Lat. of Center of Intensity ^o | Impor- tance | Area in p.u. | Class | Comment |
|---------|---------|--|-----------------|-----------------|--------|-----------|
| 1959 | | | | | | |
| May 26 | 341-347 | N88 | C | 180 | ANd | |
| | 355-8 | N70 | C | 260 | ANd | |
| | 27-43 | N37 | B- | 575 | ANd | |
| | 46-59 | N18 | D- | 60 | BNs's | |
| | 60-65 | N9 | D | 60 | ANc | |
| | 81-84 | S10 | D- | 20 | ANd | |
| | 90-94 | S20 | D- | 20 | BNs,s? | |
| | 101-102 | S29 | D- | 5 | BNs | |
| | 116-120 | S46 | D | 70 | BS*? | |
| | 194-198 | S56 | D- | 35 | ANc | |
| | 211-217 | S38 | D- | 10 | BNs,s | |
| | 233-248 | S12 | C+ | 300 | ANd | |
| | 252-254 | N1 | D- | 20 | BNs,s | |
| | 258-273 | N14 | C+ | 475 | ANd* | Streamers |
| 273-277 | N22 | D | 65 | ASa? | | |
| 277-282 | N30 | C | 190 | ANd* | | |
| May 26 | 335-336 | N83 | D- | 5 | BNs | |
| | 339-346 | N88 | C | 220 | ANd | |
| | 356-8 | N68 | C | 250 | ANd | |
| | 27-35 | N41 | C- | 190 | ANd | |
| | 37-59 | N25 | D- | 25 | BNs's | |
| | 77-88 | S12 | C- | 160 | ANd | |
| | 96-107 | S30 | D+ | 150 | ANd | Streamer |
| | 117-128 | S49 | D- | 30 | BNs's | |
| | 143-145 | S72 | D- | 10 | BNs,s | |
| | 155-194 | S82 | D- | 30 | BNs's | |
| | 169-170 | S83 | D- | 15 | ANc | |
| | 196-201 | S53 | D | 110 | ANd | |
| | 209-214 | S39 | D | 70 | ANm | |
| | 217-222 | S33 | D- | 15 | BNs's | |
| | 234-247 | S13 | C+ | 275 | ANd | |
| | 251-252 | 0 | D- | 10 | ANc | |
| | 256-269 | N11 | D+ | 170 | ANd* | Streaming |
| | 258-259 | N6 | D- | 15 | ANc | |
| | 264-272 | N19 | C | 265 | ASa | |
| | 278-282 | N28 | C | 160 | BSs | Flare |
| 283-290 | N34 | D+ | 150 | ASa | | |
| 286-295 | N38 | D | 60 | ANd | | |
| 314-323 | N66 | D- | 10 | BNs's | | |
| May 26 | 334-336 | N82 | D- | 15 | BNs | |
| | 339-346 | N89 | C | 240 | ANd | Arch |
| | 347-351 | N84 | D- | 45 | BNs's | |
| | 356-7 | N70 | C | 250 | ANd | Arch |
| | 8-29 | N56 | D- | 10 | BNs's | |
| | 27-38 | N41 | D- | 10 | BNs,s | |
| | 57-65 | N12 | D | 60 | ANd? | |
| | 71-73 | N1 | D- | 25 | ANd | |
| | 84-87 | S13 | D | 45 | BSs? | or ANm*? |
| | 88-92 | S17 | D- | 50 | BSs? | |
| Cont. | 93-94 | S21 | D- | 10 | ASa | |

| Date | Spread | Lat. of Center of Intensity ^o | Impor- tance | Area in p.u. | Class | Comment |
|--------|---------|--|-----------------|-----------------|-------|----------|
| 1959 | | | | | | |
| May 28 | 98-100 | S26 | D- | 40 | ANc | |
| Cont. | 108-115 | S39 | D | 60 | ANm? | |
| | 119-120 | S46 | D- | 5 | BNs | |
| | 124-127 | S52 | D- | 25 | ANm | |
| | 135-136 | S63 | D- | 20 | ANc | |
| | 154-197 | S77 | D | 70 | BNs's | |
| | 199-203 | S52 | D- | 30 | ANd | |
| | 209-223 | S36 | C | 230 | ANd | |
| | 234-243 | S14 | C | 250 | ANd | |
| | 251-261 | N3 | D- | 70 | ASa | |
| | 265-272 | N15 | D- | 120 | ANd* | |
| | 269-277 | N21 | D | 90 | ASa | |
| | 279-287 | N29 | D | 190 | ASa | |
| | 281-283 | N29 | D | 55 | BSs | |
| | 287-295 | N38 | C | 175 | ANd* | Streamer |
| | 299-301 | N47 | D | 40 | ANm | |
| | 309-327 | N61 | D- | 20 | BNs's | |
| | | | | | | |
| May 31 | 352-333 | N79 | D- | 5 | BNs | |
| | 328-349 | N89 | C+ | 300 | ANd | |
| | 0-6 | N71 | D | 90 | ANd | |
| | 32-50 | N31 | B | 625 | ANd* | Streamer |
| | 59-73 | N8 | D+ | 150 | ANd* | |
| | 60-61 | N14 | D- | 20 | ASa | |
| | 70-72 | N3 | D | 50 | ASa | |
| | 93-94 | S20 | D- | 20 | ASa? | |
| | 116-120 | S44 | D | 90 | ANm | |
| | 124-129 | S54 | C- | 155 | ANb | |
| | 201-217 | S44 | C | 250 | ANd | |
| | 232-259 | S9 | B | 600 | ANd | |
| | 269-274 | N16 | D- | 125 | ASf | |
| | 284-294 | N33 | C | 220 | ANe | |
| | 288-294 | N38 | D | 80 | ANd* | |
| | 295-297 | N42 | D- | 30 | ASa | |
| | 315-316 | N62 | D- | 5 | BNs | |
| | | | | | | |
| June 4 | 342-21 | N75 | D- | 30 | BNs's | |
| | 26-40 | N41 | C | 200 | ANd | |
| | 31-35 | N38 | D+ | 160 | ANa | |
| | 31-41 | N38 | C- | 190 | ANe | |
| | 41-47 | N30 | D- | 180 | ASa | |
| | 47-48 | N27 | D | 30 | BSs | |
| | 50-55 | N23 | D- | 10 | BNs's | |
| | 59-67 | N12 | D+ | 120 | ASa | |
| | 67-75 | N2 | D | 90 | ANc* | |
| | 69-71 | N5 | D- | 15 | BSs | |
| | 77-78 | S3 | D- | 20 | ANc | |
| | 84-93 | S14 | D- | 60 | ANd | |
| | 103-110 | S31 | D- | 50 | ASa | |
| | 104-105 | S30 | D- | 20 | BSs | |
| | 114-123 | S44 | C- | 290 | ANd | |
| | 134-138 | S61 | D | 60 | ANd | |
| | 170-171 | S84 | D- | 20 | ANm | |
| | 174-192 | S76 | D- | 30 | BNs's | |
| Cont. | 206-211 | S47 | D | 65 | ANd | |

| Date | Spread | Lat. of Center of Intensity° | Impor- tance | Area in p.u. | Class | Comment | |
|-------------------|-------------------------------|------------------------------------|-----------------|-----------------|-------|---|-----|
| 1959 | | | | | | | |
| June 4 Cont. | 221-223 | S33 | D | 75 | BSs? | Arch | |
| | 223-231 | S29 | D* | 135 | ANd* | | |
| | 225-231 | S27 | D* | 150 | BSs? | | |
| | 234-245 | S18 | D- | 20 | BNs's | | |
| | 244-254 | N4 | D | 70 | ANd | | |
| | 266-267 | N11 | D- | 5 | BNs | | |
| | 271-281 | N20 | D | 100 | ASa | | |
| | 279-287 | N28 | D | 85 | ANd* | | |
| | 302-304 | N48 | D- | 25 | ANe | | |
| | 305-326 | N61 | D- | 40 | BNs's | | |
| June 13 | 336-337 | N78 | D- | 10 | BNs | } Omitted in the analysis Streamers | |
| | 344-350 | N87 | D- | 40 | ANd | | |
| | 355-3 | N80 | D* | 115 | ANd | | |
| | 40-74 | N7 | D | 60 | ANd | | |
| | 84-88 | S7 | D- | 50 | ASa | | |
| | 90-111 | S21 | C- | 475 | ANd* | | |
| | 110-112 | S32 | D- | 35 | BSa | | |
| | 129-131 | S51 | D | 45 | ANa | | |
| | 147-148 | S68 | D- | 15 | ANm | | |
| | P.A. 225°, 270°, 315° missing | | | | | | |
| June 15 | 332-334 | N73 | D- | 25 | ANm | | |
| | 339-356 | N84 | C | 325 | ANd | | |
| | 358-4 | N79 | D- | 125 | ANd | | |
| | 12-13 | N67 | D- | 5 | BNs | | |
| | 49-55 | N29 | D | 60 | ANd | | |
| | 61-73 | N12 | C- | 250 | ASa | | |
| | 65-72 | N11 | D- | 90 | ANd* | | |
| | 91-103 | S20 | D- | 25 | BNs's | | |
| | 128-133 | S50 | D | 90 | ANc | | |
| | 137-139 | S58 | D- | 20 | ANc? | | |
| | 240-251 | S73 | C- | 180 | ANd | | |
| | 275-276 | N16 | D- | 5 | BNs | | |
| | 278-284 | N21 | D- | 5 | ANd | | |
| | 307-310 | N48 | D- | 15 | ANd? | | |
| P.A. 225° missing | | | | | | | |
| June 16 | 342-350 | N76 | C- | 190 | ANd | | |
| | 355-7 | N78 | C- | 290 | ANd | | |
| | 37-39 | N42 | D | 85 | ANc | | |
| | 48-53 | N29 | D | 85 | ANd | | |
| | 51-55 | N28 | D- | 75 | ANa | | |
| | 64-69 | N13 | D- | 60 | ANd | | |
| | 74-95 | S4 | D | 125 | ANd | | |
| | 97-104 | S20 | D- | 60 | ASa | | |
| | 111-115 | S33 | D- | 15 | ANd | | |
| | 124-136 | S47 | D- | 30 | BNs's | | |
| | 152-154 | S73 | D- | 20 | ANa | | |
| | Cont | 157-158 | S77 | D- | 15 | | ANm |

| Date | Spread | Lat. of Center of Intensity ^o | Importance | Area in p.u. | Class | Comment |
|---------|---------|--|------------|--------------|--------------------|-----------|
| 1959 | | | | | | |
| June 16 | 164-208 | S77 | D- | 30 | BNs ¹ s | |
| Cont. | 207-226 | S42 | C+ | 375 | ANd | |
| | 234-235 | S26 | D- | 10 | BNs | |
| | 237-240 | S21 | D | 40 | BSs? | |
| | 244-245 | S16 | D- | 10 | BNs | |
| | 262-268 | N4 | D- | 145 | ANd | |
| | 257-263 | 0 | D+ | 115 | ANe | |
| | 269-271 | N10 | D- | 20 | ASa | |
| | 275-292 | N20 | B- | 650 | ANc | Ascending |
| | 292-308 | N39 | C | 300 | ANd | |
| | 309-316 | N52 | D | 90 | ANd | |
| June 22 | 345-16 | N84 | B- | 650 | ANd | |
| | 44-59 | N27 | C | 180 | ANd* | |
| | 59-63 | N22 | C | 90 | AJa | |
| | 62-92 | N8 | A- | 1900 | ANd* | Streamers |
| | 95-112 | S21 | D | 600 | ANd | Streaming |
| | 127-132 | S47 | E | 120 | ANd | |
| | 158-186 | S88 | D- | 25 | BNs ¹ s | |
| | 214-217 | S48 | D | 70 | ANd | |
| | 244-246 | S18 | D- | 15 | BSs | |
| | 248-251 | S13 | D | 50 | BSs | |
| | 248-261 | S9 | C- | 220 | ANd* | |
| | 268-299 | N23 | B | 750 | ANd | Streamers |
| June 23 | 32-64 | N32 | C | 300 | ANd | |
| | 60-114 | S4 | A | 2500 | ANd* | Streamers |
| | 104-112 | S24 | D- | 150 | BSs | |
| | 129-131 | S47 | D- | 15 | BSs? | |
| | 137-144 | S59 | D | 65 | ANd | |
| | 152-157 | S72 | D- | 10 | BNs ¹ s | |
| | 163-207 | S87 | D- | 25 | BNs ¹ s | |
| | 208-225 | S48 | D- | 135 | ANd | |
| | 230-231 | S32 | D- | 5 | BNs | |
| | 239-243 | S22 | D- | 50 | ANd | |
| | 249-260 | S11 | C | 225 | ANd | |
| | 268-272 | N7 | D- | 40 | ASa | |
| | 274-292 | N19 | C | 285 | ASa | |
| | 305-309 | N44 | D | 65 | BSs? | or ANm? |
| | 330-331 | N67 | D- | 10 | BNs | |
| June 25 | 345-345 | N81 | D- | 5 | BNs | |
| | 348-7 | N88 | B- | 500 | ANd | |
| | 13-17 | N69 | D | 70 | ANd | |
| | 40-43 | N42 | D | 30 | ANd | |
| | 47-57 | N32 | D- | 170 | ASa? | or ANa? |
| | 58-63 | N22 | D | 60 | ANa | |
| | 82-98 | S8 | C | 380 | ANd | |
| | 105-114 | S28 | B | 200 | ANd? | |
| | 122-123 | S42 | D | 60 | ANd | |
| | 141-147 | S59 | E | 30 | ANs | |
| | 163-17 | S86 | D- | 20 | BNs | |
| Cont. | 209-21 | S52 | D | 10 | ANd | |

| Date | Spread | Lat. of Center of Intensity ^o | Impor- tance | Area in p.u. | Class | Comment |
|------------------|---------|--|-----------------|-----------------|-------|------------------|
| 1959 | | | | | | |
| June 25 Cont. | 224-231 | S38 | D | 60 | ANd | |
| | 238-244 | S24 | D | 80 | BSs? | or ANm? |
| | 251-252 | S12 | D- | 10 | BNs | |
| | 264-269 | N2 | D | 120 | ANd | |
| | 281-302 | N28 | B- | 450 | ANd | |
| | 282-291 | N21 | D | 100 | ANa | |
| June 28 | 351-18 | N83 | B | 950 | ANd | |
| | 41-43 | N44 | D- | 15 | BNs's | |
| | 57-59 | N28 | D | 60 | ANc? | |
| | 70-85 | N10 | B- | 525 | ANd | Streamer |
| | 106-122 | S28 | B- | 500 | ANd | |
| | 142-143 | S57 | D- | 15 | ANc | |
| | 205-215 | S54 | D- | 15 | BNs's | |
| | 235-266 | S13 | B | 650 | ANd | |
| | 274-283 | N11 | C- | 600 | ANa | |
| | 282-290 | N20 | D | 100 | ASa | |
| | 291-305 | N34 | C | 300 | ANc* | Streamer/or ASf? |
| | 293-295 | N28 | D- | 30 | BSs | |
| | 305-307 | N40 | D- | 35 | BSs | |
| | July 5 | 339-340 | N70 | D- | 20 | ANc |
| 353-358 | | N82 | C- | 150 | ANd | |
| 6-14 | | N79 | C+ | 325 | ANc | |
| 15-26 | | N70 | D- | 10 | BNs's | |
| 49-50 | | N40 | D- | 10 | BNs | |
| 55-75 | | N27 | B- | 475 | ANd | |
| 73-79 | | N12 | D+ | 160 | ANb | |
| 80-89 | | N3 | D | 60 | ASa | |
| 80-86 | | N7 | D | 65 | BSs,s | |
| 90-96 | | S4 | D | 110 | ANd | |
| 104-115 | | S21 | C+ | 320 | ANd | |
| 127-128 | | S38 | D- | 10 | BNs | |
| 135-141 | | S47 | D | 125 | ANc | |
| 139-140 | | S51 | D- | 15 | BNs | |
| 144-154 | | S60 | D+ | 135 | ANd | |
| 178-186 | | S87 | D- | 10 | BNs's | |
| 213-223 | | S52 | D | 110 | ANd | |
| 246-265 | | S14 | B | 800 | ANd* | Streamers |
| 269-276 | | N3 | D | 105 | BSs | |
| 278-304 | | N22 | A- | 1600 | ANd* | Streamers |
| 309-310 | | N40 | D- | 25 | ASa | |
| 310-316 | N43 | D | 70 | ANd* | | |
| 332-338 | N66 | D- | 25 | BNs's | | |

| Date | Spread | Lat. of Center of Intensity ^o | Impor- tance | Area in p.u. | Class | Comment |
|---------|---------|--|-----------------|-----------------|---------------|----------------------|
| 1959 | | | | | | |
| July 9 | 340-341 | N70 | D- | 5 | BNs | |
| | 357-20 | N82 | C+ | 410 | ANd | |
| | 54-75 | N26 | C+ | 425 | ANd* | |
| | 69-72 | N20 | D | 75 | ASf | |
| | 72-78 | N16 | C- | 170 | ASa | |
| | 74-92 | N8 | B+ | 1200 | ANd* | |
| | 93-104 | S8 | C | 225 | ANd | |
| | 110-120 | S23 | D | 145 | ANd | |
| | 122-130 | S34 | C | 265 | ANd | |
| | 136-145 | S51 | D | 180 | ANd? | |
| | 152-161 | S65 | C | 230 | ANd | |
| | 172-188 | S86 | D- | 10 | BNs's | |
| | 200-201 | S40 | D- | 10 | BNs's | |
| | 200-201 | S20 | C | 130 | ANs | Observed |
| 200-201 | S10 | C | 210 | BSs'10 | | |
| 200-201 | S3 | D- | 60 | ASa | | |
| 200-201 | N17 | B | 850 | ANd* | | |
| Aug. 2 | 16-17 | N82 | D- | 10 | BNs | Poor seeing next day |
| | 26-27 | N73 | D- | 15 | ANm | |
| | 40-42 | N60 | D | 30 | ANm | |
| | 71-82 | N23 | C+ | 330 | ANd* | |
| | 82-94 | N15 | C- | 260 | ASa | |
| | 85-90 | N13 | C | 285 | AS1 | |
| | 94-100 | N4 | D- | 70 | ANd | |
| | 115-118 | S16 | D- | 20 | BNs | |
| | 122-127 | S23 | D | 80 | ASa | |
| | 127-130 | S27 | D | 50 | BSs | |
| | 138-140 | S40 | C | 265 | ANd | |
| | 151-152 | S51 | D | 20 | BSs? | |
| | 158-162 | S58 | D | 85 | ANd | |
| | 172-180 | S73 | D- | 40 | BNs's | |
| | 222-230 | S54 | C- | 175 | ANd | |
| | 239-243 | S41 | D | 80 | ANm | |
| | 260-264 | S19 | D- | 60 | ANd | |
| | 264-266 | S16 | D- | 25 | ASa? | |
| 269-270 | S12 | D- | 15 | BSs | | |
| 270-278 | S5 | D | 90 | ANd* | | |
| 283-288 | N5 | C- | 150 | ANm | | |
| 290-292 | N10 | D- | 25 | BSs | | |
| 299-314 | N22 | B | 650 | ANd* | | |
| Aug. 8 | 343-347 | N71 | C- | 170 | ANc | |
| | 4-5 | N80 | D- | 20 | ANm | |
| | 16-17 | N83 | D- | 5 | BNs | |
| | 24-42 | N73 | D | 55 | BNs's | |
| | 64-65 | N38 | D- | 10 | BNs | |
| | 80-84 | N21 | D | 70 | ANc | |
| | 95-102 | N14 | D | 110 | ASa | |
| | 101-102 | N2 | D- | 10 | BSs | |
| 131-137 | S29 | C+ | 325 | ANb | or BSs + AS1? | |
| Cont. | 134-147 | S35 | C- | 160 | ANd | |

| Date | Spread | Lat. of Center of Intensity | Importance | Area in p.u. | Class | Comment |
|-----------------|---------|-----------------------------------|------------|-----------------|-------|-------------------|
| 1959 | | | | | | |
| Aug. 8 Cont. | 163-164 | S60 | D- | 5 | BNs | |
| | 169-170 | S67 | D- | 30 | ANc? | or BSs? |
| | 179-201 | S83 | D- | 15 | BNs's | |
| | 224-225 | S59 | D- | 15 | ANm | |
| | 229-235 | S52 | D | 100 | ANc | |
| | 255-277 | S21 | E- | 575 | ANd* | |
| | 278-284 | S3 | D | 90 | ASa | |
| | 291-315 | N19 | C* | 450 | ANd* | |
| | 301-305 | N20 | C | 150 | BSs | |
| | 305-319 | N26 | D* | 110 | ASa | |
| | 319-331 | N41 | C | 200 | ANd | |
| | 337-338 | N55 | D- | 10 | BNs | |
| | Aug. 9 | 344-12 | N72 | D | 20 | BNs's |
| 344-13 | | N31 | D | 40 | ANc | |
| 344-14 | | S71 | D | 60 | ANd | |
| 344-15 | | S57 | D | 20 | BNs's | |
| 344-16 | | N25 | D | 100 | ANc | Arching streamers |
| 83-100 | | N12 | D* | 200 | ASa | |
| 91-104 | | N7 | D- | 160 | ANd* | |
| 126-146 | | S31 | C | 220 | ANd | |
| 137-152 | | S43 | C- | 260 | ANc | |
| 153-160 | | S52 | D- | 10 | BNs's | |
| 165-171 | | S63 | D* | 130 | ANd | |
| 225-229 | | S57 | D | 60 | ANm | |
| 239-241 | | S44 | D- | 15 | ANm | |
| 269-286 | | S4 | C | 280 | ANd* | |
| 276-279 | | S6 | D | 75 | ASa | |
| 286-293 | | N5 | C- | 180 | AS1 | |
| 288-290 | | N5 | D | 30 | BSs | |
| 298-317 | | N20 | B- | 500 | ANd | Arching streamers |
| 323-347 | | N45 | C* | 375 | ANd | |
| Aug. 10 | 344-20 | N71 | D | 65 | BNs's | |
| | 30-36 | N69 | D | 40 | ANc | |
| | 37-41 | N49 | D- | 20 | BNs's | |
| | 88-94 | N13 | D | 90 | ASa | |
| | 90-100 | N9 | C | 200 | ANd* | |
| | 98-112 | S1 | C* | 350 | ANd | |
| | 113-126 | S16 | D- | 20 | BNs's | |
| | 130-137 | S30 | D* | 150 | ANd | |
| | 141-159 | S44 | D- | 30 | BNs's | |
| | 166-172 | S63 | D | 100 | ANc | |
| | 169-208 | S76 | D- | 75 | BNs's | |
| | 226-232 | S55 | D | 130 | ANd | |
| | 240-245 | S40 | D | 115 | ANd | |
| | 258-265 | S24 | D- | 20 | BNs's | |
| | 269-275 | S13 | D | 80 | BSs? | |
| | 273-284 | S7 | C | 200 | ASa | |
| | 275-279 | S7 | D | 85 | BSs | |
| | 284-290 | N2 | D- | 25 | BSs | |
| | 284-297 | N1 | D | 120 | ASa | |
| Cont. | 300-307 | N21 | C* | 290 | ANc* | Streamer |

| Date | Spread | Lat. of Center of Intensity | Importance | Area in p.u. | Class | Comment |
|---------|---------|-----------------------------------|------------|-----------------|-------|-----------|
| 1959 | | | | | | |
| Aug. 10 | 308-320 | N30 | D- | 15 | BNs's | |
| Cont. | 327-335 | N46 | C | 210 | ANd | |
| Aug. 11 | 341-350 | N62 | D | 75 | ANd | |
| | 13-29 | N80 | C | 230 | ANd | |
| | 34-36 | N68 | D- | 30 | BSs? | |
| | 37-73 | N49 | D | 75 | BNs's | |
| | 78-81 | N25 | D- | 40 | ANa | |
| | 83-88 | N18 | D | 50 | ANd | |
| | 90-94 | N12 | D- | 65 | ANa | |
| | 98-100 | N5 | D- | 25 | BSs? | |
| | 100-109 | S1 | D+ | 130 | ANd | |
| | 135-147 | S37 | D | 90 | BSs? | or ANd? |
| | 148-152 | S46 | D- | 10 | BNs,s | |
| | 175-178 | S77 | D | 10 | ANd | |
| | 179-181 | S77 | D | 10 | ANd | |
| | 182-183 | S77 | D | 10 | ANd | |
| | 184-185 | S77 | D | 10 | ANd | |
| | 186-187 | S77 | D | 10 | ANd | |
| | 188-189 | S77 | D | 10 | ANd | |
| | 190-191 | S77 | D | 10 | ANd | |
| | 192-193 | S77 | D | 10 | ANd | |
| | 194-195 | S77 | D | 10 | ANd | |
| | 196-197 | S77 | D | 10 | ANd | |
| | 198-199 | S77 | D | 10 | ANd | |
| | 200-201 | S77 | D | 10 | ANd | |
| | 202-207 | N2 | D- | 50 | ASf | |
| | 291-296 | N10 | D- | 60 | ASa | |
| | 297-304 | N17 | D | 75 | BSs | |
| | 305-311 | N25 | D | 125 | ANd | |
| Aug. 12 | 329-345 | N48 | C | 250 | ANd | Streamers |
| | 18-26 | N81 | D | 120 | ANd | |
| | 28-65 | N60 | D- | 30 | BNs's | |
| | 97-101 | N6 | D- | 40 | ANd*? | |
| | 103-106 | N1 | D- | 20 | ASa | |
| | 104-112 | S2 | D+ | 100 | ANd* | |
| | 128-132 | S25 | D | 45 | ANd | |
| | 142-158 | S43 | D- | 15 | BNs's | |
| | 150-151 | S46 | D- | 15 | ANc? | |
| | 165-171 | S63 | C+ | 135 | ANd | |
| | 229-233 | S74 | D- | 50 | ANc | |
| | 236-243 | S47 | D | 110 | ANc | Streamer |
| | 245-261 | S30 | C | 250 | ANd | " |
| | 269-278 | S14 | D- | 50 | ASa | |
| | 284-295 | N5 | D | 120 | ASa | |
| | 289-294 | N6 | D- | 45 | ANd | |
| | 300-309 | N18 | D- | 45 | ASa | |
| | 309-317 | N29 | C | 230 | BSs? | |
| | 318-328 | N35 | D | 70 | ANa | |

| Date | Spread | Lat. of Center of Intensity ^o | Impor- tance | Area in p u. | Class | Comment |
|---------|---------|--|-----------------|-----------------|-------|---------------------|
| 1959 | | | | | | |
| Aug. 17 | 352-16 | N81 | D | 55 | BNs's | |
| | 15-24 | N83 | C | 210 | ANc | |
| | 31-35 | N73 | D- | 45 | ANd | |
| | 38-59 | N57 | D- | 25 | BNs's | |
| | 71-87 | N27 | B- | 500 | ANd* | |
| | 80-103 | N13 | C | 225 | ASa | |
| | 87-101 | N12 | D | 120 | BSs | |
| | 104-107 | S1 | D | 60 | ANc? | |
| | 109-118 | S6 | D- | 20 | BNs's | |
| | 126-127 | S21 | D- | 15 | ANm | |
| | 130-138 | S28 | D- | 25 | BNs's | |
| | 134-140 | S31 | D | 85 | ANd? | |
| | 153-157 | S48 | D- | 45 | ? | |
| | 163-170 | S61 | D | 90 | ANd | |
| | 183-204 | S83 | D- | 25 | BNs's | |
| | 205-232 | S70 | D | 55 | BNs's | |
| | 246-248 | S30 | D- | 20 | ANm? | |
| | | | | | ANc | |
| | | | | | BNs's | |
| | | | | | ANd* | |
| | | | | | BSs | |
| | | | | | ANd* | |
| | | | | | BNs's | |
| Sept. 1 | 349-8 | N74 | D- | 25 | BNs's | Poor seeing all day |
| | 14-19 | N85 | D- | 100 | ANm | |
| | 19-32 | N82 | C+ | 350 | ANd | |
| | 80-83 | N30 | D- | 25 | BNs's | |
| | 87-92 | N21 | D- | 130 | ANd | |
| | 98-104 | N10 | D- | 60 | ASa | |
| | 99-102 | N10 | D | 40 | BSs | |
| | 127-146 | S25 | E | 600 | ANd | Streamers |
| | 158-166 | S51 | D | 100 | ANd | |
| | 183-188 | S73 | D- | 20 | BNs's | |
| | 197-198 | S82 | D- | 20 | ANb | |
| | 222-238 | S61 | D | 110 | ANd | |
| | 256-260 | S33 | D | 85 | ANd | |
| | 268-270 | S22 | D- | 35 | BSs | |
| | 270-292 | S11 | B | 900 | ANd* | Ascending? |
| | 304-313 | N18 | C | 175 | ANd* | |
| | 306-313 | N18 | D | 55 | BSs | |
| | 306-328 | N25 | B | 1550 | AS1 | |
| Sept. 6 | 354-355 | N62 | D- | 5 | BNs | |
| | 18-25 | N83 | C | 185 | ANd | |
| | 29-37 | N76 | C | 175 | ANd | |
| | 46-57 | N61 | D- | 15 | BNs's | |
| | 86-119 | N12 | C- | 525 | ANa | |
| | 87-91 | N23 | D | 50 | ANd | |
| | 115-118 | S5 | D | 60 | ANm | |
| | 135-144 | S27 | C | 200 | ANd | |
| | 153-159 | S43 | D | 60 | ANd | |
| Cent. | 174-176 | S72 | D- | 50 | ANd | |

| Date | Spread | Lat. of Center of Intensity ^o | Importance | Area in p.u. | Class | Comment | |
|------------------|---------|--|------------|-----------------|-------|---------------------|--|
| 1959 | | | | | | | |
| Sept. 6 Cont. | 183-192 | S74 | D- | 20 | BNs's | | |
| | 219-225 | S69 | D- | 15 | BNs's | | |
| | 235-240 | S54 | D | 75 | ANd | | |
| | 253-257 | S37 | D | 40 | ANd | | |
| | 258-282 | S21 | B- | 500 | ANd | | |
| | 282-292 | S5 | C | 235 | ANd | | |
| | 296-302 | N7 | D | 80 | ANd | | |
| | 305-307 | N14 | D | 50 | BSs | | |
| | 310-319 | N23 | C- | 235 | AS1 | | |
| Sept. 8 | 337-20 | N66 | D | 55 | BNs's | Poor seeing all day | |
| | 343-345 | N52 | D- | 20 | ANm | | |
| | 21-39 | N82 | C- | 375 | ANd | | |
| | 91-99 | N19 | D | 100 | ANd* | | |
| | 94-103 | N15 | D | 120 | ASa | | |
| | 103-108 | N8 | D | 100 | ANd* | | |
| | 110-111 | N2 | D- | 15 | BSs | | |
| | 110-117 | 0 | D- | 100 | ASa | Faint | |
| | 117-123 | S7 | D- | 25 | ANc,c | | |
| | 127-137 | S18 | C | 280 | ANd* | | |
| | 137-142 | S25 | D- | 55 | ASa | | |
| | 143-147 | S32 | D- | 20 | BSs | | |
| | 147-156 | S38 | D | 120 | ANd | | |
| | 167-191 | S66 | D- | 60 | BNs's | | |
| | 206-207 | S82 | D- | 10 | BNs | | |
| | 234-240 | S56 | D | 65 | ANd | | |
| | 260-273 | S24 | D | 240 | ANd | | |
| | 279-283 | S12 | D | 90 | ANd | | |
| | 288-290 | S7 | D | 40 | ANd | | |
| | 295-300 | N4 | D | 80 | ANc* | | |
| | 300-321 | N18 | D | 125 | BSs | | |
| | 301-324 | N19 | B- | 650 | AS1 | | |
| | Sept. 9 | 348-349 | N56 | D- | 15 | BNs | |
| | | 3-25 | N79 | D | 10 | BNs's | |
| 42-47 | | N69 | D- | 40 | BNs's | | |
| 58-59 | | N54 | D- | 10 | BNs | | |
| 80-81 | | N33 | D- | 15 | ANa | | |
| 87-97 | | N20 | D | 70 | ANd | | |
| 109-120 | | 0 | D | 85 | ANa | | |
| 112-120 | | S2 | D- | 40 | ANd | | |
| 134-162 | | S34 | B | 850 | ANd | Arching streamers | |
| 177-180 | | S74 | D | 65 | ANc | | |
| 201-202 | | S83 | D- | 20 | BNs | | |
| 206-240 | | S67 | D- | 40 | BNs's | | |
| 243-245 | | S49 | D- | 40 | ? | | |
| 250-259 | | S38 | D- | 130 | ANc* | | |
| 260-266 | | S31 | D | 60 | BSs's | | |
| 265-272 | | S24 | D | 130 | ANc*? | | |
| 280-281 | | S12 | D- | 10 | BNs | | |
| 289-291 | | S3 | D- | 20 | BNs? | | |
| 305-310 | | N15 | D- | 150 | ASf | | |
| 311-318 | | N21 | C | 265 | AS1 | | |

| Date | Spread | Lat. of Center of Intensity ^o | Import- tance | Area in p.u. | Class | Comment | |
|---------|---|--|------------------|-----------------|-----------|---------------------|-----------|
| 1959 | | | | | | | |
| Sept 11 | 334-344 | N47 | D | 85 | ANd | Poor seeing | |
| | 32-40 | N76 | D | 90 | ANc | " " | |
| | 43-44 | N69 | D | 5 | BNS | " " | |
| | P.A. 90 ^o to 315 ^o missing; omitted in the analysis | | | | | | |
| Sept 13 | 336-337 | N42 | D | 15 | ANm | Poor seeing all day | |
| | 347-351 | N55 | D- | 50 | ANc | | |
| | 356-359 | N53 | D | 20 | ANd | | |
| | 23-24 | N83 | D- | 10 | ANm | | |
| | 35-44 | N74 | D | 115 | ANd | | |
| | 51-55 | N59 | D- | 15 | ANm? | | |
| | 80-104 | N16 | | 550 | ASa | | |
| | 96-98 | N10 | | 90 | BSs | | |
| | 123-129 | S12 | | 300 | ANb | | |
| | 134-138 | S22 | | 75 | ANm | | |
| | 140-141 | S27 | | 25 | ANb | | |
| | 148-149 | S35 | D- | 20 | ? | | |
| | 162-165 | S50 | D- | 35 | ANd? | | |
| | 174-176 | S61 | D- | 40 | ANc | | |
| | 179-183 | S64 | D | 45 | ANm | | |
| | 235-238 | S58 | D | 45 | ANd | | |
| | 247-251 | S41 | D | 250 | ANd | | Streamers |
| | 271-281 | S8 | D | 150 | ANd | | |
| | 302-307 | N11 | D | 75 | ANd* | | |
| 308-325 | N20 | D | 225 | AS1 | | | |
| 311-326 | N23 | D- | 130 | BSs's | | | |
| 313-324 | N26 | D | 80 | ASa | | | |
| Sept 21 | 34-36 | N28 | D- | 15 | ANm | Flare? | |
| | 57-58 | N37 | D- | 10 | BNS | | |
| | 79-85 | N15 | D | 135 | ANd | | |
| | 96-102 | N18 | D | 60 | BSs | | |
| | 101-109 | S11 | D | 90 | ANd* | | |
| | 109-119 | N2 | D | 280 | ASr | | |
| | 110-117 | N2 | D- | 190 | ANd* | | |
| | 119-122 | S5 | D | 70 | ASa | | |
| | 142-148 | S20 | D- | 155 | ANd | | |
| | 148-167 | S41 | B | 650 | ANd | | |
| | 172-173 | S58 | D- | 10 | RNc | | |
| | 176-179 | S62 | D- | 25 | ANm | | |
| | 233-246 | S55 | D- | 10 | BNS's | | |
| | 240-246 | S52 | D- | 35 | ANc | | |
| | 256-260 | S37 | D- | 15 | BNS's | | |
| | 266-278 | S23 | D- | 500 | ANd* | | |
| | 297-299 | N3 | D- | 25 | ANc | | |
| | 299-306 | N6 | D- | 120 | BSs? | | |
| | 310-317 | N19 | D- | 15 | BNS's | | |
| 324-339 | N3 | D- | 400 | ANd | Streamers | | |

| Date | Spread | Lat. of Center of Intensity° | Impor- tance | Area in p.u. | Class | Comment | |
|----------|---------|------------------------------------|-----------------|-----------------|-------|---------------------|------------|
| 1959 | | | | | | | |
| Sept. 28 | 338-339 | N42 | D- | 15 | ANm | Poor seeing all day | |
| | 61-66 | N53 | D | 75 | ANd | | |
| | 90-95 | N23 | D | 60 | ASa | | |
| | 94-96 | N21 | D | 50 | BSs | | |
| | 102-112 | N10 | C- | 170 | AS1 | | |
| | 103-112 | N4 | D | 70 | ANd* | | |
| | 118-132 | S6 | C+ | 300 | ANd | | |
| | 132-163 | S34 | A- | 1450 | ANd | | |
| | 199-201 | S81 | D- | 40 | ANc | | |
| | 230-235 | S64 | C | 180 | ANd | | |
| | 246-247 | S50 | D- | 20 | ? | | |
| | 315-319 | N20 | D | 85 | ASa | | |
| | 325-332 | N32 | D- | 65 | ASa | | |
| | 331-333 | N34 | D- | 35 | ANd | | |
| Oct. 15 | 68-76 | N45 | D | 150 | ANd | Poor seeing all day | |
| | 91-109 | N16 | B- | 550 | ANd | | |
| | 116-119 | S1 | D | 90 | ASa | | |
| | 124-137 | S15 | C | 200 | ANd | | |
| | 155-166 | S45 | D* | 150 | ANd | | |
| | 173-178 | S60 | D | 80 | ANd | | |
| | 240-252 | S51 | D- | 40 | ANd? | | |
| | 278-280 | S17 | D- | 15 | BNs | | |
| | 290-311 | N4 | B | 650 | ANd | | Ascending? |
| | 315-317 | N20 | D | 65 | ASf? | | |

TABLE II
SACRAMENTO PEAK PROMINENCE FILMS

| DATE | P.A. | CLASS | COMMENTS |
|--------|------|---------------------------|--|
| 1959 | | | |
| Jan. 8 | 113° | BSs, ANd*, ANe | Arching streamers; bright horizontal surge flare |
| | 23 | ANd, ANd | Arch |
| Feb. 2 | 255 | ANd*, ANb*, BSs, BSs, ASa | Loop-shaped surge |
| | 4 | ANd | Very stable |
| | 5 | ANd | Ascends in fine arch |
| | 10 | ANd*, BSs,s, ASl,a, BSs | |
| Mar. 1 | 115 | BSs, ANd* | Surge flare evolves into loops |
| | 24 | ASl,a, BSs's, ANd* | Surges flare along loops |
| | 25 | ANd*, BSs, ASa, ANd*, ASl | |
| Apr. 5 | 270 | ANd*, BSs | |
| | 8 | ASl,a | |
| | 19 | ANd*, BSs, ANd*, ESs, ASl | |
| | 21 | BSs, ASl, ANd*, BSs, ANd | |
| | 23 | BSs?, ASl | |
| May 8 | 50 | BSs,p, ASa,l | Dome-shaped surges flare along loops |
| | 9 | BSs, ANd*, ASa | Complex |
| | 13 | ANd*, ASa, BSs, ANd*, BSs | Arching streamers; flare in surge by ANd* |
| | 15 | ASl, ASa, BSs, ANd* | |
| | 16 | ASl,a, BSs, ANd*, ANd* | |
| | 19 | ASl,a, BSs | |
| | 22 | BSs, p, ANb*, ASl, a | |
| | 26 | ANd*, BSs, ANd*, ASl | |
| | 27 | BSs, ASa,l, BSs, ANd | Dome-shaped flare at base of loops |
| | 29 | ASl, ANd*, ANd | |
| June 4 | 51 | ASl,a,l | |
| | 5 | BSs? or ASm? | |
| | 6 | ANd*, BSs | Looping streamers |
| | 9 | ASa, ASl,a, ESa, ANd* | Flare; slow surge brightens and turns into loops |
| | 10 | ASl,a, BSs,p, ASl | |
| | 11 | ASa,l, BSs, ANd*, ASl | |
| | | ANd*, BSs's, ASl, BSs | Surges at base of loops flare |
| | 12 | ANd*, BSs, ANd* | Arching streamers |
| | 15 | ANd, BSs,p, ASa, ANd* | |
| Cont. | | | |

COMPARISON OF CLASSES FROM SURVEYS AND FILMS

In 1959 motion pictures were made of the more interesting prominences on 59 days at the Sacramento Peak Observatory, Sunspot, New Mexico. A comparison of Tables I and II reveals that on 37 of these days no single-frame surveys were made. Hence, we have the observations on only 22 days available for a comparison of the classifications made in the two media.

Table III shows the classifications given to 81

prominences. Of these 81 prominences, 57 were observed in both media, 24 were observed only in the survey, and 10 were observed only in the film. Of the 57 prominences observed in both media, 43, or 75 percent, were classified in the same way in both media, 12, or 21 percent, were classified differently, and 2, or 3 percent, were not classified in either.

ANALYSIS

In Table IV are tabulated the average number of prominence units per day for the various prominence classes and for each 10° of solar latitude.

Table V lists the average number of prominence units at all latitudes for types A and E, S and N, those unclassified, and for all together, for each third of the year. The period of January to April exhibits an extraordinary peak in solar prominence activity.

The most common type of prominence was the S-type, or sunspot class, in which the prominence material moves downward toward the chromosphere; accounted for 93 per cent of the classified prominences; S-types, or sunspot classes, made up 20 per cent of the total.

From January to April there were an unusual number of large hedgerows, especially in the northern hemisphere. These resulted in the highest average number of prominence units per day for any one-third year so far studied (1944 to 1959). From May on the northern hemisphere continued to account for more than 50 per cent of the prominence areas.

Prominences denoted with an asterisk are those which show interaction with the prominences surrounding the sunspot areas. Such activity was exhibited by 12 per cent of the tree trunks (ANb), 27 per cent of the trees (ANc), and 26 per cent of the hedgerows (ANd).

TABLE IVa

AVERAGE NUMBER OF PROMINENCE UNITS PER DAY

Northern latitudes

| Year | 70-80 | 79-70 | 69-60 | 59-50 | 49-40 | 39-30 | 29-20 | 19-10 | 9-0 | all N. latitudes |
|-----------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------------------|
| January - April observations | | | | | | | | | | |
| 1957 | | | 2.3 | 1.0 | 0.0 | 25.7 | 27.3 | 16.0 | 7.4 | 172.6 |
| 1958 | | | | | | 2.0 | 2.0 | 55.0 | 4.0 | 137.0 |
| 1959 | | | | | | | 19.7 | 6.0 | 20.7 | 125.0 |
| 1960 | | | | | | 22.0 | 24.2 | 25.2 | 12.4 | 108.7 |
| 1961 | | | | | | | | | | 3.2 |
| 1962 | | | | | | 11.0 | | 3.4 | | 17.7 |
| 1963 | | | | | | | | 7.9 | 10.0 | 26.4 |
| 1964 | | | | | | | | 0.0 | 1.0 | 21.7 |
| 1965 | | | | | | 1.0 | 21.0 | 52.9 | 1.0 | 1057.8 |
| 1966 | | | | | | | | | | - |
| 1967 | | | | | | 11.3 | | | 1.1 | 3.6 |
| 1968 | | | | | | | | 0.5 | 1.3 | 25.5 |
| 1969 | | | | | | | | | | - |
| 1970 | | | 120.2 | 101.1 | 107.1 | 129.0 | 197.0 | 266.4 | 100.1 | 2656.0 |
| May - August observations | | | | | | | | | | |
| 1957 | | | | | | 22.0 | 50.0 | 46.6 | 21.1 | 192.0 |
| 1958 | | | | | | | | 10.6 | 3.7 | 17.5 |
| 1959 | | | | | | | 2.0 | 15.7 | 18.1 | 37.0 |
| 1960 | | | 1.1 | | 3.7 | | 32.1 | 8.3 | 17.4 | 62.6 |
| 1961 | | | | | | | | | | - |
| 1962 | | | | | | 3.5 | 10.2 | 21.6 | | 13.2 |
| 1963 | | | | | | | | 19.5 | | 15.5 |
| 1964 | | | 1.1 | 1.5 | 0.0 | 10.0 | 40.7 | | 2.0 | 104.5 |
| 1965 | | | 1.7 | 1.5 | 31.2 | 108.2 | 250.5 | 126.6 | 175.0 | 1093.4 |
| 1966 | | | | | | 15.2 | 2.6 | 10.4 | 6.3 | 35.4 |
| 1967 | | | 1.2 | 1.1 | | | | | 3.6 | 18.9 |
| 1968 | | | 1.4 | 2.0 | 1.0 | 1.7 | 2.2 | 6.1 | 1.7 | 41.6 |
| 1969 | | | | | | | | | | - |
| 1970 | | | 1.0 | 1.0 | 1.0 | 104.0 | 205.1 | 291.6 | 263.9 | 1661.5 |
| September - December observations | | | | | | | | | | |
| 1957 | | | | | | 8.1 | 23.1 | 41.2 | 15.6 | 143.0 |
| 1958 | | | | | | | 284.4 | 102.3 | | 386.9 |
| 1959 | | | | | | | 3.1 | 18.3 | 15.0 | 61.9 |
| 1960 | | | | | | | 22.5 | 52.5 | 16.0 | 91.9 |
| 1961 | | | | | | | | | | - |
| 1962 | | | | | | 1.9 | | 65.6 | 10.6 | 78.1 |
| 1963 | | | | | | | | | | - |
| 1964 | | | | | | | | | 10.1 | 16.2 |
| 1965 | | | 1.2 | 1.1 | 1.0 | 10.0 | 46.9 | 31.2 | 123.6 | 526.4 |
| 1966 | | | | | | | | | | - |
| 1967 | | | 1.1 | | 1.0 | | | | | 23.9 |
| 1968 | | | 1.1 | 1.0 | 1.0 | | | | | 22.2 |
| 1969 | | | | | | | | | | - |
| 1970 | | | 1.0 | 1.0 | 1.0 | | | 104.0 | 10.0 | 1355.5 |

TABLE IVb

AVERAGE NUMBER OF PROMINENCE UNITS PER DAY

| Class | Southern Latitudes | | | | | | | | | All S Latitude |
|---|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------------------|
| | 1-10 | 11-20 | 21-30 | 31-40 | 41-50 | 51-60 | 61-70 | 71-80 | 81-90 | |
| January - April 19 days ¹ observations | | | | | | | | | | |
| ASa | 28.9 | 13.2 | 2.1 | | 1.3 | | | | | 45.5 |
| ASl | | 24.5 | | | | | | | | 30.8 |
| ASf | 10.5 | | | | | | 6.3 | | | 18.7 |
| BSs | 42.1 | 11.1 | 36.8 | 6.3 | 0.5 | 5.3 | 12.4 | | | 114.5 |
| BSp | | | 1.6 | | | | | | | 1.6 |
| ANa | 52.7 | 2.1 | 1.1 | | 2.1 | | | | | 58.0 |
| ANb | | | | 2.6 | | | | 78.9 | | 81.5 |
| ANc | | 1.8 | | 5.3 | | 13.2 | 1.3 | | | 21.6 |
| ANd | 152.9 | 124.5 | 377.9 | 314.2 | 24.2 | 52.4 | 66.8 | 25.3 | 11.3 | 1149.5 |
| ANe | 8.4 | 1.1 | | | | | | | | 9.5 |
| ANm | 1.2 | | | 1.7 | 2.7 | 6.6 | 1.1 | | | 24.0 |
| BNs | 0.5 | 2.1 | 2.1 | 1.9 | 3.1 | 5.3 | 6.6 | 2.6 | 2.6 | 27.1 |
| Unclassed | 0.8 | 1.3 | 0.5 | 1.6 | 0.8 | | | | | 5.5 |
| All | 300.8 | 182.6 | 428.7 | 343.5 | 36.0 | 82.8 | 102.7 | 106.8 | 13.9 | 1587.8 |
| May - August 27 days ¹ observations | | | | | | | | | | |
| ASa | 21.7 | 15.0 | 3.3 | 1.9 | | | | | | 41.9 |
| ASl | | | | | | | | | | - |
| ASf | | | 8.5 | | | | | | | 8.5 |
| BSs | 3.7 | 14.5 | 18.5 | 18.5 | 8.3 | 0.7 | | | | 64.2 |
| BSp | | | | | | | | | | - |
| ANa | | | | | | | | 0.7 | 0.6 | 1.3 |
| ANb | | | 12.0 | | | 5.7 | | | | 17.7 |
| ANc | 3.0 | | 1.5 | 4.8 | 21.7 | 9.1 | 5.6 | | | 45.7 |
| ANd | 216.5 | 132.7 | 155.0 | 53.7 | 69.5 | 61.5 | 27.6 | 6.7 | | 723.2 |
| ANe | 0.4 | | | | | 1.3 | | | | 1.7 |
| ANm | 3.1 | 3.0 | 0.6 | 11.1 | 8.5 | 9.3 | | 1.3 | 0.7 | 37.4 |
| BNs | 1.3 | 3.1 | 3.0 | 3.7 | 4.8 | 1.7 | 4.6 | 18.3 | 6.3 | 47.0 |
| Unclassed | | | | | 2.0 | 4.1 | | | | 6.1 |
| All | 249.7 | 168.5 | 202.4 | 93.7 | 111.6 | 93.4 | 27.6 | 27.0 | 7.6 | 994.7 |
| September - November 6 days ¹ observations | | | | | | | | | | |
| ASa | 20.0 | | 6.9 | | | | | | | 26.9 |
| ASl | | | | | | | | | | - |
| ASf | | | | | | | | | | - |
| BSs | | | 4.4 | 10.0 | | | | | | 14.4 |
| BSp | | | | | | | | | | - |
| ANa | | | | | | | | | | - |
| ANb | | 37.5 | 3.1 | | | | | | 2.5 | 43.1 |
| ANc | 3.1 | | 16.2 | 16.2 | | | 5.0 | 8.1 | 5.0 | 53.6 |
| ANd | 113.1 | 183.8 | 275.6 | 318.1 | 146.9 | 50.6 | 36.2 | 6.2 | - | 1130.5 |
| ANe | | | | | | 4.4 | | | | 4.4 |
| ANm | 7.5 | | 9.4 | | | | 11.2 | | | 28.1 |
| BNs | 2.5 | 3.1 | | 1.9 | | 2.5 | 14.4 | 5.0 | 3.8 | 33.2 |
| Unclassed | | | | 2.5 | 7.5 | | | | | 10.0 |
| All | 146.2 | 224.4 | 315.6 | 348.7 | 154.4 | 57.5 | 66.8 | 19.3 | 11.3 | 1344.2 |

TABLE V
SUMMARY FOR 1959

| <u>AVERAGE NUMBER OF PROMINENCE UNITS PER DAY AT ALL LATITUDES</u> | | | |
|--|-------------|------------|--------------|
| Type | Jan. - Apr. | May - Aug. | Sept. - Dec. |
| A | 3958.2 | 2434.7 | 2523.0:* |
| B | 280.1 | 215.4 | 167.7: |
| S | 757.5 | 423.5 | 725.0: |
| N | 3480.8 | 2226.6 | 1965.7: |
| Unclassed | 5.5 | 6.1 | 10.0: |
| All | 4243.8 | 2656.2 | 2700.7: |

* :Only 8 days' observations, hence low in weight.

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