# SOLAR OBSERVATIONS

## SOLAR RADIATION MEASUREMENTS DURING FEBRUARY 1936

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For a description of instruments employed and their exposures, the reader is referred to the January 1935, REVIEW, page 24.

Table 1 shows that solar radiation intensities averaged considerably above normal at all three Weather Bureau stations.

Table 2 shows a deficiency in the total solar and sky radiation at New York, Fresno, Twin Falls, Miami, Blue Hill, and Friday Harbor, and an excess at all other stations. That is, the northeastern, southern, and far western sections of the country received less than average sunshine during the month, while the central portions, or those areas suffering from drought conditions, averaged considerably more than normal in radiation receipt.

Two polarization observations obtained at Washington gave a mean of 61 percent, with the greater—63 percent—on the 25th. At Madison, observations obtained on 3 days give a mean of 63.8 percent with a maximum of 66 percent on the 11th. All of these values are above the corresponding June normals.

TABLE 1.—*Solar radiation intensities during June 1936*

[Gram-calories per minute per square centimeter of normal surface]

WASHINGTON, D. C.

| Date | Sun's zenith distance | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8 a.m. | 78.7° | 75.7° | 70.7° | 60.0° | 0.0° | 60.0° | 70.7° | 75.7° | 78.7° | Noon |
| | 75th mer. time | Air mass | | | | | | | | | Local mean solar time |
| | | A. M. | | | | | P. M. | | | | |
| | e | 5.0 | 4.0 | 3.0 | 2.0 | *1.0 | 2.0 | 3.0 | 4.0 | 5.0 | e |
| | *mm.* | *cal.* | *cal.* | *cal.* | *cal.* | *cal.* | *cal.* | *cal.* | *cal.* | *cal.* | *mm.* |
| June 2 | 10.97 | | | | | 1.16 | | | | | 6.93 |
| June 5 | 9.47 | | | | 1.15 | 1.30 | | | | | 7.87 |
| June 11 | 9.83 | | | | | 1.34 | | | | | 8.81 |
| June 15 | 17.37 | | | | | 1.39 | 1.01 | | | | 16.79 |
| June 16 | 10.97 | | | | | 1.30 | | | | | 11.38 |
| June 17 | 17.86 | | | | | 1.22 | | | | | 19.23 |
| June 25 | 10.59 | 0.83 | 0.95 | 1.08 | 1.23 | 1.41 | | | | | 9.14 |
| **Means** | | .83 | .95 | 1.08 | 1.19 | 1.30 | 1.01 | | | | |
| **Departures** | | +.24 | +.27 | +.30 | +.25 | +.05 | +.09 | | | | |

TABLE 1.—*Solar radiation intensities during June 1936*—Cont'd.

[Gram-calories per minute per square centimeter of normal surface]

MADISON, WIS.

| Date | Sun's zenith distance | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8 a.m. | 78.7° | 75.7° | 70.7° | 60.0° | 0.0° | 60.0° | 70.7° | 75.7° | 78.7° | Noon |
| | 75th mer. time | Air mass | | | | | | | | | Local mean solar time |
| | | A. M. | | | | | P. M. | | | | |
| | e | 5.0 | 4.0 | 3.0 | 2.0 | *1.0 | 2.0 | 3.0 | 4.0 | 5.0 | e |
| | *mm.* | *cal.* | *cal.* | *cal.* | *cal.* | *cal.* | *cal.* | *cal.* | *cal.* | *cal.* | *mm.* |
| June 3 | 7.29 | | 0.94 | 1.09 | 1.36 | | | | | | 7.29 |
| June 4 | 7.29 | 0.86 | .94 | 1.09 | 1.23 | | | | | | 6.76 |
| June 11 | 7.29 | .97 | 1.10 | 1.25 | 1.34 | 1.49 | | | | | 7.87 |
| June 12 | 8.81 | | .88 | 1.05 | 1.22 | 1.50 | | | | | 7.87 |
| June 19 | 9.47 | | .80 | 1.01 | 1.18 | 1.32 | | | | | 12.24 |
| June 20 | 10.97 | | .80 | 1.01 | 1.18 | 1.32 | | | | | 9.47 |
| June 23 | 7.29 | .79 | .90 | 1.04 | | | | | | | 7.87 |
| June 24 | 7.87 | | .92 | 1.01 | | | | | | | 11.38 |
| June 26 | 12.24 | | | | | 1.26 | | | | | 14.10 |
| **Means** | | .87 | .91 | 1.07 | 1.26 | 1.42 | | | | | |
| **Departures** | | +.11 | +.05 | +.09 | +.22 | +.09 | | | | | |

LINCOLN, NEBR.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| June 2 | 8.48 | | | | | 1.50 | 1.26 | 1.08 | 0.90 | 0.77 | 5.36 |
| June 6 | 11.38 | | | | 1.25 | | | | | | 11.38 |
| June 10 | 7.87 | | | | | | 1.32 | 1.12 | 1.01 | .91 | 7.87 |
| June 11 | 8.18 | | | | | | 1.24 | 1.08 | .88 | .70 | 7.87 |
| June 12 | 9.14 | | 1.00 | 1.13 | 1.30 | | | .97 | .81 | .68 | 8.48 |
| June 16 | 13.13 | 0.63 | .78 | .92 | 1.13 | | | | | | 8.81 |
| June 17 | 14.10 | .88 | 1.00 | 1.11 | 1.30 | 1.53 | 1.13 | .93 | .84 | .75 | 9.14 |
| June 18 | 9.14 | .76 | .86 | .99 | 1.18 | 1.40 | 1.14 | .84 | .66 | .55 | 11.38 |
| June 22 | 7.57 | | | | | | | | .80 | .64 | 9.83 |
| June 23 | 7.87 | .76 | .86 | .99 | 1.18 | 1.40 | | | | | 8.81 |
| June 24 | 8.48 | .90 | .98 | 1.09 | 1.30 | 1.50 | 1.23 | 1.02 | .93 | .78 | 7.57 |
| June 26 | 8.18 | | .54 | .69 | .94 | | | | | | 10.21 |
| June 27 | 15.11 | .65 | .79 | .95 | 1.16 | 1.40 | | | | | 13.61 |
| **Means** | | .76 | .86 | .99 | 1.21 | 1.47 | 1.22 | 1.01 | .85 | .72 | |
| **Departures** | | .00 | +.07 | +.05 | +.10 | +.11 | +.11 | +.09 | +.06 | +.04 | |

BLUE HILL OBSERVATORY OF HARVARD UNIVERSITY

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| June 1 | 8.8 | | | | 0.92 | 1.14 | | | | | 9.6 |
| June 2 | 12.3 | | | | | 1.21 | 0.91 | | | | 9.9 |
| June 3 | 15.3 | | | | | 1.06 | .88 | 0.72 | | | 16.4 |
| June 5 | 8.2 | | | | | 1.32 | 1.04 | | | | 8.6 |
| June 6 | 8.2 | | | | 1.11 | 1.40 | 1.13 | .91 | | | 9.2 |
| June 7 | 10.7 | | | 1.21 | 1.33 | 1.27 | 1.16 | 1.11 | | | 12.8 |
| June 8 | 13.2 | | | | | 1.27 | .98 | | | | 14.3 |
| June 9 | 12.3 | | | | | 1.34 | 1.13 | | | | 13.7 |
| June 10 | 11.5 | | | | | 1.26 | | | | | 13.2 |
| June 16 | 9.9 | | | | .94 | 1.40 | 1.26 | | | | 8.8 |
| June 17 | 7.1 | | | | 1.17 | 1.21 | | | | | 8.8 |
| June 20 | 15.3 | | | | | | | .65 | | | 15.8 |
| June 22 | 6.1 | | | 1.12 | 1.28 | 1.45 | 1.22 | .90 | | | 5.8 |
| June 23 | 8.6 | | | | .97 | 1.14 | 1.29 | | | | 8.6 |
| June 25 | 9.6 | | | 1.07 | 1.24 | 1.32 | 1.01 | .72 | | | 9.9 |
| June 28 | 13.2 | | | | | | | .81 | | | 10.7 |
| June 29 | 7.6 | | | | | 1.36 | | | | | 7.9 |
| June 30 | 7.6 | | | | | 1.38 | | | | | 7.1 |
| **Means** | | | | 1.13 | 1.12 | 1.28 | 1.09 | .83 | | | |

* Extrapolated.

TABLE 2.—*Average daily totals of solar radiation (direct + diffuse) received on a horizontal surface*

| Week beginning— | Washington | Madison | Lincoln | Chicago | New York | Fresno | Pittsburgh | Fairbanks | Twin Falls | La Jolla | Miami | New Orleans | Riverside | Blue Hill | Friday Harbor | Ithaca | San Juan |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gram-calories per square centimeter | | | | | | | | | | | | | | | | |
| *1936* | *cal.* | *cal.* | *cal.* | *cal.* | *cal.* | *cal.* | *cal.* | *cal.* | *cal.* | *cal.* | *cal.* | *cal.* | *cal.* | *cal.* | *cal.* | *cal.* | *cal.* |
| June 3 | 499 | 478 | 560 | 557 | 580 | 632 | 603 | 587 | 455 | 714 | 522 | 678 | 632 | 661 | 495 | 484 | 482 |
| June 10 | 531 | 638 | 699 | 624 | 297 | 641 | 472 | 571 | 595 | 517 | 512 | 774 | 649 | 331 | 452 | 501 | 506 |
| June 17 | 496 | 544 | 710 | 557 | 470 | 711 | 621 | 410 | 657 | 565 | 312 | 765 | 623 | 571 | 689 | 587 | 520 |
| June 24 * | 554 | 510 | 681 | 500 | 358 | 758 | 488 | 435 | 659 | 635 | 392 | 717 | 626 | 515 | 660 | 503 | 546 |
| | Departures from weekly normals | | | | | | | | | | | | | | | | |
| June 3 | +4 | −32 | +10 | +113 | +152 | −16 | -------- | +118 | +3 | -------- | −4 | +185 | +157 | +155 | −43 | −6 | -------- |
| June 10 | +32 | +131 | +153 | +173 | −138 | −60 | -------- | +69 | −42 | -------- | +31 | +272 | +48 | −181 | −167 | +82 | -------- |
| June 17 | +2 | +21 | +134 | +93 | +36 | −10 | -------- | −89 | −41 | -------- | −147 | +293 | +9 | +25 | +71 | +82 | -------- |
| June 24 | +23 | −22 | +78 | +63 | −92 | +30 | -------- | −39 | +3 | -------- | −123 | +261 | +13 | −65 | +50 | −17 | -------- |
| | Accumlated departures on July 1 | | | | | | | | | | | | | | | | |
| | +2,191 | +2,170 | +3,444 | +7,945 | +4,690 | +2,947 | -------- | +448 | −203 | -------- | −4,522 | +13,902 | +1,246 | −504 | +170 | +490 | -------- |

* 8-day means. (Leap year.)

TABLE 3.—*Total, $I_m$, and screened, $I_y$, $I_r$, solar radiation intensity measurements, obtained during June 1936, and determinations of the atmospheric turbidity factor, β, and water-vapor content, w=depth in millimeters, if precipitated*

**AMERICAN UNIVERSITY, WASHINGTON, D. C.**

| Date and hour angle | Solar altitude | | Air mass | $I_m$ | $I_y$ | $I_r$ | $\beta_{I_{m-r}}$ | $\beta_{I_{y-r}}$ | $\beta_{mean}$ | $\frac{I_{w=0}}{1.94}$ (Percentage of solar constant) | $\frac{I_{w=0}-I_m}{1.94}$ (Percentage of solar constant) | $w$ | Air-mass type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *June 5, 1936* | ° | ′ | *m* | *gr. cal.* | *gr. cal.* | *gr. cal.* | | | | | | *mm* | |
| 0:40 p. m. | 72 | 04 | 1.05 | 1.317 | 1.061 | 0.857 | 0.100 | 0.096 | 0.098 | 78.2 | 8.0 | 5.2 | $N_{PC}$, S aloft. |
| 0:48 p. m. | 71 | 12 | 1.05 | 1.295 | 1.059 | .854 | .110 | .094 | .102 | 77.2 | 8.2 | 5.5 | |
| *June 15, 1936* | | | | | | | | | | | | | |
| 0:16 a. m. | 74 | 00 | 1.05 | 1.362 | 1.112 | .899 | .098 | .070 | .084 | 79.5 | 7.0 | 3.7 | $N_P$, S aloft. |
| 0:08 a. m. | 74 | 04 | 1.05 | 1.372 | 1.113 | .900 | .090 | .072 | .081 | 79.9 | 6.8 | 3.5 | |
| *June 16, 1936* | | | | | | | | | | | | | |
| 0:52 p. m. | 70 | 56 | 1.06 | 1.241 | 0.999 | .804 | .136 | .144 | .140 | 73.7 | 6.6 | 3.3 | $N_{PC}$ |
| 1:00 p. m. | 69 | 52 | 1.06 | 1.228 | .996 | .802 | .132 | .146 | .139 | 73.9 | 7.5 | 4.6 | |
| *June 17, 1936* | | | | | | | | | | | | | |
| 0:16 a. m. | 73 | 56 | 1.05 | 1.123 | .910 | .742 | .156 | .142 | .149 | 77.7 | 13.1 | 36.0 | $N_{PC}$, $T_M$ aloft |
| 0:08 a. m. | 74 | 02 | 1.05 | 1.127 | .912 | .745 | .155 | .144 | .150 | 77.5 | 12.8 | 35.0 | |

**Atmospheric conditions during turbidity measurements**

June 6. Temp. 13° C.; wind, NE. 10; polarization, 59.0 percent; blueness of sky, 5.
June 15. Temp. 17° C.; wind, NW. 12.
June 16. Temp. 16° C.; wind, NW. 10.
June 17. Temp. 15° C.; wind, SE. 10.

**BLUE HILL METEOROLOGICAL OBSERVATORY OF HARVARD UNIVERSITY**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *June 1, 1936* | | | | | | | | | | | | | |
| 3:01 a. m. | 31 | 14 | 1.61 | 1.016 | 0.720 | 0.587 | 0.131 | 0.149 | 0.140 | 63.7 | 8.7 | 6.9 | $N_{PC}$, $T_M$ aloft. |
| *June 2, 1936* | | | | | | | | | | | | | |
| 3:02 p. m. | 47 | 23 | 1.36 | 1.118 | .736 | .600 | .108 | .158 | .133 | 69.2 | 9.8 | 8.1 | $T_M$ becoming S. |
| *June 3, 1936* | | | | | | | | | | | | | |
| 1:46 a. m. | 60 | 18 | 1.15 | 1.020 | -------- | .546 | .170 | -------- | .170 | 68.0 | 13.9 | 12.8 | $T_M$, S aloft. |
| 3:08 p. m. | 46 | 16 | 1.38 | .890 | .587 | .470 | .111 | .112 | .112 | 71.0 | 23.8 | 20.3 | |
| *June 5, 1936* | | | | | | | | | | | | | |
| 0:40 p. m. | 68 | 39 | 1.08 | 1.305 | .827 | .663 | .087 | .138 | .112 | 74.5 | 5.2 | 4.8 | $N_{PC}$, S aloft. |
| 3:58 p. m. | 37 | 09 | 1.65 | 1.134 | .768 | .624 | .085 | .118 | .102 | 69.7 | 9.5 | 7.2 | |
| *June 6, 1936* | | | | | | | | | | | | | |
| 4:11 a. m. | 34 | 53 | 1.74 | 1.275 | .855 | .661 | .008 | .028 | .018 | 83.0 | 15.3 | 11.1 | |
| 1:43 a. m. | 60 | 59 | 1.14 | 1.402 | .920 | .717 | .057 | .024 | .040 | 84.5 | 10.1 | 8.8 | $N_{PC}$, S aloft. |
| 0:25 p. m. | 69 | 46 | 1.06 | 1.388 | .899 | .690 | .030 | .024 | .027 | 87.3 | 13.6 | 13.0 | |
| 3:27 p. m. | 43 | 00 | 1.46 | 1.275 | .847 | .673 | .058 | .070 | .064 | 76.8 | 9.1 | 7.4 | |
| *June 7, 1936* | | | | | | | | | | | | | |
| 3:22 a. m. | 43 | 55 | 1.44 | 1.298 | .858 | .682 | .045 | .065 | .055 | 78.7 | 9.8 | 9.0 | |
| 1:41 a. m. | 61 | 18 | 1.14 | 1.251 | .815 | .641 | .074 | .094 | .084 | 78.1 | 11.7 | 10.8 | $N_{PC}$, $T_M$+ S. aloft. |
| 4:02 p. m. | 34 | 32 | 1.76 | 1.177 | .790 | .615 | .047 | .072 | .060 | 74.7 | 12.2 | 9.0 | |
| *June 8, 1936* | | | | | | | | | | | | | |
| 1:53 a. m. | 60 | 34 | 1.14 | 1.164 | .780 | .621 | .124 | .135 | .130 | 72.4 | 10.6 | 9.2 | |
| 0:44 p. m. | 68 | 35 | 1.07 | 1.249 | .799 | .625 | .069 | .095 | .082 | 79.7 | 13.4 | 12.2 | $T_M$. |
| 4:04 p. m. | 36 | 39 | 1.67 | 1.067 | .710 | .563 | .079 | .101 | .090 | 70.2 | 13.6 | 10.4 | |
| *June 9, 1936* | | | | | | | | | | | | | |
| 2:44 p. m. | 50 | 58 | 1.28 | 1.272 | .828 | .643 | .146 | .075 | .110 | 72.9 | 5.3 | 4.5 | |
| 4:42 p. m. | 29 | 19 | 2.04 | 1.126 | .724 | .607 | .049 | .141 | .095 | 65.6 | 5.8 | 3.9 | $N_{PC}$. |
| *June 16, 1936* | | | | | | | | | | | | | |
| 3:38 a. m. | 41 | 21 | 1.51 | 1.140 | .749 | .605 | .079 | .120 | .100 | 71.0 | 10.2 | 8.1 | |
| 0:53 a. m. | 68 | 10 | 1.08 | 1.356 | .860 | .696 | .067 | .145 | .106 | 77.3 | 5.1 | 4.4 | $N_{PC}$. |
| 3:14 p. m. | 45 | 38 | 1.39 | 1.359 | .878 | .705 | .029 | .075 | .032 | 79.9 | 7.6 | 6.2 | |
| 3:31 p. m. | 42 | 44 | 1.47 | 1.340 | .865 | .698 | .029 | .062 | .046 | 80.0 | 8.7 | 6.9 | |
| *June 17, 1936* | | | | | | | | | | | | | |
| 4:21 a. m. | 33 | 32 | 1.81 | 1.207 | .778 | .637 | .029 | .100 | .064 | 73.3 | 9.1 | 6.5 | |
| 3:34 a. m. | 42 | 09 | 1.49 | 1.278 | .822 | .655 | .032 | .079 | .056 | 78.1 | 10.1 | 8.0 | $N_{PC}$, $T_M$ aloft. |
| 0:05 p. m. | 70 | 50 | 1.06 | 1.195 | .758 | .611 | .097 | .180 | .138 | 72.2 | 8.6 | 8.0 | |
| *June 20, 1936* | | | | | | | | | | | | | |
| 5:52 p. m. | 21 | 16 | 2.74 | .651 | .460 | .379 | .121 | .188 | .154 | 47.4 | 12.7 | 7.4 | $N_{PC}$, becoming $T_M$. |
| *June 22, 1936* | | | | | | | | | | | | | |
| 5:06 a. m. | 25 | 02 | 2.37 | 1.206 | .814 | .670 | .031 | .037 | .034 | 74.6 | 10.4 | 6.6 | |
| 3:51 a. m. | 38 | 58 | 1.59 | 1.321 | .871 | .707 | .046 | .080 | .063 | 76.4 | 2.0 | 1.6 | $N_{PC}$, dry $N_{PP}$ aloft. |
| 0:05 a. m. | 71 | 08 | 1.06 | 1.443 | .959 | .743 | .035 | .024 | .030 | 86.9 | 10.3 | 9.6 | |
| *June 23, 1936* | | | | | | | | | | | | | |
| 5:03 a. m. | 24 | 45 | 2.38 | 1.074 | .722 | .591 | .038 | .095 | .066 | 65.9 | 8.6 | 5.4 | |
| 3:35 a. m. | 42 | 00 | 1.49 | 1.245 | .789 | .638 | .035 | .121 | .078 | 74.4 | 7.7 | 6.1 | $N_{PC}$, dry $N_{PP}$ aloft. |
| 1:58 a. m. | 59 | 10 | 1.17 | 1.270 | .808 | .635 | .063 | .096 | .080 | 79.4 | 11.8 | 10.1 | |
| *June 25, 1936* | | | | | | | | | | | | | |
| 2:33 a. m. | 53 | 11 | 1.25 | 1.237 | .790 | .628 | .071 | .125 | .098 | 75.0 | 9.1 | 8.0 | $N_P$ |
| 0:33 a. m. | 69 | 58 | 1.06 | 1.316 | .827 | .666 | .067 | .125 | .096 | 77.6 | 7.3 | 6.7 | |
| *June 28, 1936* | | | | | | | | | | | | | |
| 5:34 p. m. | 20 | 02 | 2.90 | .936 | .637 | .523 | .053 | .091 | .072 | 61.2 | 11.4 | 6.7 | $N_P$. |
| *June 29, 1936* | | | | | | | | | | | | | |
| 3:22 a. m. | 44 | 37 | 1.42 | 1.330 | .838 | .669 | .019 | .082 | .050 | 79.9 | 9.0 | 7.4 | $N_{PC}$. |
| 2:20 p. m. | 55 | 19 | 1.21 | 1.294 | .822 | .659 | .066 | .149 | .108 | 74.4 | 5.4 | 4.3 | |
| *June 30, 1936* | | | | | | | | | | | | | |
| 2:34 a. m. | 52 | 52 | 1.25 | 1.245 | .785 | .632 | .071 | .090 | .080 | 82.0 | 13.7 | 12.1 | $N_{PC}$, $T_M$ aloft. |
| 3:09 p. m. | 46 | 36 | 1.38 | 1.287 | .804 | .643 | .029 | .101 | .065 | 77.7 | 9.1 | 7.6 | |

**Atmospheric conditions during solar radiation measurements. Blue Hill Observatory of Harvard University**

| Date and time from apparent noon | Air temperature | Wind Beaufort | Visibility (0–10) | Sky blueness | Cloudiness and remarks |
|---|---|---|---|---|---|
| *June 1936* | ° C. | | | | |
| 1; 4:34 a. m. | +16.8 | SSW 4 | 7 | 6 | 7 Acu; mod. haze. |
| 2; 2:34 p. m. | +26.4 | SSW 6 | 7 | 6 | 3 Ci; dense forest fire smoke. |
| 3; 2:09 a. m. | +22.5 | S 3 | 6 | 5 | Zero clouds; dense water haze. |
| 3; 2:49 p. m. | +21.1 | SSE 3 | 7 | 6 | Zero clouds; dense water haze. |
| 5; 1:52 a. m. | +20.0 | NE 3 | 8 | 8 | 2 Ci; light to moderate haze. |
| 5; 0:22 p. m. | +21.2 | ENE 3 | 8 | 8 | Few Ci; 2 Cu; light haze. |
| 6; 4:07 a. m. | +19.2 | NNE 3 | 8 | 8 | Few Ci; light to moderate haze. |
| 6; 0:27 p. m. | +22.3 | E 2 | 8 | 8 | Few Ci; light haze. |
| 7; 3:16 a. m. | +21.7 | S 2 | 8 | 8 | 3 Ci; light haze. |
| 8; 0:27 p. m. | +21.7 | NE 2 | 7 | 7 | 3 Ci; few Acu. |
| 9; 4:25 p. m. | +17.2 | NE 3 | 8 | 7 | Few Ci; few Acu; few Cu; light haze. |
| 16; 2:29 a. m. | +17.8 | NW 4 | 8 | 7 | Few Acu; few Frcu; light haze. |
| 16; 2:54 p. m. | +21.6 | NW 4 | 9 | 7 | Few Ci; few Acu; few Cu; light haze. |
| 17; 4:26 a. m. | +15.6 | NNW 2 | 9 | 8 | Few Ci; light haze; incinerator smoke. |
| 17; 2:53 a. m. | +18.3 | W 2 | 9 | 8 | Few Ci; Few Acu; light haze. |
| 22; 4:16 a. m. | +13.3 | NW 3 | 9 | 8 | 1 Ci. |
| 22; 0:02 a. m. | +17.2 | NW 3 | 10 | 8 | Few Ci; 1 Cu. |
| 23; 3:55 a. m. | +17.8 | E 2 | 7 | 8 | Few Ci; light haze. |
| 25; 2:49 a. m. | +18.1 | NW 2 | 8 | 8 | 2 Ci; few acu; few Cu; light haze. |
| 29; 3:45 a. m. | +15.1 | WNW 4 | 9 | 8 | Few Ci; 1 Cu and Frcu; wind gusty. |
| 29; 3:19 a. m. | +15.7 | WNW 4 | 9 | 8 | Few Ci; wind gusty. |
| 30; 2:21 a. m. | +15.6 | SW 2 | 9 | 6 | 4 Acu; few Cu; light haze. |
| 30; 1:30 p. m. | +20.2 | W 4 | 9 | 7 | Few Ci; 2 Cu; light haze. |

## POSITIONS AND AREAS OF SUN SPOTS

Communicated by Capt. J. F. Hellweg, U. S. Navy (Ret.), Superintendent U. S. Naval Observatory. Data furnished by the U. S. Naval Observatory in cooperation with Harvard and Mount Wilson Observatories. The difference in longitude is measured from the central meridian, positive west. The north latitude is positive. Areas are corrected for foreshortening and are expressed in millionths of the sun's visible hemisphere. The total area for each day includes spots and groups]

| Date | Eastern standard time | | Heliographic | | | Area | | Total area for each day | Observatory |
|---|---|---|---|---|---|---|---|---|---|
| | | | Diff. in longitude | Longitude | Latitude | Spot | Group | | |
| 1936 | h | m | ° | ° | ° | | | | |
| June 1 | 11 | 55 | −33.0 | 125.7 | −25.0 | | 123 | | U. S. Naval. |
| | | | −25.0 | 143.7 | −18.0 | | 617 | | |
| | | | +34.0 | 202.7 | −16.0 | | 278 | | |
| | | | +64.0 | 232.7 | +23.0 | | 154 | 1,172 | |
| June 2 | 12 | 15 | −19.0 | 136.3 | −24.5 | | 123 | | Do. |
| | | | −11.0 | 144.3 | −18.0 | | 463 | | |
| | | | +17.0 | 172.3 | +31.5 | | 62 | | |
| | | | +47.0 | 202.3 | −16.0 | | 278 | | |
| | | | +72.0 | 227.3 | +23.5 | | 31 | 957 | |
| June 3 | 12 | 48 | −6.0 | 135.7 | −24.0 | | 278 | | Do. |
| | | | +3.0 | 144.7 | −18.0 | | 370 | | |
| | | | +30.0 | 171.7 | +31.0 | | 46 | | |
| | | | +62.0 | 203.7 | −16.0 | | 247 | 941 | |
| June 4 | 9 | 0 | −3.0 | 127.6 | +20.0 | | 8 | | Mt. Wilson. |
| | | | +6.0 | 136.6 | −24.0 | | 464 | | |
| | | | +15.0 | 145.6 | −18.0 | | 109 | | |
| | | | +16.0 | 146.6 | +19.0 | 2 | | | |
| | | | +73.0 | 203.6 | −16.0 | | 39 | 622 | |
| June 5 | 12 | 13 | −45.0 | 70.6 | −29.5 | | 93 | | U. S. Naval. |
| | | | +11.0 | 126.6 | +20.0 | | 154 | | |
| | | | +18.0 | 133.6 | −25.0 | | 185 | | |
| | | | +25.0 | 140.6 | −25.0 | 216 | | | |
| | | | +28.0 | 143.6 | −19.0 | | 64 | | |
| | | | +33.0 | 148.6 | −15.0 | | 123 | 835 | |
| June 6 | 11 | 39 | −57.0 | 45.7 | −25.5 | | 93 | | Do. |
| | | | −31.5 | 71.2 | −29.5 | | 123 | | |
| | | | +24.0 | 126.7 | +20.0 | | 154 | | |
| | | | +32.0 | 134.7 | −25.0 | | 123 | | |
| | | | +38.0 | 140.7 | −25.0 | 185 | | 678 | |
| June 7 | 13 | 19 | −44.0 | 44.5 | −26.0 | | 154 | | Do. |
| | | | +37.0 | 125.5 | +20.0 | | 154 | | |
| | | | +47.0 | 135.5 | −25.0 | | 123 | | |
| | | | +52.0 | 140.5 | −25.0 | 185 | | 616 | |
| June 8 | 13 | 0 | −69.0 | 6.4 | −26.0 | 87 | | | Mt. Wilson. |
| | | | −30.0 | 45.4 | −24.0 | | 232 | | |
| | | | −2.5 | 72.9 | +17.0 | | 2 | | |
| | | | −1.0 | 74.4 | −28.0 | 37 | | | |
| | | | +50.0 | 125.4 | +20.0 | | 151 | | |
| | | | +65.0 | 140.4 | −23.0 | | 859 | | |
| | | | +75.0 | 150.4 | −15.0 | 8 | | 1,376 | |
| June 9 | 14 | 49 | −56.0 | 5.2 | −27.0 | 62 | | | U. S. Naval. |
| | | | −19.0 | 42.2 | −25.0 | 31 | | | |
| | | | −11.0 | 50.2 | −25.5 | 93 | | | |
| | | | +11.0 | 72.2 | −29.0 | | 31 | | |
| | | | +61.0 | 122.2 | +20.5 | 46 | | | |
| | | | +78.0 | 139.2 | −24.0 | | 309 | 572 | |
| June 10 | 12 | 7 | −45.0 | 4.5 | −27.5 | 62 | | | Do. |
| | | | −8.0 | 41.5 | −25.0 | 15 | | | |
| | | | −0.5 | 49.0 | −26.5 | 77 | | | |
| | | | +75.0 | 124.5 | +20.0 | | 46 | 200 | |

## POSITIONS AND AREAS OF SUN SPOTS—Continued

| Date | Eastern standard time | | Heliographic | | | Area | | Total area for each day | Observatory |
|---|---|---|---|---|---|---|---|---|---|
| | | | Diff. in longitude | Longitude | Latitude | Spot | Group | | |
| | h | m | ° | ° | ° | | | | |
| June 11 | 11 | 49 | −39.0 | 357.4 | +22.0 | 31 | | | U. S. Naval. |
| | | | −31.0 | 5.4 | −28.0 | 93 | | | |
| | | | −31.0 | 5.4 | −16.0 | | 46 | | |
| | | | −14.0 | 22.4 | −21.0 | 31 | | | |
| | | | +12.0 | 48.4 | −26.5 | | 77 | 278 | |
| June 12 | 13 | 45 | −78.0 | 304.1 | +17.0 | | 8 | | Mt. Wilson. |
| | | | −36.0 | 346.1 | +23.0 | | 25 | | |
| | | | −19.0 | 3.1 | −27.0 | 35 | | | |
| | | | +14.0 | 36.1 | +14.0 | 11 | | | |
| | | | +25.0 | 47.1 | −25.0 | 58 | | 137 | |
| June 13 | 11 | 43 | −23.0 | 347.0 | +22.5 | | 93 | | U. S. Naval. |
| | | | −8.0 | 2.0 | −27.0 | | 23 | | |
| | | | +24.0 | 34.0 | −18.0 | 15 | | | |
| | | | +38.0 | 48.0 | −26.0 | 46 | | 177 | |
| June 14 | 13 | 10 | −9.0 | 346.9 | +22.0 | | 35 | | Mt. Wilson. |
| | | | −5.0 | 350.9 | +11.0 | 2 | | | |
| | | | +6.0 | 1.9 | −28.0 | | 8 | | |
| | | | +51.0 | 46.9 | −25.0 | 52 | | 97 | |
| June 15 | 12 | 13 | −85.0 | 258.2 | +19.0 | | 216 | | U. S. Naval. |
| | | | −80.0 | 263.2 | +23.0 | | 62 | | |
| | | | +1.0 | 344.2 | +23.0 | | 77 | | |
| | | | +65.0 | 48.2 | +25.0 | | 46 | 401 | |
| June 16 | 12 | 24 | −71.0 | 258.9 | +18.5 | | 556 | | Do. |
| | | | −67.0 | 262.9 | +27.0 | | 154 | | |
| | | | +23.0 | 352.9 | +15.0 | | 93 | 803 | |
| June 17 | 12 | 18 | −80.0 | 236.7 | +22.0 | | 46 | | Do. |
| | | | −68.0 | 248.7 | +12.0 | 23 | | | |
| | | | −58.0 | 258.7 | +18.5 | | 741 | | |
| | | | −53.0 | 263.7 | +27.0 | | 77 | | |
| | | | +24.0 | 340.7 | +22.0 | | 93 | 980 | |
| June 18 | 15 | 39 | −65.0 | 236.6 | +22.0 | 62 | | | Do. |
| | | | −42.0 | 259.6 | +18.5 | | 617 | | |
| | | | −37.0 | 264.6 | +27.0 | | 62 | 741 | |
| June 19 | 12 | 41 | −70.0 | 220.0 | +25.0 | | 46 | | Do. |
| | | | −52.0 | 238.0 | +21.0 | 31 | | | |
| | | | −30.0 | 260.0 | +19.0 | | 525 | | |
| | | | −28.0 | 262.0 | +26.0 | | 62 | | |
| | | | +15.5 | 305.5 | +18.0 | | 77 | | |
| | | | +16.5 | 306.5 | +10.5 | | 123 | | |
| | | | +56.0 | 346.0 | +18.0 | | 31 | | |
| | | | +59.0 | 349.0 | +25.0 | | 31 | 926 | |
| June 20 | 11 | 48 | −59.0 | 218.3 | +25.0 | | 77 | | Do. |
| | | | −40.0 | 237.3 | +20.5 | 31 | | | |
| | | | −20.0 | 257.3 | +19.0 | | 494 | | |
| | | | −10.0 | 267.3 | +18.0 | 62 | | | |
| | | | −14.0 | 263.3 | +27.0 | | 93 | | |
| | | | +28.0 | 305.3 | +18.0 | | 46 | | |
| | | | +29.5 | 306.8 | +11.0 | | 31 | 834 | |
| June 21 | 11 | 7 | −46.0 | 218.4 | +25.5 | | 62 | | Do. |
| | | | −28.0 | 236.4 | +21.0 | 31 | | | |
| | | | −7.0 | 257.4 | +19.0 | | 401 | | |
| | | | −2.0 | 262.4 | +27.0 | | 62 | | |
| | | | +2.0 | 266.4 | +18.0 | 46 | | | |
| | | | +41.0 | 305.4 | +18.0 | | 46 | | |
| | | | +43.0 | 307.4 | +11.0 | | 31 | 679 | |
| June 22 | 12 | 23 | −68.0 | 182.5 | −19.5 | | 154 | | Do. |
| | | | −34.0 | 216.5 | +26.0 | | 31 | | |
| | | | −15.0 | 235.5 | +21.0 | 23 | | | |
| | | | +5.0 | 255.5 | +20.0 | | 309 | | |
| | | | +18.0 | 268.5 | +18.0 | 46 | | | |
| | | | +55.0 | 305.5 | +11.0 | | 31 | 594 | |
| June 23 | 13 | 15 | −51.0 | 185.8 | −19.0 | | 340 | | Mt. Wilson. |
| | | | −17.0 | 219.8 | +27.0 | | 8 | | |
| | | | 0.0 | 236.8 | +22.0 | 4 | | | |
| | | | +6.0 | 242.8 | +14.0 | | 11 | | |
| | | | +24.0 | 260.8 | +20.0 | | 412 | | |
| | | | +25.5 | 262.3 | +27.0 | | 52 | | |
| | | | +48.0 | 284.8 | −28.0 | | 202 | | |
| | | | +66.0 | 302.8 | −14.0 | 2 | | | |
| | | | +79.0 | 315.8 | +10.0 | 5 | | 1,036 | |
| June 24 | 12 | 50 | −39.0 | 184.8 | −19.0 | | 308 | | Do. |
| | | | +1.0 | 224.8 | +26.0 | 3 | | | |
| | | | +23.0 | 246.8 | +14.0 | | 4 | | |
| | | | +23.0 | 246.8 | +28.0 | 2 | | | |
| | | | +39.0 | 262.8 | +20.0 | | 438 | | |
| | | | +43.0 | 266.8 | +27.0 | 2 | | | |
| | | | +59.0 | 282.8 | −28.0 | | 261 | 1,018 | |
| June 25 | 11 | 40 | −32.0 | 179.2 | −20.0 | 15 | | | U. S. Naval. |
| | | | −24.5 | 186.7 | −19.5 | | 185 | | |
| | | | −11.0 | 200.2 | +19.0 | | 123 | | |
| | | | +32.0 | 243.2 | +11.0 | | 46 | | |
| | | | +43.0 | 254.2 | +19.0 | | 401 | | |
| | | | +50.0 | 261.2 | +17.0 | | 123 | | |
| | | | +70.0 | 281.2 | −27.5 | | 247 | 1140 | |
| June 26 | 12 | 16 | −43.0 | 154.6 | −20.0 | 15 | | | Do. |
| | | | −11.0 | 186.6 | −20.0 | 123 | | | |
| | | | +3.0 | 200.6 | +18.0 | | 463 | | |
| | | | +48.0 | 245.6 | +11.0 | | 46 | | |
| | | | +63.0 | 260.6 | +27.0 | 15 | | | |
| | | | +64.0 | 261.6 | +19.0 | | 370 | 1032 | |