# BIBLIOGRAPHY

C. FITZHUGH TALMAN, *in charge of Library*

## RECENT ADDITIONS

The following have been selected from among the titles of books recently received as representing those most likely to be useful to Weather Bureau officials in their meteorological work and studies:

**Calvin, Ross.**

Sky determines; an interpretation of the Southwest. New York. The Macmillan co. 1934. 354 p. front., plates. 20½ cm. Bibliography: p. 343-346.

**Cornish, Vaughan.**

Ocean waves and kindred geophysical phenomena, with photographs by the author and additional notes by Harold Jeffreys. Cambridge [Eng.] The University press. 1934. 163 p. front., 1 illus., plates, diagr. 22 cm. Bibliography: p. xv.

**Piccard, August.**

Au-dessus des nuages; orné de 32 pages en héliogravure. Paris. B. Grasset [1933.] 269 p., incl. illus., facsim., front., plates, ports. 19½ cm. At head of title: Auguste Piccard . . . on cover: 17e édition.

**Poland. Institut météorologique.**

Etudes météorologiques et hydrographiques . . . Varsovie. 1924-1929. 28 cm. Fasc. 1-6.

**Potsdam. Meteorologisch-magnetisches Observatorium.**

Tabellen der Intensität der Sonnenstrahlung in Mittel-Europa. H. 1-12. 1930-1931. Potsdam. 1930-1931. v. p. 33×20½ cm.

**Salomon-Calvi, Wilhelm.**

Die permokarbonischen Eiszeiten. Mit 8 Figuren im Text. Leipzig. Akademische Verlagsgesellschaft m. b. h. 1933. 156 p. maps. 23½ cm.

**Schubart, Ludwig.**

Praktische Orkankunde, mit Anweisungen zum Manövrieren in Stürmen. Mit 111 Abbildungen im Text. Berlin. E. S. Mittler & Sohn. 1934. 143 p. incl. tables, diagrs., fold. maps. 26½ cm. "Literaturverzeichnis": p. [141]-143.

# SOLAR OBSERVATIONS

## SOLAR AND SKY RADIATION MEASUREMENTS DURING AUGUST 1934

By IRVING F. HAND, Assistant in Solar Radiation Investigations

For a description of instruments employed and their exposures, the reader is referred to the January 1932 REVIEW, page 26.

Table 1 shows that solar radiation intensities averaged above normal for August at Washington, close to normal at Madison, and below normal at Lincoln.

Table 2 shows an excess in the total solar and sky radiation received on a horizontal surface at New York, Fresno, Pittsburgh, and New Orleans, and a deficiency at all other stations for which normals have been computed.

Polar continental air masses were indicated on all days when turbidity measurements were made, as shown in table 3.

Polarization measurements obtained at Washington on 4 days give a mean of 58 percent with a maximum of 60 percent on the 27th. At Madison, measurements on 11 days give a mean of 47 percent with a maximum of 58 percent on the 28th. The values for Washington are above the August normals, while those for Madison are below normal.

TABLE 1.—*Solar radiation intensities during August 1934*

[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] 1.0 | 2.0 | 3.0 | 4.0 | 5.0 | e |
| | *mm* | *cal* | *cal* | *cal* | *cal* | *cal* | *cal* | *cal* | *cal* | *cal* | *mm* |
| Aug. 1 | 11.38 | | | | 1.13 | 1.32 | | | | | 8.81 |
| Aug. 6 | 7.57 | | 0.77 | 0.93 | 1.16 | 1.39 | | | | | 7.87 |
| Aug. 20 | 15.65 | | | .74 | 1.03 | 1.38 | | | | | 10.21 |
| Aug. 22 | 14.10 | 0.42 | .54 | .70 | | | | | | | 14.60 |
| Aug. 27 | 12.68 | | .76 | .94 | 1.14 | 1.45 | 1.18 | | | | 8.48 |
| Aug. 29 | 10.59 | | .76 | .94 | 1.14 | 1.39 | | | | | 8.81 |
| Aug. 30 | 6.76 | | | | | 1.38 | | | | | 6.27 |
| Aug. 31 | 9.14 | | | .79 | .98 | 1.34 | | | | | 6.27 |
| Means | | (.42) | .69 | .82 | 1.10 | 1.38 | (1.18) | | | | |
| Departures | | −.21 | ±.00 | +.05 | +.16 | +.14 | +.15 | | | | |

[1] Extrapolated.

MADISON, WIS.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug. 1 | 11.38 | | 0.64 | 0.76 | 0.91 | 1.26 | | | | | 12.24 |
| Aug. 2 | 19.23 | | | | | 1.29 | | | | | 14.10 |
| Aug. 3 | 13.61 | | .54 | .72 | .88 | 1.25 | | | | | 13.13 |
| Aug. 4 | 11.81 | | .59 | .80 | .98 | 1.19 | | | | | 13.61 |
| Aug. 9 | 18.59 | | | | | 1.34 | | | | | 15.65 |
| Aug. 13 | 16.79 | | | | .89 | 1.39 | | | | | 12.68 |
| Aug. 18 | 16.20 | | | .54 | .78 | 1.21 | | | | | 15.11 |
| Aug. 20 | 6.76 | | | | | 1.44 | | | | | 5.79 |
| Aug. 21 | 9.14 | | | | .90 | | | | | | 11.81 |
| Aug. 22 | 9.14 | | | .76 | .99 | 1.30 | | | | | 8.81 |
| Aug. 24 | 6.27 | | | 1.11 | 1.23 | 1.44 | | | | | 4.95 |
| Aug. 25 | 5.56 | | | 1.07 | 1.22 | 1.45 | | | | | 6.27 |
| Aug. 28 | 7.87 | | | 1.13 | 1.31 | 1.54 | 1.31 | | | | 4.95 |
| Aug. 29 | 7.57 | | | 1.06 | 1.20 | | 1.13 | | | | 6.50 |
| Means | | | .59 | .88 | 1.03 | 1.34 | (1.22) | | | | |
| Departures | | | −.23 | −.05 | −.06 | +.02 | +.13 | | | | |

LINCOLN, NEBR.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug. 8 | 11.38 | | | 1.00 | 1.18 | 1.38 | 1.09 | 0.89 | 0.74 | 0.61 | 9.83 |
| Aug. 17 | 18.59 | | | | | | .94 | .70 | .55 | .46 | 18.59 |
| Aug. 18 | 17.96 | | 0.70 | .78 | 1.06 | 1.27 | | | | | 14.60 |
| Aug. 21 | 12.24 | | | | | | .86 | | | | 11.38 |
| Aug. 23 | 13.13 | | | .70 | .88 | .99 | | | | | 12.24 |
| Aug. 25 | 5.16 | 0.68 | .78 | .90 | .98 | 1.30 | .80 | .60 | .44 | .34 | 5.56 |
| Aug. 26 | 5.77 | .79 | .90 | 1.04 | 1.19 | 1.39 | | | | | 7.57 |
| Aug. 27 | 8.18 | | | | | | 1.17 | 1.01 | | .72 | 6.76 |
| Aug. 28 | 7.57 | .85 | .96 | 1.10 | 1.27 | 1.47 | 1.24 | 1.04 | .92 | .76 | 6.02 |
| Aug. 31 | 13.61 | .57 | .66 | | | | | | | | 16.20 |
| Means | | .72 | .80 | .92 | 1.09 | 1.28 | 1.02 | .85 | .66 | .58 | |
| Departures | | +.03 | +.01 | +.01 | ±.00 | −.03 | −.05 | −.04 | −.10 | −.10 | |

BLUE HILL METEOROLOGICAL OBSERVATORY OF HARVARD UNIVERSITY

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug. 1 | 13.6 | | | | 0.83 | 1.16 | 0.94 | 0.68 | 0.54 | | 11.8 |
| Aug. 2 | 12.7 | | | | 1.02 | 1.29 | | | | | 12.2 |
| Aug. 3 | 18.6 | | | | | | | .81 | .67 | 0.59 | 15.1 |
| Aug. 4 | 13.2 | | | | | 1.19 | | | | | 9.5 |
| Aug. 5 | 10.6 | | | | | 1.35 | | | | .84 | 6.0 |
| Aug. 6 | 7.6 | | | 1.09 | 1.22 | 1.37 | | | | | 8.5 |
| Aug. 7 | 10.2 | | | | | 1.35 | | | | | 10.6 |
| Aug. 8 | 13.6 | | | | .84 | 1.10 | .84 | | | | 15.1 |
| Aug. 11 | 18.0 | | | | | | | .86 | | | 12.7 |
| Aug. 17 | 10.2 | | | | 1.03 | 1.27 | .98 | | | | 10.6 |
| Aug. 18 | 12.7 | | | | | 1.19 | | | | | 13.6 |
| Aug. 21 | 6.3 | | | | 1.19 | 1.44 | 1.20 | 1.04 | | | 6.0 |
| Aug. 22 | 11.1 | | | | .91 | 1.17 | | | | | 11.9 |
| Aug. 30 | 7.1 | | | | 1.23 | 1.42 | 1.28 | | | | 7.1 |
| Aug. 31 | | | | | 1.05 | 1.00 | .67 | | | | |
| Means | | | | 1.09 | 1.04 | 1.25 | .98 | .85 | .60 | .72 | |

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 | Mount Washington | Friday Harbor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gram-calories per square centimeter | | | | | | | | | | | | | | | |
| | *cal* | *cal* | *cal* | *cal* | *cal* | *cal* | *cal* | *cal* | *cal* | *cal* | *cal* | *cal* | *cal* | *cal* | *cal* | *cal* |
| July 30 | 517 | 546 | 581 | -------- | 503 | 703 | 477 | 370 | 600 | 578 | 436 | 370 | 600 | 541 | -------- | 350 |
| Aug. 6 | 294 | 367 | 479 | -------- | 402 | 694 | 356 | 301 | 614 | 530 | 424 | 403 | 595 | 463 | -------- | 589 |
| Aug. 13 | 294 | 443 | 487 | -------- | 300 | 647 | 393 | 252 | 576 | 562 | 478 | 433 | 535 | 444 | -------- | 542 |
| Aug. 20 | 410 | 466 | 415 | -------- | 406 | 595 | 414 | 291 | 621 | 492 | 530 | 345 | 569 | 493 | -------- | 562 |
| Aug. 27 | 601 | 361 | 367 | -------- | 461 | 594 | 468 | 218 | 522 | 462 | 457 | 376 | 534 | 464 | -------- | 432 |
| | Departures from weekly normals | | | | | | | | | | | | | | | |
| July 30 | +50 | +78 | +69 | -------- | +92 | +59 | +9 | +33 | +14 | (1) | −77 | −25 | -------- | -------- | -------- | -------- |
| Aug. 6 | −144 | −88 | −12 | -------- | +39 | +68 | −37 | +12 | +19 | -------- | −80 | +60 | -------- | -------- | -------- | -------- |
| Aug. 13 | +134 | −2 | +2 | -------- | −49 | +42 | −19 | −42 | −14 | -------- | +15 | +97 | -------- | -------- | -------- | -------- |
| Aug. 20 | +1 | +24 | −66 | -------- | +95 | +22 | +51 | −5 | +49 | -------- | +35 | +5 | -------- | -------- | -------- | -------- |
| Aug. 27 | +175 | −45 | −84 | -------- | +105 | +44 | +90 | −35 | −26 | -------- | −29 | +13 | -------- | -------- | -------- | -------- |
| | Accumulated departures on Sept. 2 | | | | | | | | | | | | | | | |
| | +2,429 | −2,163 | +6,251 | -------- | +14,191 | −7,945 | −1,498 | −896 | +5,691 | -------- | −5,026 | +7,847 | -------- | -------- | -------- | -------- |

[1] New normals being prepared.

TABLE 3.—*Total, $I_m$, and screened, $I_y$, $I_r$, solar radiation intensity measurements, obtained during August 1934, and determinations of the atmospheric turbidity factor, $\beta$, 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Aug. 1, 1934* | ° | ′ | *m* | *gr. cal.* | *gr. cal.* | *gr. cal.* | | | | | | *mm* | |
| 4:24 a | 29 | 43 | 2.01 | 1.130 | 0.784 | 0.723 | 0.046 | 0.078 | 0.062 | 72.0 | 12.3 | 19 | $P_c$ |
| 4:20 a | 30 | 30 | 1.96 | 1.138 | .785 | .724 | .046 | .084 | .065 | 71.2 | 11.0 | 11 | |
| 3:32 a | 39 | 48 | 1.56 | 1.201 | .821 | .737 | .044 | .054 | .049 | 78.1 | 14.4 | 44 | |
| 3:29 a | 40 | 22 | 1.54 | 1.210 | .932 | .738 | .042 | .058 | .050 | 78.3 | 14.1 | 41 | |
| 3:09 a | 44 | 12 | 1.43 | 1.246 | .929 | .757 | .042 | .108 | .075 | 75.4 | 9.6 | 6 | |
| 3:05 a | 44 | 56 | 1.41 | 1.251 | .930 | .758 | .042 | .100 | .071 | 76.0 | 9.9 | 8 | |
| 2:58 a | 46 | 15 | 1.39 | 1.261 | .976 | .769 | .046 | .052 | .049 | 79.6 | 13.0 | 32 | |
| 2:54 a | 47 | 00 | 1.57 | 1.249 | .975 | .770 | .052 | .054 | .053 | 79.0 | 13.0 | 33 | |
| 2:50 a | 47 | 45 | 1.35 | 1.259 | .974 | .772 | .052 | .058 | .055 | 79.5 | 13.0 | 35 | |
| 2:46 a | 48 | 30 | 1.33 | 1.265 | .975 | .772 | .048 | .054 | .051 | 80.4 | 13.6 | 38 | |
| 2:42 a | 49 | 07 | 1.32 | 1.262 | .988 | .774 | .048 | .042 | .045 | 80.9 | 14.2 | 44 | |
| 2:38 a | 50 | 00 | 1.30 | 1.275 | .988 | .774 | .046 | .040 | .043 | 81.6 | 14.3 | 45 | |
| 1:11 a | 64 | 07 | 1.11 | 1.301 | .978 | .777 | .048 | .068 | .058 | 82.2 | 13.5 | 45 | |
| 1:06 a | 64 | 44 | 1.10 | 1.294 | .977 | .776 | .050 | .068 | .059 | 82.2 | 13.8 | 46 | |
| 0:55 a | 66 | 00 | 1.09 | 1.283 | .971 | .750 | .046 | .040 | .043 | 83.9 | 15.1 | 50 | |
| 0:51 a | 66 | 25 | 1.09 | 1.283 | .971 | .751 | .048 | .040 | .044 | 83.9 | 16.1 | 50 | |
| 0:43 a | 67 | 12 | 1.09 | 1.259 | .939 | .739 | .054 | .080 | .067 | 81.6 | 15.0 | 50 | |
| 0:40 a | 67 | 27 | 1.09 | 1.240 | .939 | .738 | .070 | .082 | .076 | 79.8 | 13.3 | 50 | |
| *Aug. 6, 1934* | | | | | | | | | | | | | |
| 5:07 a | 20 | 40 | 2.81 | .957 | .846 | .710 | .088 | .078 | .073 | 59.4 | 8.9 | 4 | $P_c$ |
| 5:03 a | 21 | 22 | 2.74 | .978 | .847 | .711 | .085 | .082 | .084 | 59.6 | 8.1 | 3 | |
| 4:59 a | 22 | 08 | 2.64 | .970 | .861 | .713 | .082 | .074 | .078 | 62.4 | 10.2 | 5 | |
| 4:56 a | 22 | 48 | 2.57 | 1.000 | .865 | .726 | .086 | .088 | .087 | 65.0 | 12.4 | 16 | |
| 4:22 a | 29 | 20 | 2.04 | 1.158 | .969 | .757 | .048 | .044 | .046 | 74.2 | 13.2 | 28 | |
| 4:07 a | 32 | 14 | 1.87 | 1.195 | .970 | .801 | .063 | .084 | .076 | 69.8 | 6.9 | 3 | |
| 3:23 a | 40 | 47 | 1.53 | 1.236 | 1.023 | .855 | .085 | .079 | .082 | 72.8 | 7.8 | 3 | |
| 3:20 a | 41 | 18 | 1.51 | 1.245 | 1.025 | .857 | .080 | .080 | .080 | 73.6 | 8.1 | 4 | |
| 2:33 a | 50 | 03 | 1.30 | 1.298 | 1.016 | .827 | .050 | .064 | .057 | 79.6 | 11.2 | 17 | |
| 2:30 a | 50 | 36 | 1.29 | 1.323 | 1.014 | .824 | .042 | .058 | .050 | 80.8 | 11.2 | 18 | |
| 0:32 a | 66 | 45 | 1.09 | 1.362 | 1.100 | .902 | .090 | .100 | .095 | 77.5 | 5.5 | 2 | |
| *Aug. 27, 1934* | | | | | | | | | | | | | |
| 3:15 a | 38 | 00 | 1.62 | 1.218 | 1.000 | .809 | .078 | .070 | .074 | 73.2 | 10.0 | 9 | $P_e$ |
| 3:12 a | 38 | 33 | 1.60 | 1.218 | 1.003 | .810 | .078 | .066 | .072 | 73.8 | 10.6 | 10 | |
| 2:43 a | 43 | 44 | 1.45 | 1.231 | 1.007 | .814 | .068 | .078 | .073 | 75.8 | 9.4 | 8 | |
| 2:39 a | 44 | 25 | 1.43 | 1.296 | 1.020 | .814 | .052 | .060 | .056 | 78.8 | 11.6 | 17 | |
| 2:10 a | 49 | 08 | 1.32 | 1.328 | 1.018 | .822 | .052 | .078 | .065 | 78.3 | 10.0 | 10 | |
| 2:06 a | 49 | 51 | 1.32 | 1.346 | 1.021 | .823 | .038 | .078 | .058 | 79.2 | 9.5 | 8 | |
| 1:16 p | 56 | 37 | 1.19 | 1.380 | 1.075 | .865 | .052 | .070 | .061 | 80.4 | 8.9 | 7 | |
| 1:20 p | 56 | 07 | 1.20 | 1.360 | 1.075 | .867 | .065 | .071 | .068 | 79.8 | 9.3 | 7 | |
| 2:20 p | 47 | 37 | 1.36 | 1.333 | 1.075 | .799 | .036 | .048 | .042 | 81.8 | 12.7 | 28 | |
| 2:25 p | 46 | 46 | 1.38 | 1.343 | 1.014 | .800 | .032 | .046 | .039 | 82.1 | 12.5 | 25 | |
| 2:46 p | 43 | 09 | 1.46 | 1.270 | 1.017 | .817 | .068 | .066 | .067 | 76.8 | 11.0 | 14 | |
| 2:50 p | 42 | 39 | 1.48 | 1.259 | 1.019 | .817 | .072 | .066 | .069 | 76.4 | 10.1 | 10 | |
| 3:31 p | 34 | 14 | 1.77 | 1.216 | .978 | .778 | .048 | .048 | .048 | 76.2 | 13.1 | 30 | |
| 3:34 p | 34 | 02 | 1.78 | 1.207 | .978 | .778 | .054 | .046 | .050 | 76.2 | 13.6 | 32 | |
| 4:21 p | 25 | 50 | 2.29 | 1.137 | .886 | .743 | .042 | .096 | .069 | 67.6 | 8.6 | 4 | |
| 4:24 p | 25 | 03 | 2.37 | 1.098 | .886 | .741 | .060 | .094 | .077 | 64.8 | 7.8 | 3 | |
| *Aug. 30, 1934* | | | | | | | | | | | | | |
| 3:21 a | 36 | 11 | 1.69 | 1.231 | 1.020 | .830 | .077 | .069 | .073 | 73.0 | 9.2 | 6 | $P_c$ |
| 3:17 a | 36 | 55 | 1.67 | 1.212 | 1.021 | .831 | .082 | .066 | .074 | 73.0 | 9.1 | 6 | |
| 1:43 a | 52 | 14 | 1.26 | 1.326 | 1.077 | .863 | .080 | .052 | .066 | 79.0 | 10.3 | 12 | |
| 1:39 a | 52 | 53 | 1.25 | 1.327 | 1.079 | .865 | .080 | .052 | .066 | 79.0 | 10.3 | 12 | |

Atmospheric conditions

| Date | Temperature °C. | Wind, miles per hour | Direction | Visibility | Sky blueness | Polarization, percent | Clouds and remarks |
|---|---|---|---|---|---|---|---|
| Aug. 1 | 21 | 10 | SW | 12 | 4 | 54.6 | Cumuli. |
| Aug. 6 | 20 | 12 | NW | 20 | 5 | 58.2 | Do. |
| Aug. 27 | 19 | 9 | NW | 30 | 5 | 59.6 | Light haze. |
| Aug. 30 | 16 | 10 | NE | 30 | 6 | 59.3 | Light to moderate haze. |

TABLE 3.—*Total, $I_m$, and screened, $I_y$, $I_r$, solar radiation intensity measurements, obtained during August 1934, and determinations of the atmospheric turbidity factor, $\beta$, and water-vapor content, $w$=depth in millimeters, if precipitated*—Continued

BLUE HILL METEOROLOGICAL OBSERVATORY OF HARVARD UNIVERSITY

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Aug. 1, 1934* | ° ′ | *m* | *gr. cal.* | *gr. cal.* | *gr. cal.* | | | | | | *mm* | |
| 3:00 a | 45 04 | 1.41 | 0.930 | 0.710 | 0.575 | ---------- | 0.177 | 0.177 | 62.4 | 13.0 | 35.6 | Pc |
| 0:53 a | 63 31 | 1.11 | 1.104 | .799 | .642 | 0.181 | .165 | .173 | 68.5 | 9.9 | 13.0 | |
| 3:52 p | 35 41 | 1.71 | .937 | .718 | .590 | .179 | .152 | .166 | 58.8 | 9.1 | 5.7 | Pc |
| *Aug. 2, 1934* | | | | | | | | | | | | |
| 3:38 a | 44 42 | 1.61 | 1.105 | .806 | .650 | .110 | .095 | .102 | 69.1 | 10.5 | 11.0 | NPC |
| 2:30 a | 49 51 | 1.30 | 1.198 | .854 | .679 | .103 | .095 | .099 | 73.8 | 10.3 | 13.0 | TG aloft. |
| 2:06 a | 53 44 | 1.24 | 1.205 | .862 | .686 | .103 | .098 | .100 | 74.6 | 10.6 | 15.0 | |
| 0:01 a | 66 33 | 1.09 | 1.273 | .884 | .696 | .090 | .092 | .091 | 78.1 | 10.5 | 18.0 | |
| 0:10 p | 65 27 | 1.10 | 1.256 | .869 | .686 | .094 | .098 | .096 | 77.5 | 10.8 | 20.0 | |
| *Aug. 4, 1934* | | | | | | | | | | | | NPC |
| 2:29 a | 58 28 | 1.18 | 1.121 | .826 | .662 | .169 | .134 | .152 | 69.2 | 4.4 | 1.4 | TG aloft. |
| *Aug. 6, 1934* | | | | | | | | | | | | |
| 3:12 a | 41 56 | 1.49 | 1.314 | .915 | .729 | .046 | .056 | .051 | 78.8 | 9.1 | 6.3 | Pc |
| 3:08 a | 42 39 | 1.48 | 1.310 | .901 | .711 | .038 | .047 | .042 | 80.6 | 11.2 | 16.0 | |
| *Aug. 7, 1934* | | | | | | | | | | | | |
| 2:48 a | 45 17 | 1.40 | 1.238 | .865 | .680 | .069 | .062 | .066 | 77.4 | 11.8 | 21.0 | Pc |
| *Aug. 8, 1934* | | | | | | | | | | | | |
| 3:21 a | 39 55 | 1.56 | .959 | .700 | .555 | .148 | .110 | .129 | 66.0 | 15.2 | 58.0 | NPC. |
| 3:13 a | 40 48 | 1.53 | .963 | .704 | .559 | .150 | .140 | .145 | 64.3 | 13.3 | 33.0 | |
| 1:51 a | 54 44 | 1.23 | 1.087 | .774 | .610 | .140 | .122 | .131 | 71.0 | 13.3 | 41.0 | |
| *Aug. 11, 1934* | | | | | | | | | | | | |
| 5:02 p | 20 47 | 2.80 | .895 | .670 | .532 | .072 | .065 | .068 | 63.0 | 15.6 | 49.0 | Pc |
| 5:20 p | 17 31 | 3.30 | .832 | .670 | .535 | .061 | .052 | .056 | 61.9 | 15.2 | 37.0 | |
| *Aug. 17, 1934* | | | | | | | | | | | | |
| 3:10 a | 40 00 | 1.55 | 1.146 | .817 | .660 | .097 | .104 | .100 | 70.2 | 9.7 | 8.0 | NPC |
| 0:34 a | 59 57 | 1.15 | 1.250 | .890 | .711 | .081 | .096 | .088 | 77.2 | 11.2 | 22.0 | |
| 1:45 p | 53 18 | 1.25 | 1.194 | .849 | .682 | .121 | .118 | .120 | 72.5 | 9.4 | 8.7 | NPC |
| 4:27 p | 26 07 | 2.27 | .915 | .670 | .560 | .108 | .143 | .126 | 57.2 | 8.8 | 4.1 | |
| *Aug. 18, 1934* | | | | | | | | | | | | |
| 1:37 a | 56 12 | 1.21 | 1.185 | .850 | .680 | .130 | .118 | .124 | 72.3 | 9.7 | 10.0 | NPC |
| 0:30 p | 60 10 | 1.15 | 1.115 | .830 | .662 | .186 | .132 | .159 | 69.2 | 10.3 | 15.0 | |
| *Aug. 21, 1934* | | | | | | | | | | | | |
| 2:20 a | 47 14 | 1.36 | 1.340 | .914 | .732 | .045 | .075 | .060 | 78.8 | 8.1 | 4.5 | Pc |
| 0:19 a | 59 37 | 1.16 | 1.385 | .964 | .772 | .067 | .071 | .069 | 79.9 | 6.9 | 3.4 | |
| 4:42 p | 22 31 | 2.60 | 1.100 | .808 | .652 | .048 | .051 | .050 | 68.6 | 10.6 | 8.6 | NPC |
| *Aug. 22, 1934* | | | | | | | | | | | | |
| 2:40 a | 43 51 | 1.44 | 1.024 | .725 | .603 | .150 | .200 | .175 | 62.0 | 8.0 | 4.1 | NPC |
| *Aug. 30, 1934* | | | | | | | | | | | | |
| 3:09 a | 36 59 | 1.66 | 1.290 | .929 | .738 | .055 | .040 | .048 | 77.5 | 9.7 | 7.5 | Pc |
| 2:51 a | 39 58 | 1.59 | 1.323 | .930 | .738 | .042 | .045 | .044 | 79.2 | 9.7 | 8.0 | |
| 1:55 a | 48 17 | 1.33 | 1.358 | .954 | .753 | .054 | .041 | .048 | 81.2 | 9.9 | 10.1 | |
| 3:59 p | 28 16 | 2.10 | 1.353 | .978 | .775 | .021 | .034 | .028 | 77.3 | 6.2 | 2.1 | Pc |
| *Aug. 31, 1934* | | | | | | | | | | | | |
| 3:55 a | 28 45 | 2.08 | 1.200 | .886 | .723 | .066 | .069 | .068 | 79.5 | 16.5 | 60 | Pc |
| 3:10 a | 36 34 | 1.67 | 1.170 | .861 | .711 | .111 | .112 | .112 | 70.9 | 9.5 | 7.0 | |
| 1:07 p | 56 23 | 1.19 | .995 | .739 | .620 | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | Pc |
| 4:05 p | 26 57 | 2.20 | .582 | .462 | .416 | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | |

**Atmospheric conditions during solar radiation measurements**

| Date and time from apparent noon | Air temperature | Wind (Beaufort scale) | Visibility | Sky blueness | Cloudiness and remarks |
|---|---|---|---|---|---|
| *August 1934* | °C. | | | | |
| 1; 3:00 a | 22.2 | W 2 | 8 | 5 | Few Ci, moderate hz. |
| 1; 0:53 a | 25.0 | WSW 2 | 8 | 5 | 1 Cu, moderate hz. |
| 1; 3:52 p | 25.0 | WNW 4 | 8 | 4 | 3 Cu, moderate haz. |
| 2; 3:38 a | 23.9 | ESE 4 | 8-9 | 6 | Few Ci. |
| 2; 2:30 a | 25.0 | ESE 4 | 8-9 | 6 | Few Ci. |
| 2; 2:06 a | 25.0 | ESE 4 | 8 | 6 | |
| 2; 0:01 a | 26.7 | SxW 4 | ------- | ------ | 1 Ci, Few Cu. |
| 2; 0:10 p | 26.7 | SxW 4 | 8 | 5 | |
| 4; 2:29 a | 21.7 | NW 5 | 8 | 6 | Few Ci, Few Cu, moderate hz. |
| 6; 3:12 a | 15.0 | NW 3 | 9 | 4 | Few Ci few Frcu. |
| 6; 3:08 a | 15.0 | NW 3 | 9 | 5-6 | 1 Frcu. |
| 7; 2:48 a | 19.4 | SW 2 | 8 | 4 | 0 clouds. |
| 8; 3:21 a | 20.6 | SW 4 | 8 | ------ | 0 clouds. |
| 8; 3:13 a | 20.6 | SW 4 | 8 | ------ | 0 clouds. |
| 8; 1:51 p | 26.1 | S 5 | 8 | ------ | 1 Cu. moderate hz. |
| 11; 5:02 p | 19.4 | NExE 2 | 8+ | 6 | 1 Acu. |
| 11; 5:20 p | 19.4 | NExE 2 | 8+ | 6 | 1 Acu. |
| 17; 3:10 a | 13.9 | NxNE 2 | 7 | 6 | Trace Frcu. |
| 17; 0:34 a | 17.8 | N 2 | 7 | 5 | 0 clouds. |
| 17; 1:45 p | 20.0 | NE 2 | 7 | 4 | 0 clouds. |
| 7; 4:27 p | 23.2 | SSE 2 | 7W, 8, 9E. | 5 | 0 clouds. |
| 18, 1:17 a | 21.7 | SSW 8 | 8 | 1 | 3 Ci. |
| 18; 0:30 p | 24.7 | S 3 | 8 | 5 | 2 Ci. 2 Cu. |
| 21; 2:20 a | 16.1 | NW 2 | 9 | 6 | 1 Cist. |
| 21; 0:19 a | 17.8 | NWxN 2 | 9 | 6 | 2 Ci, 1 Acu. |
| 21; 4:42 p | 22.2 | SxW 2 | 8+ | 7 | 1 Ci, it hz. |
| 22; 2:40 a | 19.4 | SW 4 | 8 | 4 | 1 Acu. few Frcu; fumules over sky. |
| 30; 3:09 a | 11.9 | NW 3 | 8 | 6 | Few Cu. |
| 30; 2:51 a | 13.1 | NW 5 | 9 | 6 | 3 Cu. |
| 30; 1:55 a | 13.3 | NW 5 | 9 | 6 | 3 Cu. |
| 30; 3:59 p | 16.9 | NW 5 | 9 | 8 | 4 Cu |
| 31; 3:55 a | 10.6 | N 3 | 8 | 6 | 1 Ci in E. |
| 31; 3:10 a | 11.0 | N 3 | 8 | 6 | 1 Ci in E. |
| 31; 0:07 p | 17.5 | NNE 3 | 9+ | 1 | 10 Ci haze; trace Cu. |
| 31; 4:05 p | 17.2 | NNE 2 | 9 | 4 | 4 to 9 Ci, ill defined; hz. in N. |

## POSITIONS AND AREAS OF SUN SPOTS

[Communicated by Capt. J. F. Hellweg, U. S. Navy, 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 | | |
| 1934 | h m | ° | ° | ° | | | | |
| Aug. 1 | 11 50 | (1) | (1) | (1) | ------- | ------- | ------- | U. S. Naval. |
| Aug. 2 | ------- | (1) | (1) | (1) | ------- | ------- | ------- | Harvard. |
| Aug. 3 | 11 53 | (1) | (1) | (1) | ------- | ------- | ------- | U. S. Naval. |
| Aug. 4 | 11 21 | (1) | (1) | (1) | ------- | ------- | ------- | Do. |
| Aug. 5 | 13 52 | (1) | (1) | (1) | ------- | ------- | ------- | Do. |
| Aug. 6 | 11 8 | −75.0 | 229.1 | −30.0 | 154 | ------- | 154 | Do. |
| Aug. 7 | 13 17 | −61.0 | 228.7 | −30.0 | 185 | ------- | 185 | Do. |
| Aug. 8 | 13 54 | −49.0 | 227.1 | −30.0 | 201 | ------- | 201 | Do. |
| Aug. 9 | 10 4 | −36.9 | 228.1 | −30.0 | 335 | ------- | 335 | Harvard. |
| Aug. 10 | 13 10 | −23.0 | 227.1 | −30.0 | 201 | ------- | 201 | U. S. Naval. |
| Aug. 11 | 12 0 | −12.0 | 225.5 | −29.0 | 303 | ------- | 303 | Mount Wilson. |
| Aug. 13 | 12 50 | −15.0 | 195.6 | +4.0 | ------- | 15 | ------- | Do. |
| | | +14.0 | 224.6 | −29.0 | 159 | ------- | 174 | |

## 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 | | |
| 1934 | h m | | ° | | | | | |
| Aug. 14 | 11 1 | −2.5 | 195.9 | +4.0 | ------- | 31 | ------- | U. S. Naval. |
| | | +27.0 | 225.4 | −30.0 | 216 | ------- | 247 | |
| Aug. 15 | 11 3 | +11.5 | 196.6 | +4.0 | 185 | ------- | ------- | Do. |
| | | +39.5 | 224.6 | −30.0 | ------- | 46 | 231 | |
| Aug. 16 | 13 50 | +26.0 | 196.4 | +4.0 | ------- | 36 | ------- | Mount Wilson. |
| | | +55.0 | 225.4 | −29.0 | 160 | ------- | 196 | |
| Aug. 17 | 13 27 | +39.0 | 196.4 | +3.5 | 15 | ------- | ------- | U. S. Naval. |
| | | +66.0 | 223.4 | −30.0 | 123 | ------- | 138 | |
| Aug. 18 | 12 0 | +19.0 | 163.9 | −23.0 | ------- | 7 | ------- | Mount Wilson. |
| | | +52.0 | 196.9 | +4.0 | 3 | ------- | ------- | |
| | | +80.0 | 224.9 | −29.0 | 157 | ------- | 167 | |
| Aug. 19 | 12 46 | (1) | (1) | (1) | ------- | ------- | ------- | U. S. Naval. |
| Aug. 20 | 13 27 | (1) | (1) | (1) | ------- | ------- | ------- | Do. |
| Aug. 21 | 13 14 | (1) | (1) | (1) | ------- | ------- | ------- | Do. |
| Aug. 22 | 13 17 | (1) | (1) | (1) | ------- | ------- | ------- | Do. |
| Aug. 23 | 13 26 | (1) | (1) | (1) | ------- | ------- | ------- | Do. |
| Aug. 24 | 13 15 | (1) | (1) | (1) | ------- | ------- | ------- | Do. |
| Aug. 25 | 11 47 | (1) | (1) | (1) | ------- | ------- | ------- | Do. |
| Aug. 26 | 9 0 | (1) | (1) | (1) | ------- | ------- | ------- | Mount Wilson. |
| Aug. 27 | 11 15 | (1) | (1) | (1) | ------- | ------- | ------- | U. S. Naval. |
| Aug. 28 | 14 23 | (1) | (1) | (1) | ------- | ------- | ------- | Do. |
| Aug. 29 | 11 31 | (1) | (1) | (1) | ------- | ------- | ------- | Do. |
| Aug. 20 | 10 57 | (1) | (1) | (1) | ------- | ------- | ------- | Do. |
| Aug. 31 | 13 20 | (1) | (1) | (1) | ------- | ------- | ------- | Do. |

[1] No spots.

NOTE.—Mean daily area for 30 days: 84.

## PROVISIONAL SUN-SPOT RELATIVE NUMBERS FOR AUGUST 1934

(Dependent alone on observations at Zurich and its station at Arosa)

Data furnished through the courtesy of Prof. W. Brunner, Eidgenossische Sternwarte, Zurich, Switzerland]

| August 1934 | Relative numbers | August 1934 | Relative numbers | August 1934 | Relative numbers |
|---|---|---|---|---|---|
| 1 | 0 | 11 | 12 | 21 | 0 |
| 2 | 0 | 12 | Eae 21 | 22 | 0 |
| 3 | 0 | 13 | 21 | 23 | 7 |
| 4 | ------- | 14 | 23 | 24 | 8 |
| 5 | 0 | 15 | 24 | 25 | 0 |
| 6 | d 8 | 16 | 26 | 26 | 0 |
| 7 | 8 | 17 | 17 | 27 | ------- |
| 8 | 9 | 18 | 22 | 28 | 0 |
| 9 | 10 | 19 | 13 | 29 | 0? |
| 10 | 11 | 20 | 0 | 30 | 7 |
| | | | | 31 | 0? |

Mean for 29 days=8.5.

*a*=Passage of an average-sized group through the central meridian.
*b*=Passage of a large group or spot through the central meridian.
*c*=New formation of a center of activity: E, on the eastern part of the sun's disk; W, on the western part; M, in the central zone.
*d*=Entrance of a large or average-sized center of activity on the east limb.