RECORD OF DRY SPELLS AT NASHVILLE, TENN., 1871–1925

By ROSCOE NUNN

[Weather Bureau Office, Nashville, Tenn., October 23, 1925]

A dry spell of the character described in this article does not necessarily mean a severe drought, but a period of unusual duration with little or no precipitation. As being consistent with the general characteristics of precipitation in middle Tennessee, and almost as truly applicable to the State as a whole, we define a noteworthy dry spell as a period of 21 days, or longer, with total precipitation of less than 0.25 inch. The total number of such spells during the 55-year period, 1871–1925 (record for 1925 up to October 23, only) is 69, or an average of about 1.3 per year. The greatest number of such spells in any one year was four and this occurred twice in the 55-year period. On the other hand, a good many years have only one and a few have none. The greatest length of time without a dry spell of the character defined was three years, and this occurred twice in the 55-year period. There were 16 spells of 30 days or more in length and 4 spells of 40 days or more.

It will be seen that periods of 30 days or longer with less than 0.25 inch of precipitation are quite unusual at Nashville, occurring less often than once in three years on an average. A period of 40 days or longer with less than 0.25 inch of precipitation is very rare and has occurred only four times in the last 55 years.

The longest spell was 43 days, from August 2 to September 13, 1913, with total precipitation of 0.24 inch. But for a period of 63 days, July 13 to September 13 of this remarkable year, 1913, the total precipitation was only 0.94 inch, while for a period of 77 days, the same year, July 13 to September 27, the total precipitation was only 1.61 inches. The year 1913 thus shows the longest period of almost rainless weather of any year of record at Nashville. The year 1925, however, had a more disastrous drought, because it came earlier, when crops were most in need of moisture. In 1925 the persistency of very light rainfall month after month was the most marked feature; heavy deficiencies began in January and continued through August, excepting February, which had a slight excess.

Most of the droughts in the Nashville district come in September and October, and at that season are often not seriously detrimental. Considering the record by months, we find that dry spells of 21 days or longer were distributed as follows (assigning a spell that covered parts of two months to the month which contained the larger part): January 2, February 4, March 0, April 1, May 6, June 5, July 3, August 8, September 11, October 19, November 6, December 4.

The following table gives a complete list of dry spells at Nashville from the beginning of records to date:

Dry spells of 21 days or longer at Nashville, Tenn.

Year	Period of dry spell	Number of days	Total precipitation during spell	Year	Period of dry spell	Number of days	Total precipitation during spell
			Inches				*Inches*
1871	Sept. 16–Oct. 15	30	0.16	1903	Aug. 20–Sept. 26	38	0.18
1874	July 25–Aug. 25	32	.20	1903	Oct. 8–Oct. 31	24	.11
1875	Aug. 18–Sept. 9	23	.11	1903	Nov. 18–Dec. 11	24	.04
1876	Nov. 20–Dec. 23	34	.24	1904	Sept. 4–Sept. 24	21	.06
1877	May 9–June 4	27	.06	1904	Oct. 6–Nov. 2	28	.17
1877	Nov. 28–Dec. 22	26	.24	1905	Oct. 26–Nov. 23	29	.20
1879	Sept. 14–Oct. 6	23	0	1906	Jan. 23–Feb. 19	28	.21
1879	Oct. 17–Nov. 8	23	.17	1906	Oct. 19–Nov. 10	23	.19
1880	July 11–Aug. 1	22	.21	1908	Oct. 10–Nov. 9	31	.02
1884	Oct. 30–Nov. 22	24	.24	1909	Oct. 15–Nov. 8	25	.04
1885	Aug. 14–Sept. 7	25	.08	1910	Jan. 21–Feb. 10	21	.19
1886	Oct. 15–Nov. 8	25	.20	1910	Sept. 2–Sept. 24	23	.24
1887	Aug. 27–Sept. 16	21	.07	1910	Oct. 28–Nov. 23	27	.15
1891	Sept. 12–Oct. 3	22	0	1911	Apr. 20–May 19	30	.22
1891	Oct. 19–Nov. 8	21	.12	1911	May 23–June 18	27	.21
1892	Sept. 21–Oct. 22	32	.23	1911	Sept. 18–Oct. 8	21	.09
1894	Sept. 19–Oct. 28	40	.17	1912	Nov. 7–Nov. 30	24	.20
1896	Oct. 12–Nov. 3	23	.24	1913	Aug. 2–Sept. 13	43	.24
1897	May 14–June 6	24	.12	1914	Dec. 29–Jan. 23	26	.19
1897	Sept. 1–Oct 10	40	.19	1914	May 7–June 13	38	.24
1898	Feb. 12–Mar. 12	29	.18	1914	Oct. 18–Nov. 7	21	.01
1898	May 23–June 12	21	.09	1915	Feb. 6–Mar. 3	26	.15
1898	Aug. 10–Sept. 1	23	0	1915	Oct. 15–Nov. 7	24	.16
1899	May 23–June 25	34	.16	1917	Apr. 13–May 3	21	.15
1899	June 29–July 20	22	.11	1919	Dec. 14–Jan. 5	23	.24
1899	Aug. 8–Aug. 29	22	.15	1920	Sept. 26–Oct. 24	29	.06
1900	Apr. 24–May 17	24	.24	1921	May 12–June 14	34	.23
1900	July 29–Aug. 22	25	.19	1921	June 25–July 18	24	.21
1900	Oct. 23–Nov. 18	27	.15	1921	Oct. 4–Oct. 26	23	.09
1900	Nov. 27–Dec. 18	22	.24	1922	Sept. 21–Oct. 22	32	.16
1901	Feb. 12–Mar 8	25	.18	1923	Sept. 8–Oct. 16	39	.22
1901	June 10–June 30	21	.23	1924	Sept. 29–Nov. 7	40	.11
1901	Aug. 24–Sept. 13	21	.02	1925	May 18–June 17	31	.05
1901	Oct. 13–Nov. 2	21	.08	1925	Aug. 15–Sept. 11	28	.12
1902	Oct. 14–Nov. 4	22	0				

A NEW TYPE OF RAIN TIMER

By F. N. HIBBARD

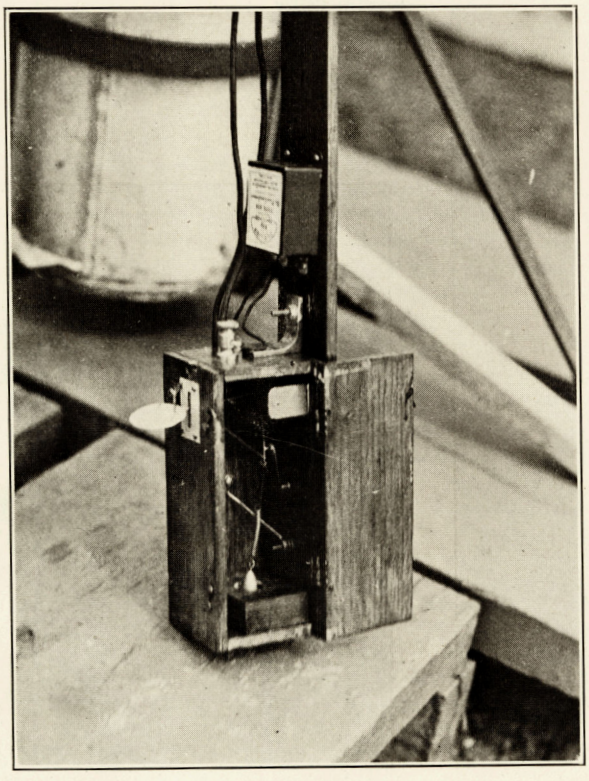
[Weather Bureau, Duluth, Minn.]

Experiments have been made at the Duluth station during the last two summers to determine the practicability of obtaining the beginnings and endings of rain automatically. Through the courtesy of the Chief of Bureau a double register was put into service and various mechanisms were tried out, from those that attempted to use water drops themselves as part of the recording circuit to those that operated a recording pen once per minute during the time of rainfall—similar to the present sunshine recorder.

The mechanism finally selected for development is illustrated diagrammatically in Figure 1. It consists of a light balance with an aluminum pan *a* at one end for receiving the impact of water from a funnel and a platinum contact *b* at the other. The total weight of this balance, including the spindle *f*, is 30 grains or less. It is held in position by the weight *e*, suspended by a very light spring *d* and multiple silk thread *c*, the total weight of the thread, spring, and weight being about 135 grains. A condenser of 3 to 5 microfarads is used across the contacts to quench the spark.

All parts are provided with full adjustment and the entire mechanism, with the exception of the pan, is inclosed, the complete unit being mounted at the bottom

(To face p. 398)



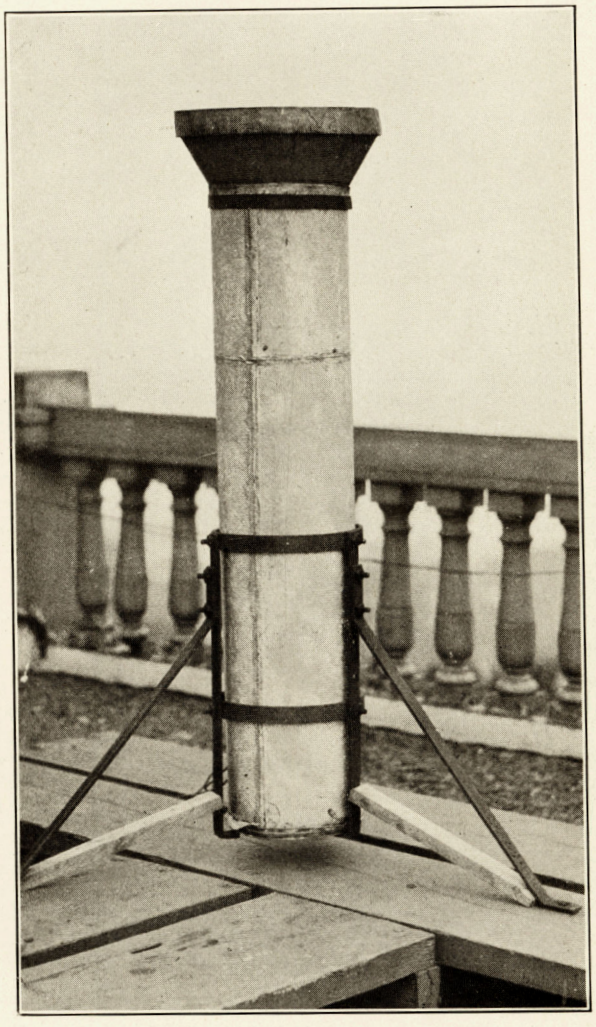


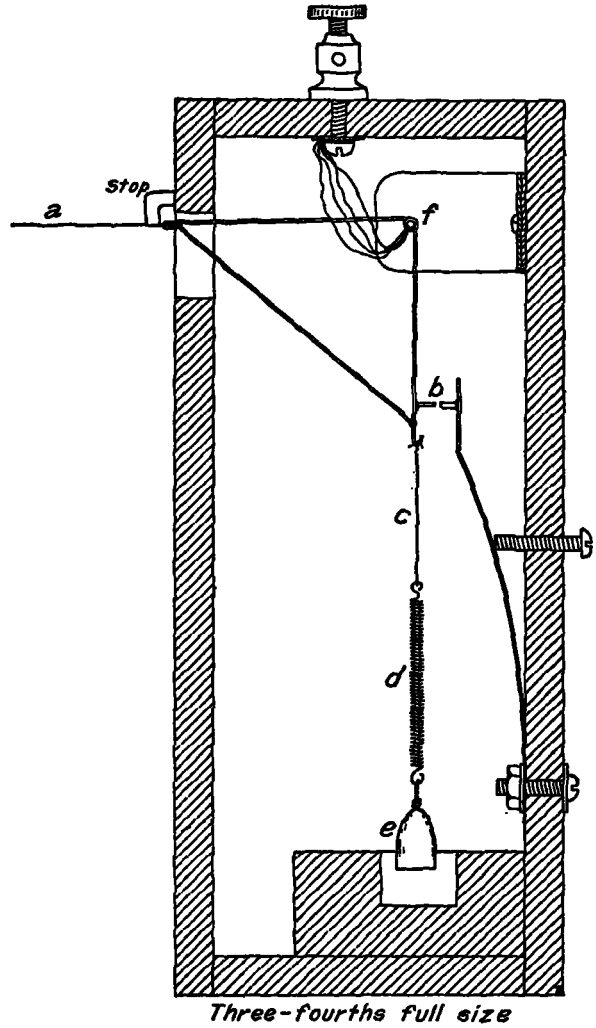
FIG. 2.—Hibbard rain timer, and its funnel container

of a cylinder 8 inches in diameter and 38 inches deep, shown in Figure 2. Linen cloth forms the bottom of the cylinder, and a 12-inch funnel collector is fitted at the top. Special precautions are taken in mounting the gauge solidly to eliminate vibration.

It is found that this form of balance properly adjusted responds readily to the impact of water from the funnel, and with a battery of 3.5 volts one action of the magnet on a chronographic register is effected by each drop from the funnel irrespective of whether the pan is weighted with water or dry. The balance is durable and retains its adjustment well.

Both times and amounts of rainfall are recorded on a single sheet. It is of interest to note that only a slight interval correction needs to be applied to the beginnings of rain and that the drainage from the funnel, or from any funnel, lasts several minutes and continues to close the circuit considerably after the end of rain. Dripping fog or dew also records, but the checks therefrom are quite characteristic and can not be confused. Of the many scores of records obtained from the Duluth instrument rain invariably made the checks close enough to coalesce, and no very heavy dripping fog has been known to bring them closer together than a minute, or nearly a minute. The fog record is also readily distinguished from funnel drainage, the checks from funnel drainage gradually getting farther apart.

The critical part of a timer is the funnel. Many experiments have been made with various coatings and materials, but the best so far found is the plain weathered zinc or copper surface, which starts the drops down by capillarity. The threshold value of such a surface is small, and our experience has been that a timer so equipped picks up the time somewhat better than an observer under average conditions during the day and preeminently better during the night. No timer, however ingenious, can equal the alert human eye; the best that can be hoped for is an instrument that will not fail to record on all precipitation greater than a very small and perhaps negligible trace.



Three-fourths full size

Fig. 1.—Details of the Hibbard rain timer

NOTES, ABSTRACTS, AND REVIEWS

A WATERSPOUT IN LATITUDE 53° N.

The reproductions on the opposite page are from a small photograph sent us by Mr. Thomas Nunns, of New Westminster, British Columbia. The waterspout occurred at Jackfish Lake, which lies about 8 miles west of North Battleford, Saskatchewan, on July 20, 1923. Mr. Nunn's notes accompanying the photograph are as follows:

Jackfish Lake, about 15 by 7 miles. Waterspout traveled about 14 miles.
Direction, from NW. to SE. across lake, appearing from a wheat field.
Direction from camera, almost direct east.
Approximate distance from camera, about 1 mile.
Waterspout stopped at SE. corner of lake near small island. Caused quite high wave; about 4 feet. Weather very hot and sultry. Two terrific thunderbolts preceded it.

NOTE.—The small picture of the original print, unretouched and on the same scale, is presented to show by comparison the extent to which retouching to remove blemishes has altered the appearance of the waterspout.—*B. M. V.*

DOUBLE ANTISOLAR CORONA BY REFLECTED SUNLIGHT

A double solar corona is not often observed; neither is a corona caused by fog about a reflection of the sun. A specter of the Brocken, or antisolar corona, is apparently more rare. And until I saw a double solar corona about the antisolar point of reflected sunlight I did not know of the existence of such a phenomenon. Yet, once seen, it is quite apparent that such an occurrence is natural when there is bright sunshine, with a calm lake, and a low cloud, in the proper positions.

From about 6:05 to 6:20 a. m. (eastern standard time), September 18, 1925, at Silver Lake, N. H., these conditions existed. A low bank of strato-cumulus cloud was forming over a hill about half a kilometer west, and on this cloud was both direct and reflected sunlight. The silhouette of the hilly west shore of the lake with its pointed pine trees was easily recognizable from a house roof 60 meters above and 300 meters west of the lake. Spanning a point about 18° above my shadow on the trees near by, there appeared the double antisolar corona. Its aspect was like that of a small, hazy double rainbow, with a light area of reddish tinge at the center. To the inner red arc the radius was approximately 5° and to the outer about 8°, as roughly measured with forefinger held at arm's length. At the same time, single and double coronal arcs of about the same size were occasionally visible in the fleeting low clouds passing over the sun. The phenomenon ceased when these clouds in the east became too dense, and did not reappear when the sun shone again, for in the meantime the lake had become rippled again, with the south wind.—*Charles F. Brooks (Clark University), Silver Lake, N. H., September 18, 1925.*