

These include: differences in the paths followed by the airplane and the balloon and therefore possibly even different air masses encountered; the limited experience of personnel in the technique of calibrating and of making regularly scheduled observations of this kind; differences in time, in some cases, between the airplane and radiometeorograph observations; differences in rate of ascent and lag of radiometeorograph and aerometeorograph; possible changes in the aerometeorograph since last calibration; and possible differences between the initial temperatures of the instruments.

It is planned in the near future to obtain comparisons by sending aloft the various types of radiometeorographs simultaneously from the same place, with recording, i. e., nonradio, meteorographs attached to the same balloon. This method of comparison is considered to be more reliable than the airplane observations used so far.

In view of the promising results being obtained with radiometeorographs and because of the great value of the observational data, it is planned to increase the number of stations to six next fiscal year. To do this, it will be necessary to replace airplane with radiometeorograph observations at some places, since additional funds were not made available for this work. An important factor in this connection, which should reduce the cost materially

at favorably located stations, is the large percentage of instruments which will be found and returned. The percentages of recovery for some of the past sounding balloon series made in this country with recording meteorographs, i. e., the nonradio types, are given in table 3.

TABLE 3

Place	Number of observations	Percentage returned
Omaha, Nebr.....	306	92
St. Louis, Mo.....	115	94
Royal Center, Ind.....	80	91
Dallas, Tex.....	77	83
Ellendale, N. Dak.....	64	91
Groesbeck, Tex.....	44	84
Broken Arrow, Okla.....	34	78
Huron, S. Dak.....	26	92
Avalon, Calif.....	23	65

With the experience which will be gained during the next fiscal year, it seems probable that most of the airplane observations will be replaced by radiometeorographs after June 1939.

It is desired to acknowledge the assistance of M. E. Crawford of the Aerological Division for drawing the graphs shown.

RECORD-BREAKING ANNUAL PRECIPITATION, 1846-1850

By LEON J. GUTHRIE

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Available records for the years of 1846 to 1850 establish the fact that over limited areas of northeastern United States remarkably heavy annual precipitation must have occurred. For instance, southwestern Ohio experienced wetness that has never been approached since that time; a peak of 62.96 inches was recorded at Dayton during 1846 and 65.18 inches at Cincinnati during 1847. Correspondingly heavy precipitation apparently fell at points as far west as St. Louis, where 65.36 inches were recorded during 1848. A curious feature is the time lag of a year between the maximum amounts at each of the three stations. The similarity of these maximum figures tend to bear out the authenticity of the data, although gages or methods of measurements might have differed materially in those days. At Steubenville, Ohio, it is also to be noted that there was a surplus for which we find no equal in later records of southeastern Ohio.

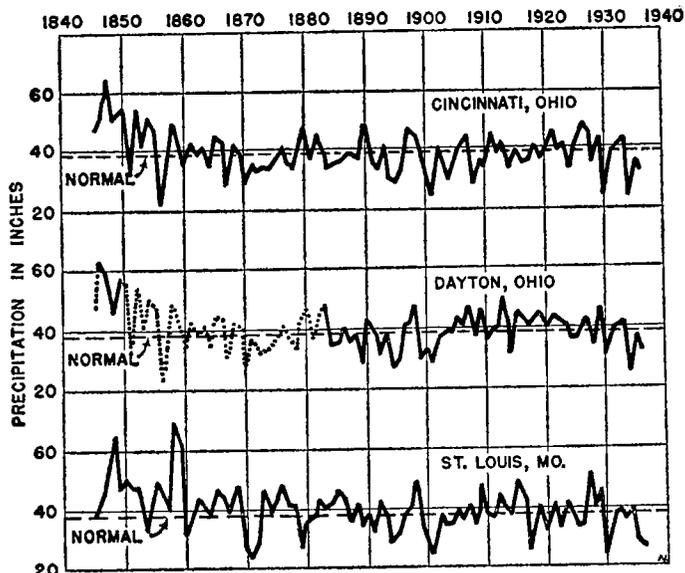
Judging by graphs of all the above stations, not only did copious rains occur but the yearly variation was more erratic than it has ever been since. This condition lasted until about 1860; at least one bad drought is evident between 1850 and 1860. It is interesting to note that extreme positive departures for precipitation at the above stations were never offset by negative departures of equal or greater magnitude. One cannot reach any definite conclusions from the foregoing data because of the paucity of records prior to that time and the fact that nearby stations disagree in some of the main characteristics.

At Dayton the old record was kept at Cooper's Seminary, which is remembered as having had a good standard for educational work. Originally this old part of the record was omitted from precipitation charts as seemingly doubtful, but more recent studies indicate that it should

be included. It is presented in the accompanying graph with missing years adapted from the Woodward High School record at Cincinnati. This is on the assumption that it gives a general idea of the trend for the missing years; the normal annual difference between Dayton and Cincinnati is only 0.69 inch.

The extremely wet years were preceded and followed by subnormal rains in 1845 and in 1851; thus, rain diagrams show a sharply defined positive area for the intervening years. At St. Louis precipitation decreased considerably after 1848 but increased again to the all time maximum of 68.83 inches in 1858. In eastern Ohio, and as far east as Pittsburgh, the years 1846 to 1850 reveal similar characteristics for precipitation except that the amounts are not nearly as excessive as in southwestern Ohio. Annual fluctuations were more marked subsequent to the early years mentioned and down to the year 1890. To the south, Springdale, Kentucky, showed an average excess for the period 1846 to 1850 of 5.33 inches. Much farther south, at New Orleans, rain was below normal within the wet interval, while as far east as Rochester, N. Y., it was just slightly in excess.

The above figures would serve to uphold the tradition that "it doesn't rain like it used to," at least for a few sections in the Northeastern States. For southwestern Ohio it looks as if back in the years 1846 to 1850 rain making forces within the atmosphere reached their maximum of recorded history. Annual amounts of 56 inches or more appear in the records as late as the year 1890, but after that they are exceeding rare. The accompanying graphs of precipitation at Dayton, Cincinnati, and St. Louis were taken from the *Climatic Summary of the United States*, 1930 edition.



Total annual precipitation (inches) 1845-51

Year	Dayton, Ohio	Cincinnati, Ohio	Portsmouth, Ohio	Marietta, Ohio	Steubenville, Ohio	Pittsburg, Pa.	Springdale, Ky.	St. Louis, Mo.	New Orleans, La.	Rochester, N. Y.
1845.....	(1)	46.38	40.05	33.90	38.44	31.89	43.28	37.99	54.43	34.44
1846.....	62.96	53.52	45.39	46.27	52.21	47.79	47.80	45.45	67.29	37.13
1847.....	59.43	65.18	48.30	52.30	57.28	46.22	50.12	52.72	53.51	36.14
1848.....	45.58	50.58	41.14	43.18	50.25	34.14	58.36	65.39	53.49	32.03
1849.....	56.37	52.97	43.26	42.89	47.32	34.81	45.27	43.71	52.52	32.67
1850.....	(2)	54.70	57.20	52.36	46.98	37.41	67.10	50.50	51.13	38.49
1851.....	(3)	31.70	30.97	34.94	28.59	29.64	42.34	48.84	50.11	24.97
Average 1846-50.....	56.21	55.40	47.06	47.40	50.81	40.07	53.73	51.95	55.57	35.33
Official averages to 1930.....	37.86	38.55	41.06	42.25	41.15	35.91	48.40	37.44	57.35	33.23

1 Partial record; below average, 7 months.
 2 Partial record; above average, 7 months.
 3 Partial record; below average, 9 months.
 4 4-year average.

NOTES AND REVIEWS

JOHN A. LAPP, et al. *Meteorology as a career*. The Institute for Research. Chicago. 1938.

This 24-page booklet is designed to aid individuals, who are concerned with the problem of choosing a career, in reaching a decision with regard to a career in meteorology. The booklet opens with a few introductory paragraphs on the definition, delimitations, history, and description of the science of meteorology. This is followed by a few paragraphs on the Weather Bureau: its history; a summary of its functions and services; and a list of its positions including their salary ranges. The processes involved preliminary to making the official weather forecast and the duties of the personnel at a district forecast center are then reviewed. Private concerns and Government agencies other than the Weather Bureau are mentioned

as employers of meteorologists and climatologists, while the practical restriction of the field to male employees is emphasized. The particular importance of and the duties involved in the application of meteorology to airline operation are considered in some detail. The personal and educational qualifications desired in meteorologists are stated and some of the opportunities awaiting the qualified few are indicated. Brief comments are made relative to the duties and salaries of meteorological positions in the Canadian service. As a further aid to those interested in meteorology as a career, a list of meteorological associations, periodicals, and suggested readings is added.

The booklet, which is 8½ by 11 inches, is bound in a heavy brown-paper cover and is priced at \$1.—Charles M. Lennahan.

BIBLIOGRAPHY

[RICHMOND T. ZOCH, in Charge of Library]

By AMY D. PUTNAM

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:

- Bowman, Isaiah. Limits of land settlement; a report on present-day possibilities. New York, Council on foreign relations. [c1937]. vii, 380 p. maps (1 fold.). 24-½ cm.
- Eisenlohr, Roland, & others. Flugtechnisches Handbuch. Berlin, Leipzig. 1936. Band IV. Atmosphäre, Wetter. Physikalische und technische Tabellen. Ballone und Luftschiffe. illus., diags. 22½ cm.
- Fellows, Jennie Dorcas. Cataloging rules, with explanations and illustrations, prepared by Dorcas Fellows, instructor in advanced cataloging, New York state library school. 2d ed., rev. and enl. New York, H. W. Wilson company, 1926. xv, 303 p. illus. 26 cm. Based on the A. L. A. catalog rules.

- French, Thomas Ewing. A manual of engineering drawing for students and draftsmen. 5th ed., rev. and enl. New York & London. 1935. xii, 481 p. illus. (incl. plans), diags. 23½ cm. "Bibliography of allied subjects": p. 434-439.
- Grober, Julius. Die Akklimatisation, eine Untersuchung über ihre Bedingungen, ihre Fehlschläge und ihre erfolgreiche Führung. Jena. 1936. 156 p. 25½ cm.
- King, Horace Williams. Handbook of hydraulics for the solution of hydraulic problems. 1st ed. New York. 1918. xvi, 424 p. incl. tables, diags. fold. diag. 17½ cm.
- Lake-carriers' association. Annual report. 1937. Detroit. 1938. plates, ports., maps, 24 cm. 176 p. "Weather bureau service," p. 160-161.
- U. S. Geological survey. Surface water supply of the United States, pt. vi. Missouri river basin. 1936. Washington. 1938. plates, maps, etc. 23 cm. (Its Water-supply paper 806.)