Arago (in 1811) and of Brewster, relative to sky polarization, and the experiments of Brücke and of Tyndall[2] first indicated the true explanation, and later the necessary theory was supplied by Lord Rayleigh.[3] The conclusions of the latter have been verified by King,[4] Cabannes[5] (who was the first to observe the scattering of light by dust-free air), Lord Rayleigh (then Prof. Strutt), who made a very comprehensive study of the relative scattering power of different gases and its dependence upon the density of the gas, together with an investigation of the state of polarization of the scattered light,[6] and R. W. Wood.[7]

On the subject of the light from the night sky and whether or not it can all be accounted for by starlight; as well as whether the total light from all theoretically existing stars can satisfactorily account for the observed illumination of the night sky, a voluminous literature exists.[8]—*E. W. W.*

[2] W. J. Humphreys, loc. cit. H. H. Kimball, Jour. Frank. Inst., April, 1911, p. 344.
[3] Phil. Mag., vol. 41, pp. 107, 274, 447, 1871; vol. 12, pp. 81, 1881; vol. 47, p. 375, 1899.
[4] L. V. King, On the Scattering and Absorption of light in gaseous media, with applications of the intensity of sky radiation, Phil. Trans., A, 212, 375–433, 1913.
[5] J. Cabannes, Sur la diffusion de la lumière par l'air, Comptes Rendus, 160, 62–63, 1915.
[6] Proc. Roy. Soc., A, 94, 453; 95, 155, 1918.
[7] R. W. Wood, Light Scattering by Air and the Blue Colour of the Sky, Phil. Mag., 39, 423–433, 1920; see Monthly Weather Review, 48, 220, April, 1920; also Monthly Weather Review, 44, 246, 1916; 45, 484, 576, 1917; 46, 70, 1918; 47, 797, 1919. On the brightness and total light of the sky, etc., see the *Annals* of the Astrophysical Observatory, Smithsonian Institution; F. E. Fowle, Atmospheric Scattering of Light, Smiths. Misc. Coll., 69, No. 3, 1918; A. F. Moore and L. H. Abbot, Brightness of the Sky, Misc. Coll., 71, No. 4; M. Luckiesh, Aerial Photometry, Astrophys. Jour., 49, 108–130, 1919; Monthly Weather Review, 47, 540, 1919.
[8] See, e. g., E. E. Barnard, On the Dark Markings of the Sky, Astrophys. Jour., 49, 1–23, 1919; W. J. Humphreys, On "Earth-Light," or the brightness, exclusive of starlight, of the midnight sky, Astrophys. Jour., 35, 273–278, 1912; E. E. Barnard, Self-Luminous Night Haze, Proc. Amer. Phil. Soc., 50, 246–253, 1911; 58, 223–235, 1919; P. J. van Rhijn, On the Brightness of the sky at night and the total amount of starlight, Astrophys. Jour., 50, No. 5, 1919; W. D. MacMillan, Astrophys. Jour., 48, 35–49, 1918; V. M. Slipher, Astrophys. Jour., 49, 266–275, 1919.

RAINFALL AT MUSCATINE, IOWA.

By WM. P. MOLIS.

The *Journal of the American Water Works Association*, for January, 1920, pages 127–131, contains an interesting and practical discussion of the use of rainfall data in the municipal water works. The data on rainfall at Muscatine covered a period from 1846 to 1918. As the author points out, "the rainfall is the source of the water supplies of our communities, and long-time records of it are invaluable in estimating the quantity of water obtainable from a surface supply and in investigations of the quantity which exists as ground water. Such data are also valuable in studies of the relation between rainfall and floods. Few who have not experienced flood difficulties realize the danger which may arise if their pumping stations and machinery are situated on low lands exposed to overflow. A rain of one week or a cloudburst will suddenly swell the streams to such a height as to make quick work by the water department necessary in order to save the plant from being put out of commission."

It was found that the average annual rain and snowfall was about 37 inches. The minimum for the period studied was 23.04 inches in 1910, and the maximum was 74.50 inches in 1851. Another interesting point is that when the average precipitation for two thirty-year periods, 1846–1875 and 1876–1915 are compared it is found that it is 2.46 inches less for the second period than the first. Unusually severe rains (at Muscatine, those over 1.5 inches in 24 hours are so regarded) are studied with a view to determining the probability of such occurrences; it is believed that if a 2-inch fall of rain does not occur at some time during the first six months of the year, it is almost certain to occur during July, August, or September. It is dangerous, of course, to place too much confidence in such frequency tables, but, when this fact is remembered, such data may be of grrat practical value to the superintendent of water works in planning to meet emergencies.—*C. L. M.*

CERTAIN ENVIRONMENTAL FACTORS INFLUENCING THE FRUITING OF COTTON.

By E. C. EWING.

[Technical Bull. No. 8, Miss. Agr. Expt. Station, 1918.]

The relation of weather and soil conditions, and of the varietal, or hereditary, factors, to the rate of fruiting and shedding are treated in considerable detail, but this review is restricted to the meteorological aspect of the problem.

A daily census of flower production, started in 1911, showed a pronounced variation in the number of flowers opening from day to day. Weather influence on this variable rate was suspected; but owing to limited meteorological data, the maximum and minimum temperatures, precipitation, and the charcter of the day as to the degree of cloudiness, no definite relation between any of these weather elements and the rate of blossoming was apparent. In 1913 additional meteorological instruments were installed, including a thermograph, hygrograph, porous cup atmometer, and a photographic sunshine recorder. In addition, soil moisture observations were made each day, first to a depth of 12, and later to 18 inches. Observations were made on this basis during that and the succeeding year, except for sunshine in 1914 when a defect in the sunshine recorder prevented observations by that instrument.

The tabulation and study of the data obtained from these observations, however, did not show any marked or dependable relation between the additional data secured and the rate of blossoming. In the case of temperature, the curve indicating the daily minimum values appeared to vary rather frequently in the same direction as the flowering curve. As a result of the studies during the four-year period from 1911 to 1914, it may be stated, but only in a very general way, that temperatures below 65° F. may be expected to decrease the number of flowers opening about two days later.

There was also some indication of agreement between the percentage of soil moisture and the flowering data, but this was less suggestive than in the case of minimum temperature. Increased soil moisture seemed to inhibit flowering somewhat, irrespective of the trend of the minimum temperature curve, as in some cases the rate of flowering was retarded after rain and increased soil moisture when the minimum temperature remained high.

The other weather elements showed little or no relation to the rate of flowering, but unfortunately, from the experimental viewpoint, no abnormalities of consequence in the weather elements prevailed; otherwise more definite results probably would have appeared. During protracted periods of cloudy and rainy weather, rank stock growth in cotton at the expense of fruit is not uncommonly observed, for under such conditions growth occurs mostly, not so much by multiplication of nodes as by the lengthening of the inner nodes.

Normal shedding, or abscission, of a variable number of immature fruits of the cotton plant is the general experience in America. It is the opinion of cotton growers that either too little or too much moisture will cause cotton shedding. From some studies made in Egypt, it has been shown that shedding becomes abundant there toward the end of the interval between irrigations and