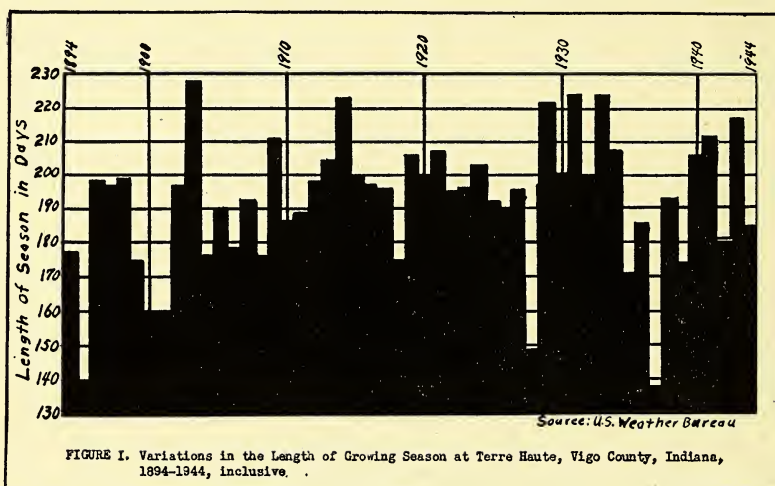


Variations in the Growing Season—Vigo County, Indiana

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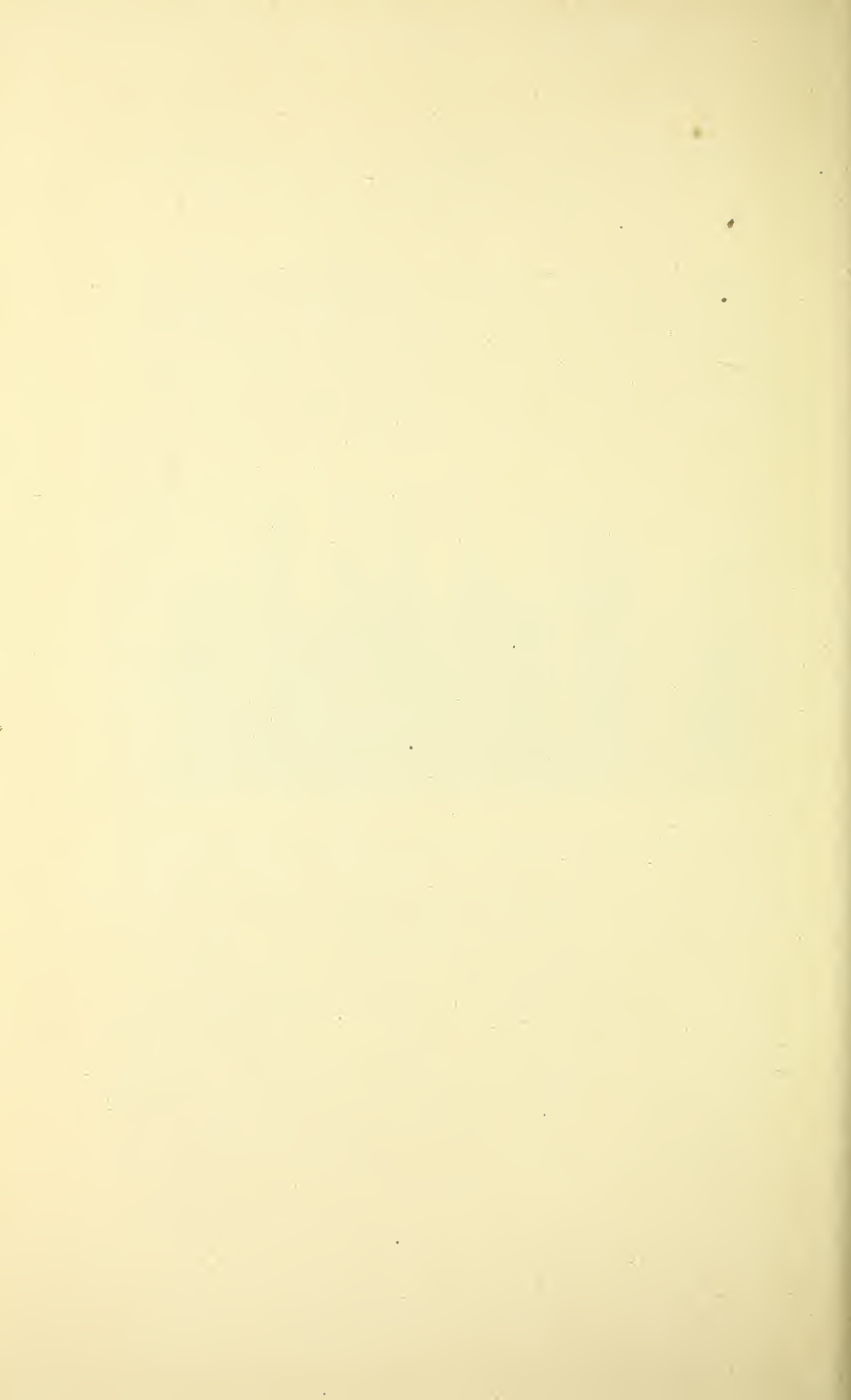
In Vigo County, Indiana, as is true in all counties of the state, the length of the growing season is one of the most significant climatic factors in limiting crop production. The wide variation from year to year in the dates of the last killing frost in spring and the first killing frost in autumn creates a hazard only too well recognized by the average farmer. In view of that fact a knowledge of the probabilities relative to the variations in the frost-free season¹ are highly desirable. The



element of chance the farmer must take with tomatoes, for example, causes the producer to be interested in a knowledge of what his chances are of avoiding the late spring frosts. The farmer, in other words, is highly interested in reducing the element of chance and increasing the element of certainty with respect to planting and harvesting dates.

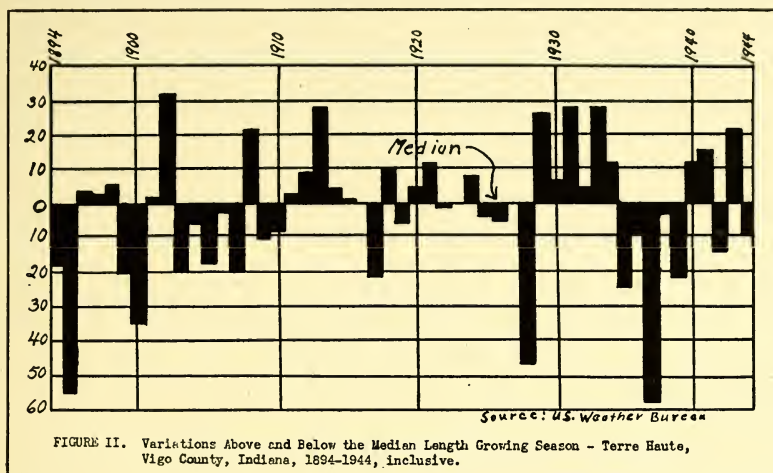
Many commendable studies have been made, and the results published, of weather phenomena in Vigo County and Indiana as a whole. Among the studies those dealing with the growing season have been noteworthy. However, such studies have usually been based upon the average growing season and variations therefrom. In working out the data for Vigo County, the median rather than the average dates have been used. The 20, 40, 50, 60 and 80 percentiles were used as a basis of analysis. By use of the median it is believed that a more comprehensive

¹ The term frost-free season is used in this study in the same sense as the growing season.



and meaningful analysis of the possibilities of late spring and early autumn frosts may be secured. Hence the results of this study are presented upon the above mentioned merits.

The only United States weather bureau station in Vigo County is located in Terre Haute, where continuous records of frost data have been recorded for a period of 51 years.² During this period the median length



of the frost-free season was 195 days. This means that in the past 51 years 50 per cent of the time the growing season was 195 or more days in length. Calculations for the other four percentiles were as follows: 20 per cent, 204 or more days; 40 per cent, 198 or more days; 60 per cent, 190 or more days, and 80 per cent of the time the growing season was at least 176 days in length (Table I).

Table I. Length of the Frost-Free Season—Terre Haute, Vigo County, Indiana—1894-1944, Inclusive

Per Cent of Time	80%	60%	50%	40%	20%
Length of season in days	176 or more	190 or more	195 or more (Median)	198 or more	204 or more

The variations in length of the frost-free season are great (Figure I). The longest season on record was 228, while the shortest was 138 or a variation of 90 days. This difference is sufficient for the maturity of several crops produced by Vigo County farmers.

² All of the data used as a basis for this study are those published by the United States Weather Bureau.

The yearly variations show little or no symmetry nor regular fluctuations. For example, in 1928 the season was 149 days in length as compared to 222 days in the following year. However, during the six-year period from 1929 to 1934, inclusive, the frost-free season was at no time less than 200 days or five days above the median (Figure II). During the next five-year period, 1935 to 1939, the season was never longer than 193 days or 2 days below the median for the 51-year record. These data indicate clearly the constant hazard presented to the farmer.

Not only does the variation in the actual length of the growing season present a hazard to crops but variations in the dates of the last killing frost in spring and the first killer of autumn also present problems. During the 51-year period under discussion the last killer in spring has occurred as early as March 17 and as late as May 29 at Terre Haute. This is a difference of 73 days. The median date for the last killing frost in spring was April 13 (Table II). Twenty per cent of the time

Table II. Per Cent of Time Last Killing Frost of Spring Occurred on Certain Dates at Terre Haute, Vigo County, Indiana, 1894-1944, Inclusive

Per Cent of Time	80%	60%	50%	40%	20%
Date	April 2 or later	April 9 or later	April 13 or later (Median)	April 14 or later	April 21 or later

the date was April 21 or later; 40 per cent, April 14 or later; 60 per cent, April 9 or later, and 80 per cent of the time on April 2 or later. As was true with respect to the lack of uniformity in yearly fluctuations so it has been with successive yearly dates of the last killing spring frosts. For example, in 1938 the last killer occurred on April 9, four days ahead of the median date while during the previous spring of 1937 the date was May 29, the latest date on record. In 1928 and 1929 the dates were April 28 and March 17, respectively. Numerous similar examples are present in the data.

Table III. Per Cent of Time First Killing Frost of Autumn Occurred on Certain Dates at Terre Haute, Vigo County, Indiana, 1894-1944, Inclusive

Per Cent of Time	80%	60%	50%	40%	20%
Date	Nov. 2 or earlier	Oct. 27 or earlier	Oct. 23 or earlier (Median)	Oct. 20 or earlier	Oct 12 or earlier

Source of data: U. S. Weather Bureau.

The median date for the last killing frost in autumn was October 23 for the 51-year period under consideration. The earliest date for the fall was September 24, and the latest date was November 23, or a fluctuation of 60 days. This is 14 days less than the variation between the dates for the spring frosts. Twenty per cent of the time the first killing frost of autumn did not occur until November 2 or later; 40 per cent of the time on October 27 or later; 60 per cent of the time on October 20 or later, and 80 per cent of the time not until October 12 or later.

Only three times since 1894 has the first killing frost occurred before October 1. These dates were in widely separated years, 1899, 1928 and 1942.

One may rightfully inquire just what value the foregoing data may have for the agriculturist of Vigo County. The farmer who has data of this type available is better able to judge when and what per cent of the time to expect frosts in spring and fall. For example, a farmer who wishes to grow an early crop of sweet corn will take a 20 per cent chance of it being killed by a late spring frost after April 21. On the other hand, unless the farmer's corn or soy bean crop is matured by October 20, there is a 40 per cent chance of these crops being caught by a killing frost.

It becomes apparent that numerous other possibilities may be computed. By using quartiles of fives, close predictions may be made. In the use of any of these data it must be assumed that the records of the past are a safe criterion in making forecasts for the future. Only thus are the data of value for prediction. However, since the record is comparatively short and the variations are large it is not claimed that the figures presented may be used as a final basis for forecast. They do, however, present the conditions that have obtained during the past 51 years at Terre Haute in Vigo County, Indiana.