

## PHENOLOGICAL NOTES FOR 1928 ON MIDDLE WESTERN SPRING FLOWERS

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THE WORK of comparing lists of first blooming dates of middle western spring flowers started in 1927 was continued in 1928. This year's results are here presented in tabular and graphical form. It is the intention to publish this later in detail after data for several more years have been gathered; hence only a brief summary is presented at this time.

Lists were exchanged between correspondents at twenty-two universities and colleges and the writer at the University of Oklahoma. These lists were sent every two weeks from the time the flowers started blooming in early spring until the end of May. They consisted of the scientific and common names of plants, the date of first blooming, and a brief note as to the habitat and locality. This opportunity is taken to acknowledge and thank those who cooperated in this matter. Those taking part were:

- Mr. Edwin Bogusch, University of Texas, Austin, Texas.
- Mr. U. R. Gore, Texas Agricultural and Mechanical College, College Station, Texas.
- Mrs. Hortense Winton, Texas Christian University, Fort Worth, Texas.
- Miss Voncile Womack, Oklahoma College for Women, Chickasha, Oklahoma.
- Professor Delzie Demaree, University of Arkansas, Fayetteville, Arkansas.
- Dr. Robert Stratton, Oklahoma Agricultural and Mechanical College, Stillwater, Oklahoma.
- Miss Bess Avery, University of Tennessee, Knoxville, Tennessee.
- Miss Esther Hulpieu, Southwestern College, Winfield, Kansas.
- Miss Mildred Mathias, Missouri Botanical Garden, St. Louis, Missouri.
- Miss Mary L. Knoop, University of Missouri, Columbia, Missouri.
- Miss Helen Bishop, University of Colorado, Boulder, Colorado.
- Miss Constance Nice, Ohio State University, Columbus, Ohio.
- Miss Rena Caskey and Miss Elizabeth Buettzenbach, Nebraska State Teachers College, Peru, Nebraska.
- Professor Elda R. Walker, University of Nebraska, Lincoln, Nebraska.
- Miss Anabel Clark, Iowa Wesleyan College, Mount Pleasant, Iowa.
- Mr. Elbert Little, University of Chicago, Chicago, Illinois.
- Mr. D. G. Deihl, Grinnell College, Grinnell, Iowa.
- Dr. Hilary S. Jurica, St. Procopius College, Lisle, Illinois.
- Miss Myrel Burk, Iowa State Teachers College, Cedar Falls, Iowa.
- Professor H. H. Camburn, Nebraska State Normal College, Chadron, Nebraska.
- Dr. Mary E. Renich, Augustana College, Sioux Falls, South Dakota.
- Mr. O. A. Stevens, North Dakota Agricultural College, Fargo, North Dakota.

The plants blooming at each station were checked against the same species blooming in the vicinity of the University of Oklahoma, dates of each were noted, and from these was computed the average number of days that the season of each station was earlier or later than that of the University of Oklahoma. These results are given in the following table:

TABLE OF AVERAGE SEASONAL DIFFERENCES

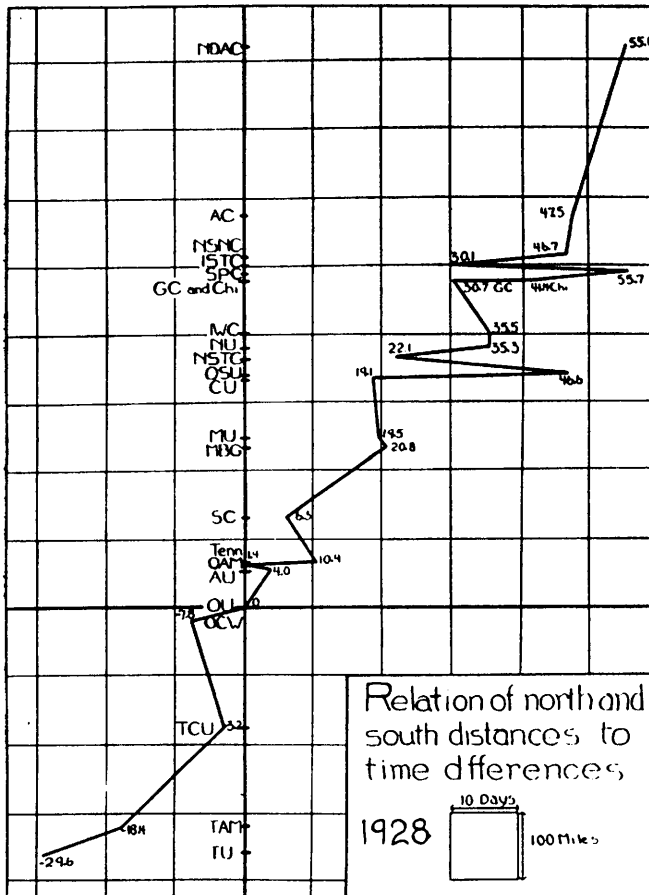
Reckoned with Norman, Oklahoma, as zero.

Name of school	Distance north or south of O.U.	Days earlier or later	No.Plants in common	Data for 1927
University of Texas TU	360 south	29.6 earlier	15	8.1 earlier on 22 plants
Texas A. & M. College TAM	320 south	18.4 earlier	27	33.7 earlier on 7 plants
Texas Christian University TCU	175 south	3.0 earlier	13	.9 later on 29 plants
Oklahoma College for Women OCW	20 south	7.8 earlier	21	4.2 later on 31 plants
University of Oklahoma OU	0	0		
University of Arkansas AU	55 north	4.0 later	21	
Oklahoma A. & M. College OAM	60 north	1.4 later	37	4.1 later on 49 plants
University of Tennessee Tenn	62 north	10.4 later	22	
Southwestern College SC	135 north	6.3 later	71	12.6 later on 48 plants
Missouri Botani- cal Garden MBG	235 north	20.8 later	49	21.1 later on 35 plants
University of Missouri MU	250 north	19.5 later	12	23.6 later on 9 plants
University of Colorado CU	335 north	19.1 later	12	29.7 later on 12 plants
Ohio State University OSU	340 north	46.6 later	6	
Nebraska State Teach- ers College NSTC	365 north	22.1 later	6	
University of Nebraska NU	380 north	35.3 later	8	
Iowa Wesleyan College IWC	403 north	35.5 later	11	25.1 later on 30 plants
University of Chicago Chi Grinnell	480 north	41.4 later	20	
College GC St. Procopius	480 north	30.7 later	8	
College SPC Iowa State Teach- ers College ISTC	490 north	55.7 later	14	
500 north	30.1 later	49		
Nebraska State Normal College NSNC	560 north	46.7 later	4	
Augustana College AC	575 north	47.5 later	4	
North Dakota Agricultural College NDAC	820 north	55.1 later	14	

Note: Distances are only approximate. Initials following names of schools refer to the way in which they are designated on the graph.

The results are represented on the accompanying graph, in which the north and south distances are plotted vertically and the seasonal differences in days plotted horizontally. The resulting line shows two distinct features:

1. The season varies directly with the distance north and south, and advances about five days for every degree of latitude. An approximate average



would approach a straight line. The tendency noted in the graph of 1927 in which the season became later than normal in the northern stations was not repeated this year.

2. A distinct tendency is noticed for eastern stations to be later than western ones. This is well shown in the case of the University of Colorado and Ohio State University. There is about five miles difference in their distance north of Norman, Oklahoma, yet Ohio State University is 46.6 days later than Norman, and the University of Colorado is only 19.1 days later; this is a difference of 27.5 days. Another example is that of the University of Arkansas, Oklahoma A. & M. College, and the University of Tennessee, all within seven miles of the same distance north of Norman. Oklahoma A. & M. College, the farthest west, is 1.4 days later than Norman, the University of Arkansas, the next farthest west, is 4 days, and the University of Tennessee, the easternmost, is 10.4 days later. The plotting of the Missouri Botanical Garden and the University of Missouri shows

a trend in this direction. That of Grinnell College and the University of Chicago is most striking, although consideration must be made of the fact that the presence of Lake Michigan undoubtedly makes the season later. It is planned to check this tendency another year with results from a greater number of eastern stations.

In regard to the distribution of these plants, it is noticed that the majority of widely spread plants are either trees or introduced species. In the following list plants are noted which are reported from ten or more of the twenty-two stations. Those marked 'T' are trees, those marked 'I' are introduced, and those marked '\*' are native herbs.

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T	<i>Ulmus americana</i> L.	20 stations
T	<i>Acer saccharinum</i> L.	19
I	<i>Capsella Bursa-pastoris</i> (L.) Medic.	17
I	<i>Taraxacum officinale</i> Weber.	17
*	<i>Claytonia virginica</i> L.	15
T	<i>Populus deltoides</i> Marsh.	14
I	<i>Stellaria media</i> (L.) Cyrill	13
T	<i>Cercis canadensis</i> L.	11
*	<i>Androsace occidentalis</i> Pursh.	10
T	<i>Prunus americana</i> Marsh	10
T	<i>Ulmus fulva</i> Michx.	10

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*Conclusion:* Although two seasons' work is hardly sufficient to give data for definite conclusions, the present indications lead to the following:

1. The season varies directly with the distance north and south and advances one degree of latitude in about five days.
2. The season is later at eastern stations than at western ones of approximately the same latitude.