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REGARDING WASHINGTON, D. C., PRECIPITATION AND TEMPERATURE, 1952 AND 1953

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REGARDING WASHINGTON, D. C., PRECIPITATION AND TEMPERATURE, 1952 AND 1953

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Nine years ago I drew attention to a period of 27.0074 days in the precipitation at Washington, D. C.[1] Since then I have published annually in advance 175 dates throughout each year in which the average daily precipitation was expected to exceed the average daily precipitation on all other days of those years. From statistical studies of Washington precipitation, January 1924 to December 1941, it was believed that the precipitation for the days I, II, III, IV, V, XII, XIII, XV, XVII, XVIII, XXII, XXVI, and XXVII of the 27.0074-day cycles, based on January 1, 1924, as the first I day, would average 142 percent as great as the average precipitation on all other days. For 18 successive years, ending December 1951, the average precipitation on those selected days has been for each year above that for all other days, and the ratio $\frac{\text{average selected}}{\text{all others}}$ for 18 years was 146 per cent.[2]

In 1952, for the first time in 19 years, that ratio fell below unity, and was, in fact, only 62 percent, as shown in table 1. In only 3 months out of 12 did that ratio exceed unity.

On July 8 and 9 there fell 2.42 inches of rain, on August 31 and September 1, 3.60 inches, and on November 20 and 21, 4.77 inches, all being on days not included among my "preferred" dates. These heavy rainfalls were unusual and contributed largely to the failure of my forecast.

I sought to discover why the nineteenth year differed so widely from the previous 18. Had the cycle utterly failed? Or had there been a displacement of phases, with the cycle still persisting? To fix ideas on this inquiry, I give in figure 1 a replica of curve 1 of figure 1 of my publication of 1944, cited above, and above it the

[1] Smithsonian Misc. Coll., vol. 104, No. 3, 1944.

[2] Smithsonian Misc. Coll., vol. 117, No. 9, 1952.

average precipitation for the days I to XXVII of the 13 complete cycles of 1952, based on day number I, being January 10, 1952, which is the next succeeding day number I after those of 1951.

It will be seen from figure 1 that "preferred" days I, II, XV, XXVII, and XXVIII in the average of the cycles of 1952 are high in precipitation, but the remaining eight "preferred" days of the 27 days of the cycle fall below the average during 1952. But days VIII, XIV, XVI, XIX, XX, XXIV, and XXV, not among the "preferred" days of the cycle, had high precipitation in 1952. Especially the day XX is so extraordinarily high that it would be unlikely to happen for any

TABLE 1.—*Statistics of Washington precipitation, 1952*

	Jan.	Feb.	Mar.	Apr.	May	June
Average per day { Pfd.	0.198	0.034	0.034	0.333	0.027	0.082
Average per day { All other	0.101	0.097	0.270	0.139	0.160	0.106
Ratio Pfd. / All other	1.96	0.35	0.13	2.40	1.29	0.77
	...	...	...	...	...	...
Total ppt.	4.48	1.99	4.60	7.28	5.59	2.87
Normal ppt.	3.55	3.27	3.75	3.27	3.70	4.13
Percent normal	126	61	123	223	151	144

	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Average per day { Pfd.	0.076	0.159	0.028	0.013	0.034	0.082	0.109
Average per day { All other	0.161	0.304	0.213	0.031	0.467	0.137	0.176
Ratio Pfd. / All other	0.47	0.50	0.13	0.42	0.08	0.60	0.62
	...	...	...	...	...	...	...
Total ppt.	3.63	7.25	3.80	0.70	7.08	3.36	52.63
Normal ppt.	4.71	4.01	3.21	2.84	2.37	3.22	42.16
Percent normal	77	181	119	28	299	104	125

cycle day if the cycle is illusory. I infer that the cycle of 27.0074 days still stands, but the phases of it are shifted to 2 days earlier than in former years. Under that interpretation, the precipitation for cycle days I, II, III, X, XI, XIII, XV, XVI, XX, XIV, XV, XVI, XVII, if substituted for the "preferred," would be found to yield the results in table 3 for the year 1952, in which 8 of the 12 months are favorable, and the year's ratio, 1.57, becomes normal.

I do not know what caused this apparent shift of phases. Possibly the haziness of the atmosphere has been altered by the intensive artillery and heavy bombing actions of the Korean war, and by the tests here and in Russia and Britain of atomic bombs. It is altogether uncertain whether this change of phases will persist in 1953. Accordingly I give in table 2 the "preferred" days of the cycles as heretofore, and in addition, designated by italic type, the dates which should be

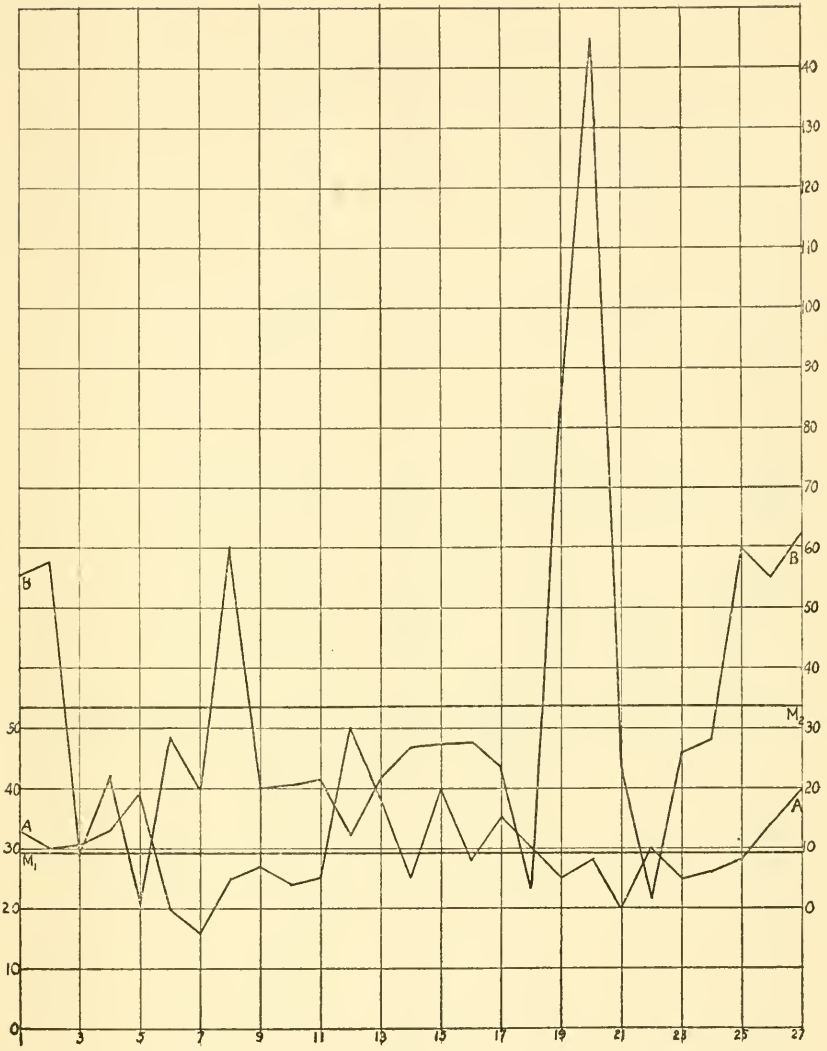

FIG. 1.—Frequency of precipitation on days of 27.0074-day cycle. A, Average, 1924 to 1941. B, Average, 1952.

TABLE 2.—*Predicted dates when average daily precipitation at Washington should exceed that on other dates for the year 1953*

"Preferred"* cycle places	Jan.	Feb.	Mar.	Apr.	May	June
I.....	22	18	17	13	10	6
II.....	23	19	18	14	11	7
III.....	24	20	19	15	12	8
IV†.....	25	21	20	16	13	9
V.....	26	22	21	17	14	10
X.....	*4, 31*	*27*	*26*	*22*	*19*	*15*
XI.....	*5*	*28, 1*	*27*	*23*	*20*	*16*
XII.....	6	2	1, 28	24	21	17
XIII.....	7	3	2, 29	25	22	18
XV.....	9	5	4, 31	27	24	20
XVI.....	*10*	*6*	*5*	*1, 28*	*25*	*21*
XVII.....	11	7	6	2, 29	26	22
XVIII.....	12	8	7	3, 30	27	23
XX.....	*14*	*10*	*9*	*5*	*2, 29*	*25*
XXII.....	16	12	11	7	4, 31	27
XXIV.....	*18*	*14*	*13*	*9*	*6*	*2, 29*
XXV.....	*19*	*15*	*14*	*10*	*7*	*3, 30*
XVI.....	20	16	15	11	8	4
XVII.....	21	17	16	12	9	5

"Preferred"* cycle places	July	Aug.	Sept.	Oct.	Nov.	Dec.
I.....	3, 30	26	22	19	15	12
II.....	4, 31	27	23	20	16	13
III.....	5	1, 28	24	21	17	14
IV†.....	6	2, 29	25	22	18	15
V.....	7	3, 30	26	23	19	16
X.....	*12*	*8*	*4*	*1, 28*	*24*	*21*
XI.....	*13*	*9*	*5*	*2, 29*	*25*	*22*
XII.....	14	10	6	3, 30	26	23
XIII.....	15	11	7	4, 31	27	24
XV.....	17	13	9	6	2, 29	26
XVI.....	*18*	*14*	*10*	*7*	*3, 30*	*27*
XVII.....	19	15	11	8	4, 31	28, 1
XVIII.....	20	16	12	9	5	29, 2
XX.....	*22*	*18*	*14*	*11*	*7*	*31, 4*
XXII.....	24	20	16	13	9	6
XXIV.....	*26*	*22*	*18*	*15*	*11*	*8*
XXV.....	*27*	*23*	*19*	*16*	*12*	*9*
XVI.....	1, 28	24	20	17	13	10
XVII.....	2, 29	25	21	18	14	11

* Cycle days in italics would become "preferred" if the phase change of 1952 persists.
† Cycle days IV, V, XII, XVII, XVIII, XXII would cease to be "preferred" if said change persists.

substituted for "preferred" dates if the change of phases of 2 days persists in 1953. At the end of the year it will be seen which list is the better.

TABLE 3.—*Revised statistics of Washington precipitation*

Preferred dates 2 days earlier than in table 1

		Jan.	Feb.	Mar.	Apr.	May	June
Average per day	Pfd.	0.124	0.153	0.207	0.386	0.282	0.158
	All other	0.159	0.000	0.085	0.079	0.096	0.048
Ratio	Pfd. / All other	0.78	∞	2.44	4.89	2.94	3.28

		July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Average per day	Pfd.	0.154	0.136	0.237	0.026	0.203	0.026	0.179
	All other	0.078	0.326	0.030	0.020	0.274	0.196	0.115
Ratio	Pfd. / All other	1.97	0.42	7.90	1.30	0.74	0.13	1.57

TEMPERATURE AT WASHINGTON

Continuing previous reports on a period of 6.6485 days in Washington temperature, table 4 carries on from table 3 of last year's publication (Smithsonian Misc. Coll., vol. 117, No. 9).

In figure 2 are shown the relative frequencies with which the observed dates departed 0, 1, 2, and 3 days from dates predicted for 1952.

Possibly it may be significant, in view of what was shown above regarding precipitation in 1952, that temperature minima came most frequently one day before predicted. This has not occurred in former years.

TABLE 4.—*Dates in 1952 when minima in Washington temperatures were predicted and observed, and dates predicted for 1953*

	January					February					March				
1951 predicted	6	12	19	26		1	8	15	21	28	6	12	19	25	
1952 observed	7	11	19	24		Jan. 30	7	15	23	26	7	..	16	26	
1953 predicted	7	13	20	27		2	10	16	22		1	8	14	21	27

	April					May					June				
1952 predicted	1	8	14	27	28	4	11	18	24	31	7	13	20	27	
1952 observed	1	8	15	24	26	3	13	19	29	30	8	12	21	30	
1953 predicted	3	10	16	23	30	6	13	20	26		2	9	15	22	29

	July					August					September				
1952 predicted	3	10	16	23	30	5	12	19	25		1	8	14	21	28
1952 observed	2	10	16	25	..	8	14	20	23		Aug. 31	7	17	22	27
1953 predicted	5	12	19	25		1	7	14	21	27	3	10	16	23	30

	October					November					December				
1952 predicted	4	11	18	24	31	7	13	20	26		3	10	16	23	30
1952 observed	3	9	17	26	30	7	11	22	29		2	9	15	20	28
1953 predicted	6	13	20	26		2	9	15	22	28	5	12	18	25	

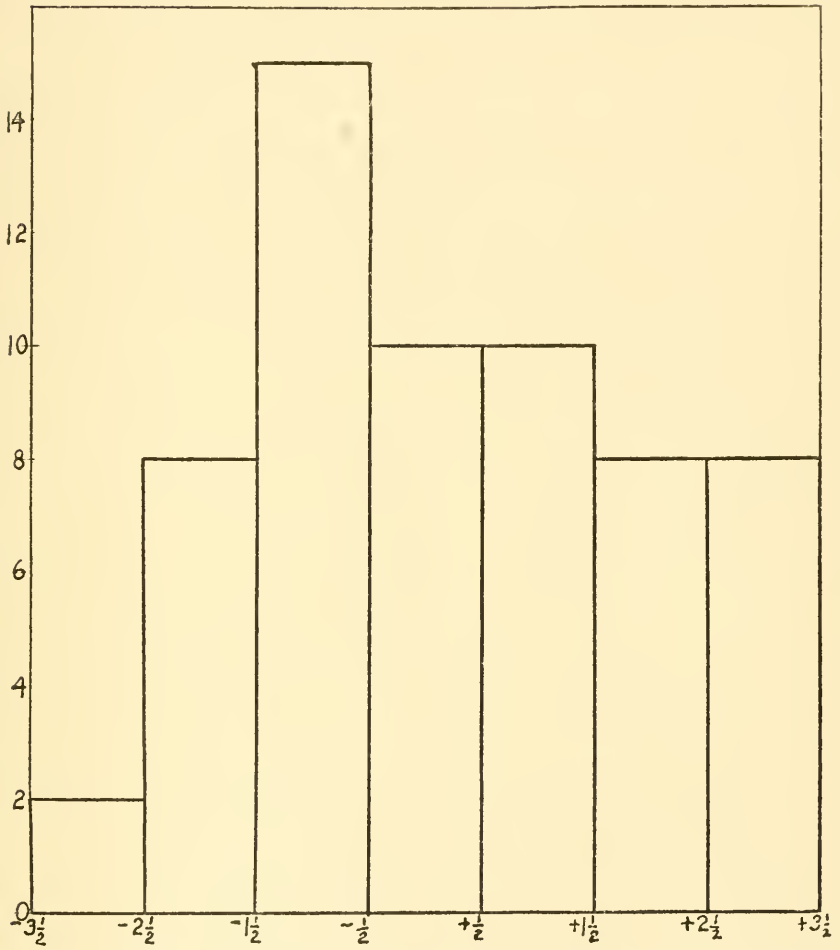

FIG. 2.—Relative frequency of temperature minima before and after predicted, 1952. Abscissae are days.