TABLE 2.—*Average hourly values of daytime radiation measured in gram calories per square centimeter on a horizontal surface. Scripps Institution of Oceanography, La Jolla, July 1, 1934—July 1, 1934*

	Hour ending at—													
	A. M.						Noon	P. M.						
	6	7	8	9	10	11	12	1	2	3	4	5	6	7
	gr. cal.	gr. cal.	gr. cal.	gr. cal.	gr. cal.	gr. cal.	gr. cal.	gr. cal.	gr. cal.	gr. cal.	gr. cal	gr. cal.	gr. cal.	gr. cal.
January			3.5	14.1	24.9	35.0	39.7	44.1	36.6	28.2	17.3	6.7	0.4	
February		0.3	5.4	15.5	25.5	35.4	40.4	41.0	39.2	34.2	23.8	11.5	2.2	0.1
March		2.5	12.0	24.0	36.4	44.6	49.7	51.6	48.1	42.0	31.0	16.5	4.9	.2
April	1.0	6.4	20.0	29.9	41.3	51.6	57.2	56.9	52.8	46.2	35.2	20.4	8.0	.8
May	2.0	9.6	19.6	31.1	42.1	53.3	60.7	61.6	56.1	48.2	38.3	24.2	10.8	1.8
June	2.3	8.7	17.4	29.9	40.5	49.7	56.1	58.6	54.6	48.3	39.3	26.0	12.4	2.7
July	1.6	6.5	15.1	27.3	38.5	48.3	54.3	54.9	51.2	44.8	35.5	22.7	11.1	2.5
August	.9	5.9	15.2	25.9	37.3	46.2	51.9	52.3	48.9	41.9	32.2	19.5	8.3	.9
September	.2	3.7	10.7	19.5	30.1	39.3	45.0	45.8	41.8	35.1	24.9	12.9	3.4	.1
October	.1	2.9	10.2	20.8	31.2	38.2	42.0	42.3	37.7	30.0	18.1	7.0	.6	
November		.8	8.6	20.0	31.4	38.2	41.8	40.9	33.7	24.9	15.3	5.0	.7	
December			4.4	15.7	25.4	33.1	36.2	36.2	32.0	22.3	12.5	3.0		
6-year hourly average of daytime radiation	.7	3.9	11.8	22.8	33.7	42.7	47.9	48.9	44.4	37.2	27.0	14.6	5.2	.8

TABLE 3.—*Average monthly values of the ocean surface temperature measured in degrees Centigrade, Scripps Institution of Oceanography Pier, La Jolla, Calif., July 1, 1928–July 1, 1934*

	1928	1929	1930	1931	1932	1933	1934	6-year monthly average
	° C.	° C.	° C.	° C.	° C.	°C.	° C.	° C.
January		13.9	14.7	15.3	13.3	13.0	13.3	14.0
February		13.3	14.8	16.1	13.3	12.6	14.0	14.0
March		13.8	14.9	16.8	14.8	13.5	15.7	14.9
April		14.5	16.6	18.0	14.8	14.9	17.3	16.0
May		17.6	17.2	19.0	16.1	15.4	19.2	17.4
June		18.7	18.7	20.0	19.0	17.3	16.1	18.8
July	19.8	21.3	19.4	23.7	19.5	18.7		20.4
August	20.1	21.9	21.6	23.3	18.8	19.0		20.8
September	18.1	20.0	19.7	20.1	18.6	17.0		18.9
October	17.4	18.5	18.1	18.8	17.4	17.0		17.9
November	15.7	16.8	17.5	16.5	16.2	15.4		16.3
December	14.6	16.0	16.2	14.1	14.0	13.9		14.7

TABLE 4.—*Average monthly air temperature at San Diego, Calif., measured in degrees Centigrade, July 1, 1928–July 1, 1934*

	1928	1929	1930	1931	1932	1933	1934	6-year monthly average
	° C.	° C.	° C.	° C.	° C.	° C.	° C.	° C.
January		12.5	13.2	14.3	11.2	11.6	13.4	12.7
February		11.8	14.4	15.1	13.1	11.5	14.6	13.4
March		13.1	15.4	16.6	15.0	13.9	16.6	15.1
April		14.2	16.7	17.7	15.7	14.3	16.8	15.9
May		17.1	15.6	19.0	16.6	14.6	18.2	16.9
June		18.5	18.1	20.4	17.7	16.5	17.8	18.2
July	19.2	20.8	20.9	23.1	18.7	18.6		20.2
August	19.6	22.2	21.3	23.2	18.9	19.2		20.7
September	19.0	20.1	19.4	21.0	18.7	17.1		19.2
October	16.8	19.3	18.2	19.2	17.3	16.9		18.0
November	15.7	16.7	17.2	14.2	17.9	17.3		16.5
December	13.4	15.7	13.9	12.1	12.4	12.8		13.3

TABLE 5.—*Average monthly daytime radiation in La Jolla, Calif., ocean surface temperatures at La Jolla, air temperatures in San Diego, July 1, 1928–July 1, 1934*

	La Jolla radiation	Surface temperatures, La Jolla	San Diego air temperatures
	gr. cal.	° C.	° C.
January	249.6	14.0	12.7
February	285.5	14.0	13.4
March	375.7	14.9	15.1
April	407.2	16.0	15.9
May	466.0	17.4	16.9
June	460.1	18.8	18.2
July	450.9	20.4	20.2
August	389.0	20.8	20.7
September	310.5	18.9	19.2
October	297.4	17.9	18.0
November	277.2	16.3	16.5
December	242.6	14.7	13.3

THE TEMPERATURES OF NEW ENGLAND [1]

By PHIL E. CHURCH

New England occupies about 66,000 square miles of the eastern margin of the continent between the parallels of 41° N. and 47° N.

Within this area are various types of relief which have an influence on the temperatures. A slightly irregular coastal lowland borders a sinuous coast. Hilly sections form the transition zone between the coastal lowland and the mountainous regions inland.

The backbone of New England is the mountainous northeastward extension of the Appalachian Mountain system. In western Massachusetts it forms the Berkshire Hills, in Vermont the Green Nountains, in New Hampshire the White Mountains, a continuation of which to the northeast is part of the Maine-Quebec boundary. No definite ranges make up the highlands of northern and western Maine. In various places the mountains of New England rise to moderate heights: Mount Greylock in western Massachusetts, 3,535 feet; Mount Mansfield in Vermont, 4,389 feet; Mount Monadnock in southern New Hampshire, 3,166 feet; Mount Washington, the highest in the Presidential Range and New England, 6,293, with several others nearby having an altitude over

[1] Abstract of a thesis presented in partial fulfillment of the degree of master of arts at Clark University, under the supervision of Prof. Charles F. Brooks.

4,000 feet, and Mount Katahdin in north central Maine, 5,273 feet.

The Green Mountains of Vermont extend through the entire length of the State from north to south. Their southward extension in western Massachusetts forms the Berkshire Hills, the Hoosac and Taconic Mountains. In Connecticut they diminish to low hills which disappear near Long Island Sound.

The White Mountains comprise the highland near the western edge of New Hampshire and continue southward into Massachusetts as the central highland there. Farther south the altitude decreases to low hills. The higher altitudes show a decided lowering of temperatures.

In eastern Maine, just back from the coast, is an area of perhaps 1,000 square miles having an altitude higher than 500 feet. This is the only coastal area of appreciable extent, along the lowland that skirts the whole of the New England coast, which has a noticeable effect on the temperature. The lowland strip, under 500 feet, varies from a few miles to about 100 miles in width. Cape Cod, Marthas Vineyard, Nantucket, and Block Island are considered a part of this coastal lowland.

Several low and wide river valleys have enough contrast in relief between the valley floor and the highlands on either side to make an appreciable difference in temperature. Some of these are the valleys of the Housatonic, Conn., Quinebaug, Merrimac, Saco, Androscoggin, Penobscot, St. Croix, and Aroostock Rivers and the Lake Champlain lowland.

New England is exposed to the extreme temperatures of the interior because of its position on the lee side of the continent, but these temperatures are moderated somewhat by the Atlantic Ocean. The shifting of the winds, due to the passage of high and low pressure areas, alternately brings air from over the land and ocean. The effects of the ocean often linger, thanks to the mountain barrier on the north and west.

The climate of New England is dominated by cyclonic activity bringing frequent and marked changes in the weather. Winter is moderately long and cold with a continuous snow cover from January to the middle of March; spring comes discouragingly late; summer passes after a few brief periods of high temperatures; autumn is clear, crisp and delightful. Precipitation is evenly distributed throughout the year. In all seasons sunny days are frequent.

The temperatures are characterized by wide differences resulting from the latitudinal range of 6°, the moderate differences in altitude, the proximity of the Atlantic Ocean, the continental winds, and the character of the local terrain.

The mean winter temperatures differ by more than 22° F. from northern Maine (Van Buren, 10.6° F.) to the islands off the south coast (Nantucket, 32.9° F.). This large contrast may be accounted for by the prevailing cold northwest winds. These winds attain somewhat higher temperatures along the coastal margin. Spring is considerably warmer and the contrast from north to south is much less than in the winter. The mean spring temperature map reveals a warmer belt on the lowlands inland from the coast. In summer there is a small difference in temperature from north to south with a greater definition of the warm inland belt and the cool coastal margin. Southwest wind prevails at this season. In autumn the small contrast from north to south continues though the wind prevails from the northwest in the latter part of the season.

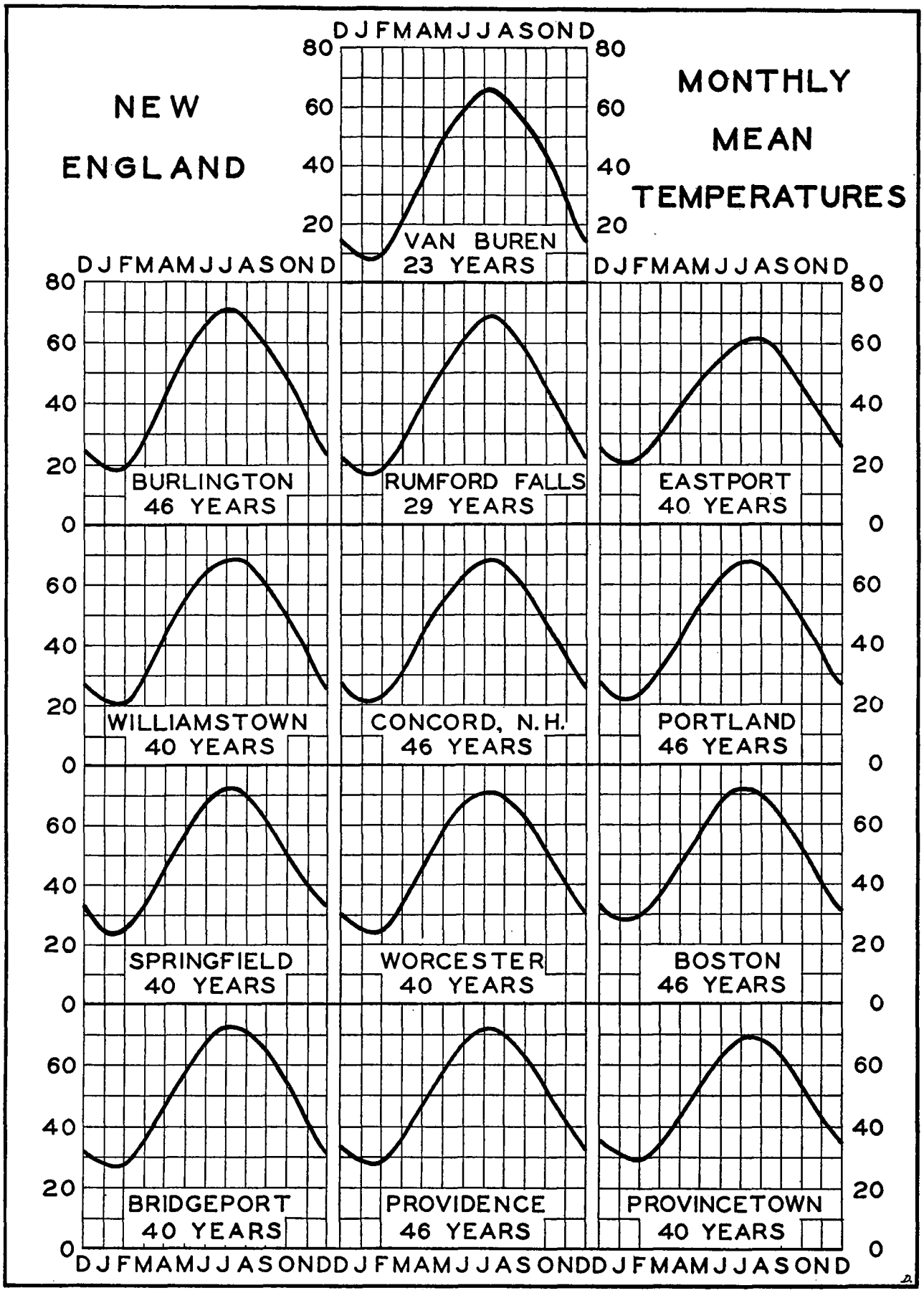
The lowest monthly means in New England come in January in the north and in February along the south coast. A difference of 24° F. within the small latitudinal range in midwinter is a contrast greater than that for the same difference of latitude in interior United States. This contrast results from the oceanic influence in the south and the continentality in the north. Temperatures increase rapidly and evenly from a minimum in January to a maximum in July, except at a few stations of more marine characteristics. At this time there is less than 10° F. difference over all New England, the means being from 64° to 72° F. Temperatures decline evenly from July to January. The average daily range is greatest in the north, 22° F., where continental effects are most pronounced. In the south along the coastal margin the range is much less.

There is a difference of more than 12° F. from north to south in the mean annual temperature. The southern part enjoys the highest mean temperature, 50° F., and the northern part the lowest, about 36° F. The mean annual range is considerable, Van Buren, in the interior of northern Maine having the most, 57° F. Along the coast the marine influence limits the range to 45° F. or less while on the island of Nantucket the range is 37° F., the least in New England.

Frost date maps express well the spring and autumn temperature distribution. Near Buzzards Bay the average date of the last killing frost in spring falls on or before April 21. North of central Maine and in the highlands of New Hampshire and Vermont the last frost comes after June 1, on the average. This difference of nearly 6 weeks is due, for the most part, to the moderating influence of the ocean along the coast, while in the north the effect of land mass and altitude prevail. The valleys of the Connecticut River and Lake Champlain deflect the frost date lines to the north.

In the north and the highlands the average date of the first killing frost in fall is about September 11. In southern New England it arrives early in October. But in the Cape Cod region it does not come until after November 1. However, Taunton, in the same latitude and inland about 25 miles, suffers from killing frost by October 1.

The great variation of the frost dates produces wide differences in the length of the growing season. Northern Maine has less than 100 days free from killing frost. In contrast, Cape Cod has more than 200 days, though Taunton has but 140. Along the coast the growing season is at least 150 days. The best agricultural land of New England is included within the area having a frost-free season of 130 days or more. The highland areas have a short growing season because of the lower mean temperature of both summer and winter.


NEW ENGLAND
MONTHLY MEAN TEMPERATURES
D J F M A M J J A S O N D
80
60
40
20
0
VAN BUREN 23 YEARS
BURLINGTON 46 YEARS
RUMFORD FALLS 29 YEARS
EASTPORT 40 YEARS
WILLIAMSTOWN 40 YEARS
CONCORD, N.H. 46 YEARS
PORTLAND 46 YEARS
SPRINGFIELD 40 YEARS
WORCESTER 40 YEARS
BOSTON 46 YEARS
BRIDGEPORT 40 YEARS
PROVIDENCE 46 YEARS
PROVINCETOWN 40 YEARS

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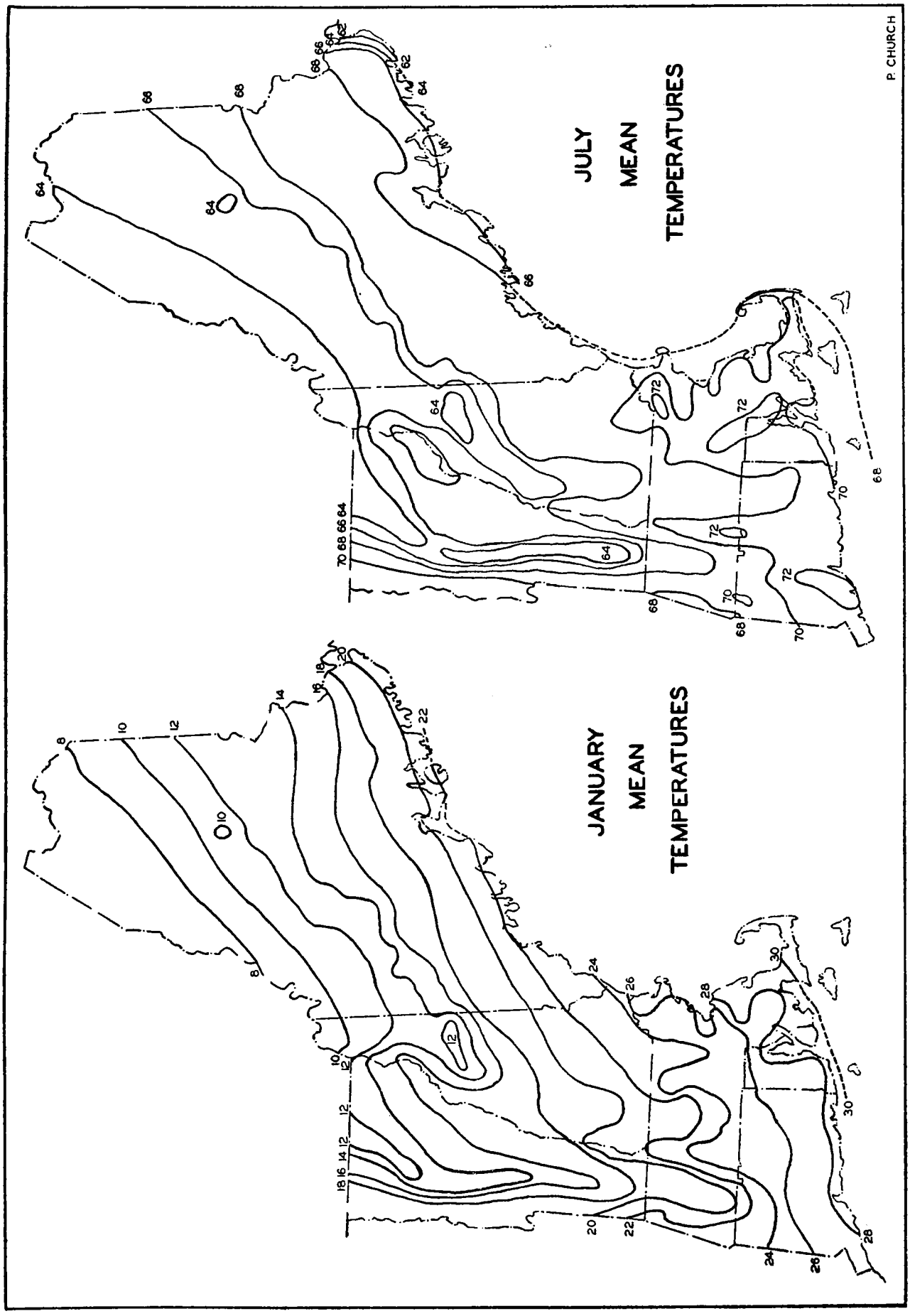
JULY
MEAN
TEMPERATURES
JANUARY
MEAN
TEMPERATURES
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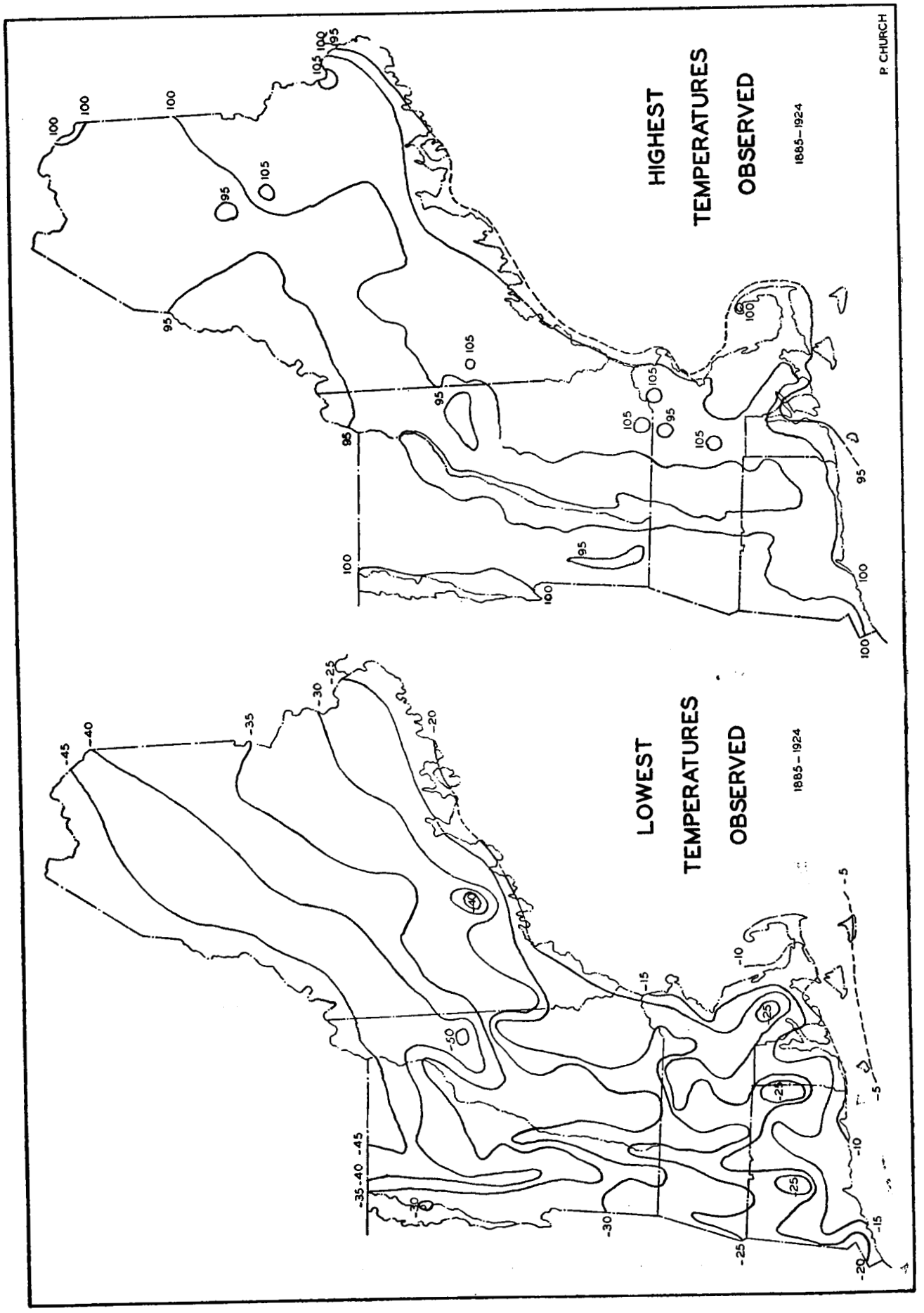
HIGHEST
TEMPERATURES
OBSERVED
1885–1924
LOWEST
TEMPERATURES
OBSERVED
1885–1924
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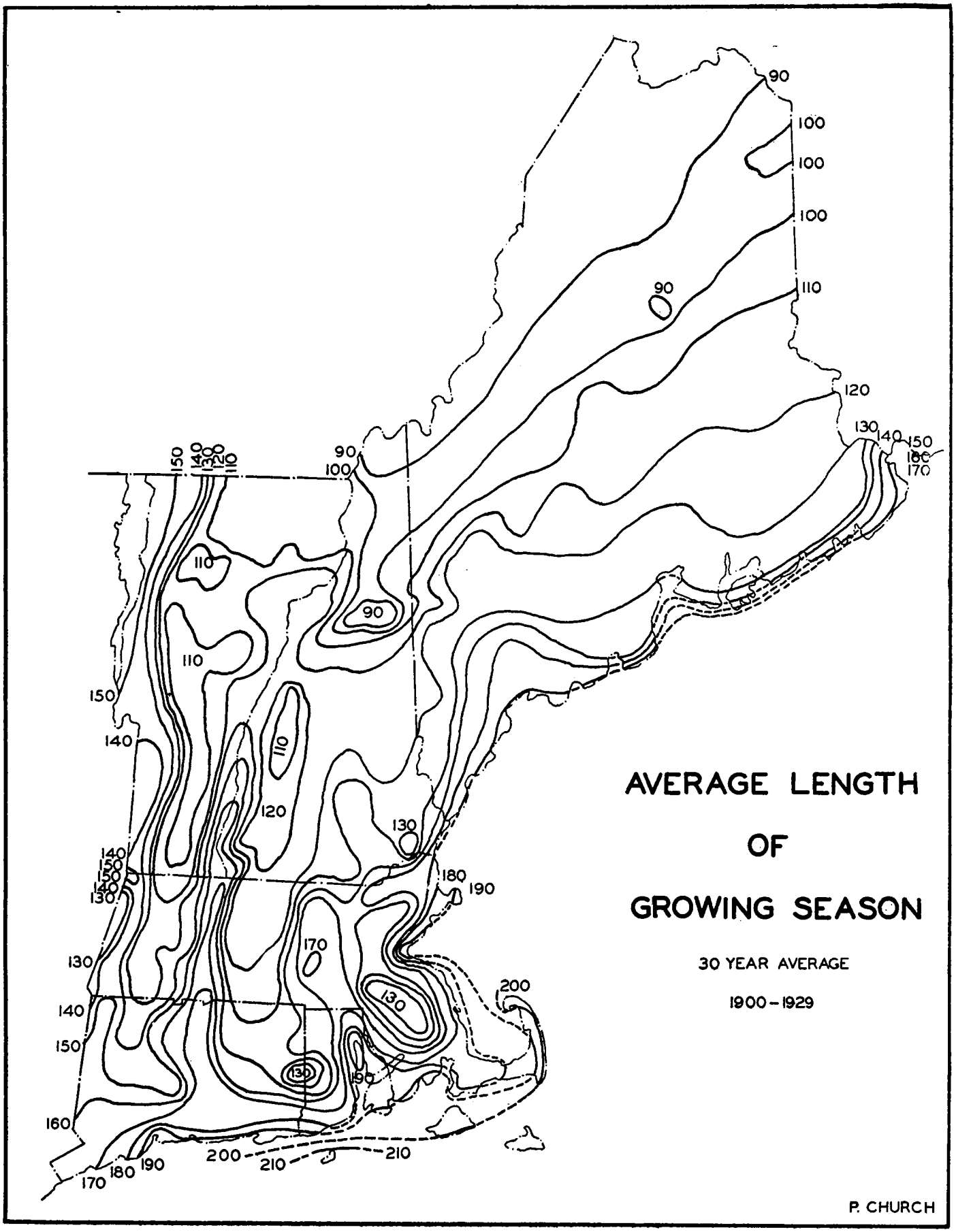
AVERAGE LENGTH
OF
GROWING SEASON
30 YEAR AVERAGE
1900-1929
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