

Weekly Weather & Crop Bulletin

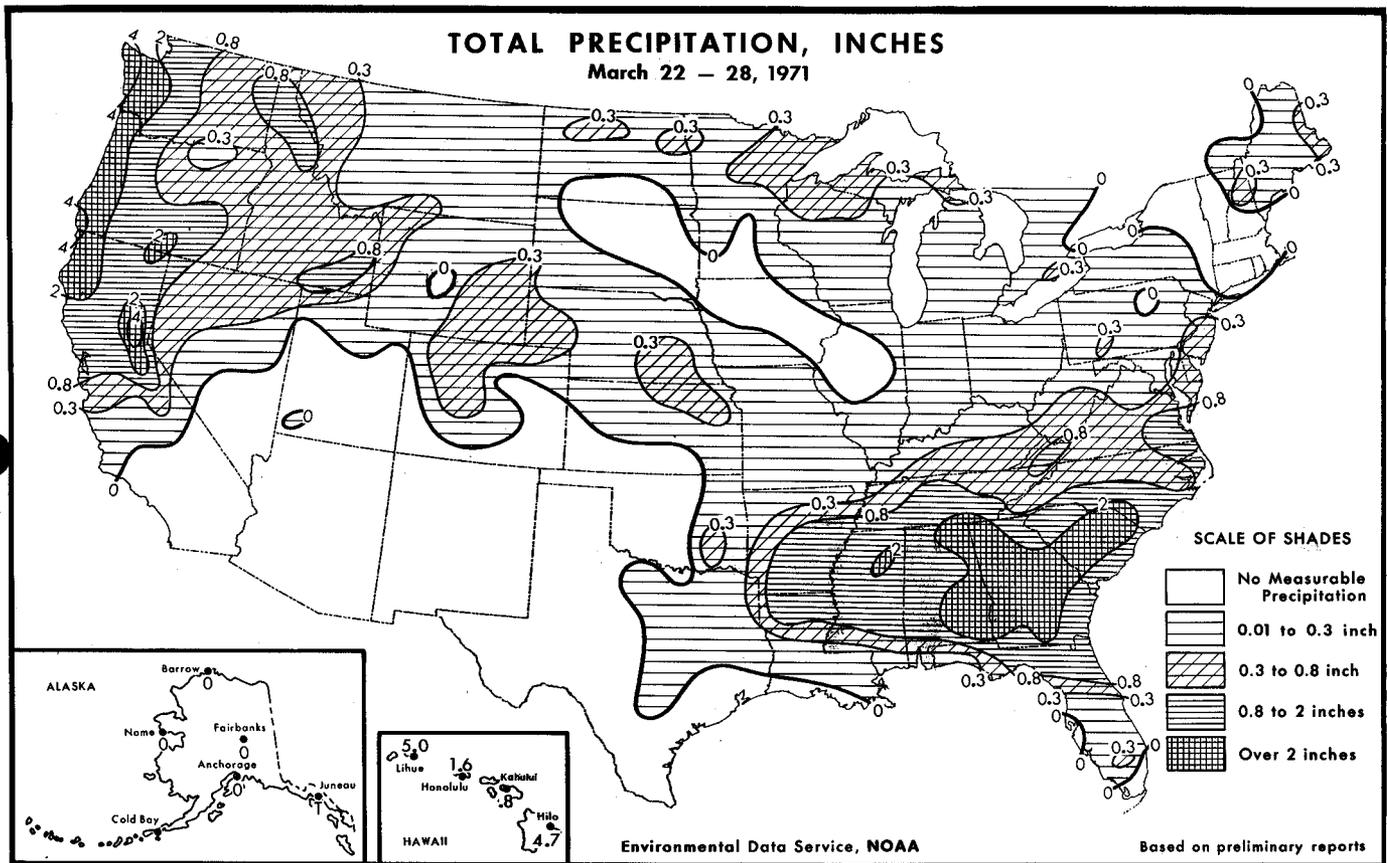
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Edited by Lucius W. Dye

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NATIONAL WEATHER SUMMARY

HIGHLIGHTS: The East continued cold. Record high temperatures occurred in Texas on Sunday. Snowfall since last autumn at some northeastern locations has exceeded previous seasonal totals.

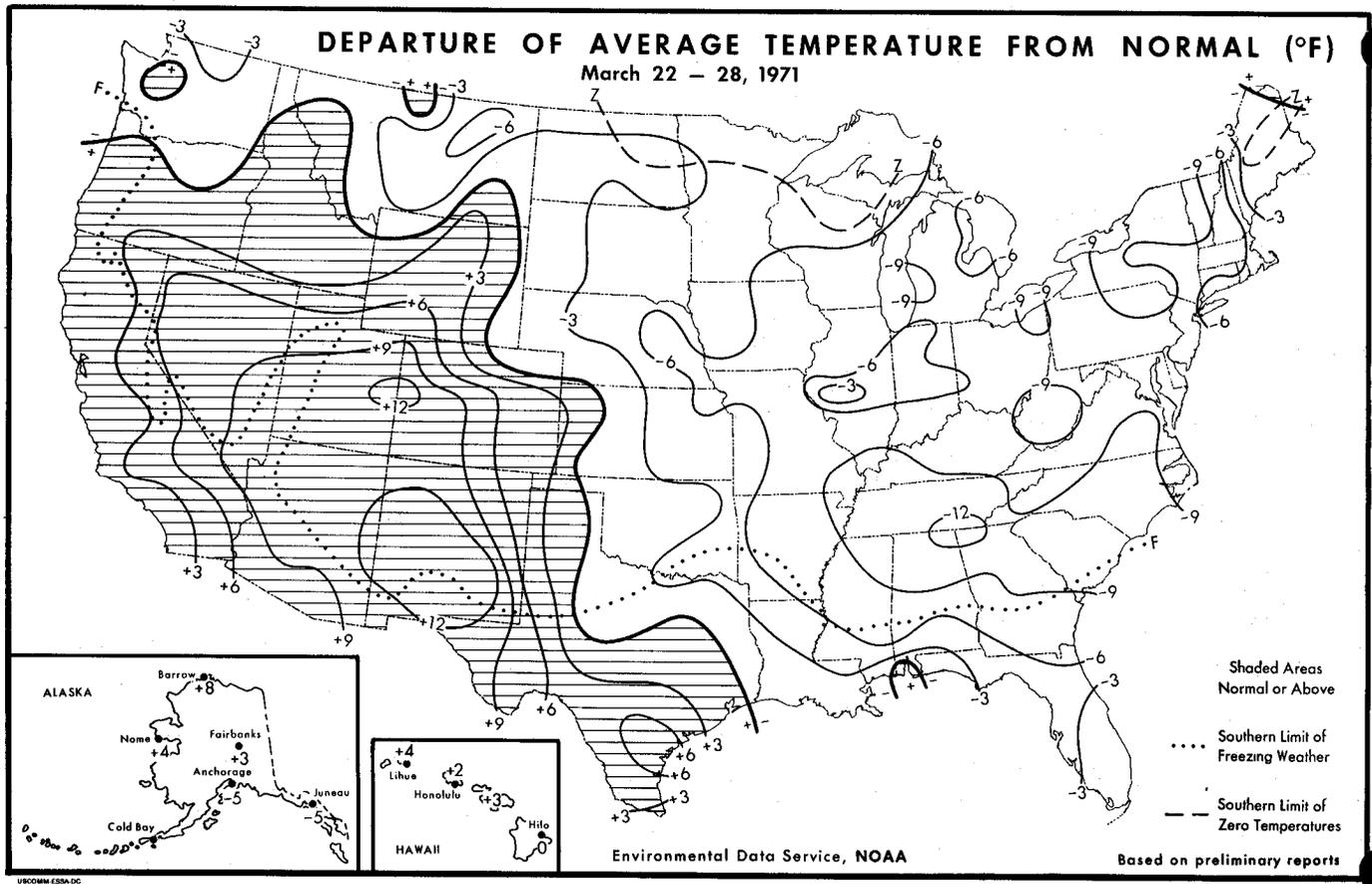
PRECIPITATION: Rain fell along the Pacific Coast on most days last week with snow in the higher mountains. The Southwest was mostly sunny and clear. Squally weather persisted in the lee of the Great Lakes. Scattered thunderstorms dotted the Deep South.

A storm developed in the central Rocky Mountains early in the week and moved to the adjacent Great Plains. Snow, blowing snow, and fog reduced the visibility at Sidney, Nebr., to near zero.

Wednesday morning 8 inches of snow covered Cheyenne, Wyo. Some schools in south-central Nebraska closed Wednesday due to the blowing and

drifting snow. Five to 10 inches of snow fell along the middle portion of the Nebraska-Kansas line. The snow spread eastward and by Thursday the snow belt extended from central Nebraska and Kansas to western Kentucky. By Friday morning, the snow area had reached Georgia and the Carolinas. Snow covered the ground at Columbus, Ga., and was 10.5 inches deep at Clemson, S.C. Four to 8 inches of snow fell in the mountains in western North Carolina. By Friday evening the storm had dumped heavy snow in Virginia, 13 inches of snow at Blackstone, 10 inches at Newport News, and 8 inches at Richmond. By Saturday the storm center had moved off the Atlantic coast.

Sunday a new storm began battering the northern Pacific coast with high winds and rain. Snow fell in the mountains of Washington and Oregon and eastward to the Rockies.



TEMPERATURE: Winter temperatures continued in the northern States but summer weather persisted in the South. Alice, Texas, registered 99° Monday afternoon. Austin, Texas, recorded 96° Monday afternoon but a cold wave dropped the temperature at Austin to 51° by Tuesday morning. Afternoon temperatures in the northern Great Plains remained in the 20's and low 30's. The maximum readings at Minot, N. Dak., and Bemidji, Minn., Tuesday were 20°. Cool air continued to pour into the northern States and spread wouthward. Devils Lake, N. Dak., registered 10° below zero Wednesday morning. The freezing line pushed Southward to central Alabama and 17° minimums were recorded at Lexington and London, both in Kentucky, and at Crossville, Tenn. Subzero temperatures occurred in several northern States Thursday morning. The coldest reading that has come to our attention was 12° below zero at Iron River and Marquette

Airport, both in Michigan.

Warm weather persisted in the extreme South throughout the week. Maximums reached the 80's and low 90's in the Far Southwest, the lower and middle 90's in the Rio Grande Valley in Texas, and the 80's in the Florida Peninsula on most days. A number of Texas stations recorded temperatures of 100° or higher Sunday afternoon. San Antonio registered 100°, the highest temperature of record for that location in the month of March.

In general, temperatures averaged warmer than normal over the West and cooler than normal over the East. A large area including southern Utah, southwestern Colorado, Arizona, and New Mexico averaged 9° to 14° warmer than normal. A strip from Tennessee and northern Alabama to the Atlantic coast averaged 9° to 12° cooler than normal.

L. W. Dye

NATIONAL AGRICULTURAL SUMMARY

AGRICULTURAL HIGHLIGHTS: Rain and snow halted fieldwork in the South. * Wheat received some moisture on the Great Plains, but some areas remain dry. * Spring grazing prospects dim in the Southwest. * Cotton planting active from California to Texas.

SMALL GRAINS: Light precipitation, falling as snow provided some moisture to the winter wheat crop on the Great Plains. However, drying winds hastened the depletion of topsoil moisture in the western areas of Kansas and Oklahoma. For the 2d straight week moderate to light wind damage occurred in Kansas. Rain is needed in (extremely dry) western Oklahoma within the next few weeks. Texas grain growers would also rejoice with a good rain, as drought conditions prevail.

On the Northern Plains wheat and rye are greening, but the snow and cold halted plant development. Topsoil moisture will be good for spring growth. Light wind damage was noted in Montana and Colorado, but grain is good in both States. Fall-seeded grains are growing slowly in the Northwest, but fields in Southern California and Arizona are starting to head.

In the South-central and Southeastern States moisture is plentiful, but warm weather is needed for growth. The cold damaged some fields in North Carolina. Wheat fields are beginning to green in the southern Corn Belt, with the crop in fair to good condition.

Seeding of spring grains made some progress across the Nation. Seeding of oats occurred as far north as Illinois and Pennsylvania. Spring planting remains well behind last year in Kansas. Planting was active in the Pacific Northwest as weather permitted.

OTHER CROPS: Land preparation and planting were restricted by wet soils in the South. Farmers are anxious to resume fieldwork, but several warm dry days will be needed to dry the fields. Moving north, fieldwork was also delayed by cold weather and snow in the middle Atlantic States, but activity was increasing as soils dried in southern Corn Belt areas. Warm dry weather aided spring progress in the West. However, in extremely dry South Texas planting is lagging behind last year.

Tobacco plants in North Carolina and Virginia were damaged by the cold and snow. Seeding plant beds and transplanting continued behind last year in most tobacco growing States.

Corn planting got underway in the Deep South, with 15% of the Louisiana crop in. Stands of early-planted corn are good in California. Warm weather

saw cotton planting very active in Texas, California, and Arizona. Seeding of Rice in Texas and Louisiana is well ahead of last year. Potato planting was active in the middle Atlantic States. Some acreage was seeded in Washington and Idaho growers were busy hauling seed.

Fruits and Nuts: Cold dry weather is causing erratic blooming to Florida citrus trees. Orange harvest was slow. Citrus picking remains active in Texas and Arizona, with frost-damaged trees in Arizona putting on new growth. Rains curtailed cultural activities in California orchards and vineyards. Prunes and pears are in full bloom with grapes showing green tips. Freezing temperatures nipped peach orchards in the South. Extent of damage unknown. Peach buds were swelling as far north as Maryland. Orchard pruning and spraying continued as conditions allowed throughout the Country.

Vegetables: Florida vegetable shipments remain steady, with most commodities except melons available. The March 21 frost damaged some corn and beans in northern areas. Irrigated spring vegetables are growing well in South Texas, but dryland crops are suffering due to the drought. Onion pulling increased in the Lower Valley. Arizona cantaloupes made good growth in the Yuma area; with lettuce harvest active in the Salt River Valley. California growers were busy planting sweet corn and tomatoes. Wet fields slowed vegetable seeding in the South and Pacific Northwest. Some spinach was cut in west Arkansas, and some strawberries picked in Louisiana.

PASTURES AND LIVESTOCK: Cool temperatures slowed pasture growth in the eastern half of the Nation. Some pastures were starting to green, but only provided limited grazing. Livestock herds are thriving on rye grass pastures in Louisiana. On the Great Plains from Kansas to Texas, pastures are grazed down and prospects for spring growth are dim. Supplemental feed supplies are short. Livestock wintered well in the Northern States. Feed supplies will be adequate until pastures are ready for grazing.

Cattle sales increased in Arizona due to poor spring grass growth. Lower elevation desert ranges are dry and providing only limited feed. Cold weather, snow, and freezing rain caused discomfort to livestock over the eastern portion of the Country; with some calf and lamb losses attributed to the weather.

S. J. Pscodna
Agricultural Statistician

Temperature and Precipitation Data for the Week Ending Midnight, l.s.t., March 28, 1971

States and Stations	Temperature °F		Precipitation Inches		States and Stations	Temperature °F		Precipitation Inches		States and Stations	Temperature °F		Precipitation Inches	
	Average	Departure*	Total	Departure*		Average	Departure*	Total	Departure*		Average	Departure*	Total	Departure*
ALA. Birmingham . . .	47	-10	1.6	+ .3	New Orleans . . .	62	- 1	T	-1.3	OKLA. Okla. City . . .	50	- 1	T	- .5
Mobile . . .	62	0	.3	-1.4	Shreveport . . .	56	- 3	.9	- .1	Tulsa . . .	49	- 2	T	- .7
Montgomery . . .	53	- 9	3.1	+1.7	MAINE. Caribou . . .	27	0	.1	- .5	OREG. Astoria . . .	44	- 2	3.3	+1.5
ALASKA. Anchorage . . .	21	- 5	0	- .1	Portland . . .	31	- 3	T	-1.1	Burns . . .	40	+ 1	1.1	+ .9
Barrow . . .	-5	+ 8	0	0	MD. Baltimore . . .	40	- 6	.2	- .7	Medford . . .	48	+ 3	1.4	+1.1
Fairbanks . . .	16	+ 3	0	- .1	MASS. Boston . . .	35	- 5	0	-1.0	Pendleton . . .	45	- 1	.2	- .2
Juneau . . .	27	- 5	T	- .7	Chatham . . .	34	- 5	T	---	Portland . . .	47	0	1.1	+ .3
Nome . . .	14	+ 4	0	- .2	MICH. Alpena . . .	24	- 5	.1	- .4	Salem . . .	47	+ 1	1.9	+1.0
ARIZ. Flagstaff . . .	47	+10	0	- .3	Detroit . . .	31	- 7	.1	- .5	PA. Allentown . . .	34	- 7	T	- .9
Phoenix . . .	71	+10	0	- .1	Flint . . .	29	- 6	0	- .5	Erie . . .	25	-12	.1	- .6
Tucson . . .	68	+ 8	0	- .1	Grand Rapids . . .	26	-10	.2	- .3	Harrisburg . . .	36	- 7	T	- .8
Winslow . . .	59	+11	0	- .1	Houghton Lake . . .	22	- 8	.1	- .3	Philadelphia . . .	38	- 6	.4	- .5
Yuma . . .	71	+ 6	0	0	Lansing . . .	29	- 7	.2	- .4	Pittsburgh . . .	33	- 7	.1	- .7
ARK. Fort Smith . . .	48	- 6	.2	- .6	Marquette . . .	26	- 4	.3	- .2	Scranton . . .	30	-10	T	- .7
Little Rock . . .	47	- 8	1.1	0	Muskegon . . .	26	-10	.2	- .3	R.I. Providence . . .	34	- 6	0	-1.0
CALIF. Bakersfield . . .	63	+ 5	0	- .2	S. Ste. Marie . . .	21	- 7	.8	+ .4	S.C. Charleston . . .	49	-10	1.4	+ .5
Eureka . . .	51	+ 2	3.2	+2.2	MINN. Duluth . . .	21	- 4	.5	+ .1	Columbia . . .	47	-10	3.0	+2.0
Fresno . . .	59	+ 2	.1	- .3	Internat'l Falls . . .	20	- 4	.3	0	Greenville . . .	43	-11	1.1	0
Los Angeles . . .	61	+ 1	0	- .3	Minneapolis . . .	28	- 4	.8	- .2	S. DAK. Aberdeen . . .	30	- 3	T	- .3
Red Bluff . . .	55	0	1.4	+ .9	Rochester . . .	24	- 8	T	- .4	Huron . . .	28	- 5	T	- .3
San Diego . . .	60	0	T	- .3	St. Cloud . . .	25	- 5	T	- .3	Rapid City . . .	33	- 1	.3	0
San Francisco . . .	55	+ 1	1.2	+ .7	MISS. Jackson . . .	53	- 6	1.5	+ .3	Sioux Falls . . .	29	- 5	T	- .4
Stockton . . .	58	+ 3	1.0	+ .5	Meridian . . .	52	- 7	1.6	+ .2	TENN. Chattanooga . . .	42	-12	2.1	+ .8
COLO. Denver . . .	45	+ 6	T	- .4	MO. Columbia . . .	38	- 7	T	- .7	Knoxville . . .	43	-10	.8	- .2
Grand Junction . . .	56	+ 2	T	- .2	Kansas City . . .	41	- 5	.2	- .5	Memphis . . .	45	- 9	1.2	0
Pueblo . . .	48	+ 5	T	- .2	St. Louis . . .	38	- 8	T	- .8	Nashville . . .	41	-11	1.1	- .1
CONN. Bridgeport . . .	36	- 4	0	-1.0	Springfield . . .	41	- 6	.3	- .5	TEX. Abilene . . .	56	- 2	T	- .3
Hartford . . .	34	- 6	0	- .3	MONT. Billings . . .	32	- 4	.3	0	Amarillo . . .	52	+ 2	0	- .2
D.C. Washington . . .	40	- 8	.2	- .5	Glasgow . . .	23	- 8	.1	0	Austin . . .	65	+ 3	.1	- .4
FLA. Apalachicola . . .	60	- 2	.1	- .9	Great Falls . . .	29	- 4	.2	0	Beaumont . . .	63	0	T	- .8
Ft. Myers . . .	66	- 4	.1	- .5	Havre . . .	31	+ 1	T	- .2	Brownsville . . .	72	+ 2	T	- .3
Jacksonville . . .	58	- 6	1.3	+ .5	Helena . . .	33	- 1	.2	0	Corpus Christi . . .	74	+ 7	T	- .3
Key West . . .	73	- 9	0	- .4	Kalispell . . .	35	0	.6	+ .4	Dallas . . .	58	0	T	- .7
Lakeland . . .	64	- 4	.1	- .9	Miles City . . .	34	0	.1	- .1	Del Rio . . .	71	+ 5	T	- .3
Miami . . .	71	- 1	T	- .5	Missoula . . .	38	+ 2	.3	+ .1	El Paso . . .	69	+12	0	- .1
Orlando . . .	64	- 3	.1	- .7	NEBR. Grand Island . . .	33	- 6	.6	+ .2	Fort Worth . . .	57	- 1	T	- .6
Tallahassee . . .	57	- 5	1.3	- .2	Lincoln . . .	35	- 6	.3	+ .1	Galveston . . .	63	0	T	- .7
Tampa . . .	63	- 3	T	- .3	Norfolk . . .	30	- 7	.2	- .2	Houston . . .	64	+ 2	T	- .6
GA. Atlanta . . .	45	- 6	2.3	+1.1	North Platte . . .	36	- 2	.2	- .1	Lubbock . . .	55	+ 3	T	- .2
Augusta . . .	47	-11	2.7	+1.8	Omaha . . .	32	- 6	.2	- .2	Midland . . .	64	+ 6	0	0
Macon . . .	50	- 9	3.3	+2.2	Valentine . . .	30	- 5	.2	- .1	San Angelo . . .	62	+ 2	0	- .2
Savannah . . .	53	- 8	1.2	+ .2	NEV. Ely . . .	44	+ 9	T	- .2	San Antonio . . .	69	+ 6	T	- .4
HAWAII. Hilo . . .	71	0	4.7	+1.2	Las Vegas . . .	67	+10	0	- .1	Victoria . . .	71	+ 6	T	- .6
Honolulu . . .	75	+ 2	1.6	+1.0	Reno . . .	49	+ 6	.6	+ .5	Waco . . .	62	+ 2	.1	- .5
Kahului . . .	76	+ 3	.8	- .1	Winnemucca . . .	47	+ 7	.5	+ .3	Wichita Falls . . .	53	- 3	T	- .4
Lihue . . .	75	+ 4	5.0	+4.0	N.H. Concord . . .	28	- 7	0	- .8	UTAH. Blanding . . .	52	+10	0	- .2
IDAHO. Boise . . .	46	+ 2	.6	+ .3	N.J. Atlantic City . . .	36	- 8	.3	- .6	Salt Lake City . . .	49	+ 7	.2	- .2
Lewiston . . .	45	+ 1	.6	+ .3	Trenton . . .	37	- 7	.3	- .6	VT. Burlington . . .	20	-11	T	- .5
Pocatello . . .	40	+ 2	1.1	+ .8	N.MEX. Albuquerque . . .	62	+14	0	- .1	VA. Lynchburg . . .	39	- 9	.6	- .4
ILL. Cairo . . .	41	-10	.1	-1.1	Roswell . . .	65	+13	0	- .1	Norfolk . . .	43	- 8	1.4	+ .7
Chicago . . .	34	- 6	T	- .7	N.Y. Albany . . .	28	- 8	T	- .7	Richmond . . .	40	-11	1.1	+ .3
Moline . . .	33	- 6	T	- .6	Binghamton . . .	25	-10	T	- .7	Roanoke . . .	40	- 8	.7	- .1
Peoria . . .	34	- 7	T	- .7	Buffalo . . .	27	- 8	.1	- .6	WASH. Colville . . .	38	- 2	.8	+ .6
Rockford . . .	31	- 7	T	- .7	New York . . .	38	- 6	.1	- .9	Omak . . .	38	- 5	.5	+ .3
Springfield . . .	40	- 3	.3	- .5	Rochester . . .	26	-10	T	- .7	Quillayute . . .	42	- 2	6.2	+3.8
IND. Evansville . . .	39	- 9	.1	-1.0	Syracuse . . .	28	- 8	.1	- .8	Seattle-Tacoma . . .	44	0	2.4	+1.6
Fort Wayne . . .	33	- 7	T	- .9	N.C. Asheville . . .	41	- 8	.8	- .1	Spokane . . .	39	- 1	.9	+ .6
Indianapolis . . .	36	- 6	T	- .7	Charlotte . . .	43	-10	1.1	+ .1	Walla Walla . . .	46	- 2	.5	+ .1
South Bend . . .	33	- 5	.1	- .6	Greensboro . . .	39	-11	.5	- .3	Yakima . . .	42	- 2	.8	+ .7
IOWA. Burlington . . .	34	- 6	T	- .7	Hatteras . . .	45	- 8	2.0	+1.2	W.VA. Beckley . . .	33	- 9	.8	- .3
Des Moines . . .	32	- 6	T	- .5	Raleigh . . .	41	-11	.8	0	Charleston . . .	37	-11	.5	- .5
Dubuque . . .	29	- 7	T	- .7	Wilmington . . .	46	-11	1.1	+ .2	Huntington . . .	39	- 9	.2	- .8
Sioux City . . .	34	- 3	T	- .4	N. DAK. Bismarck . . .	28	- 3	T	- .2	Parkersburg . . .	37	- 9	.1	- .8
KANS. Concordia . . .	38	- 4	.5	+ .1	Fargo . . .	27	- 2	.3	+ .1	WIS. Green Bay . . .	26	6	.3	0
Dodge City . . .	43	- 1	0	- .3	Williston . . .	25	- 3	.3	+ .1	La Crosse . . .	28	- 7	T	- .5
Goodland . . .	42	+ 3	.1	- .2	OHIO. Akron-Canton . . .	34	- 6	.2	- .6	Madison . . .	25	- 8	T	- .5
Topeka . . .	39	- 6	.4	- .1	Cincinnati . . .	39	- 7	T	- .9	Milwaukee . . .	26	- 8	.1	- .4
Wichita . . .	44	- 4	0	- .5	Cleveland . . .	29	- 9	.3	- .5	WYO. Casper . . .	37	+ 3	.5	+ .2
KY. Lexington . . .	38	- 8	.1	-1.0	Columbus . . .	35	- 7	.1	- .7	Cheyenne . . .	33	- 1	.8	+ .5
Louisville . . .	41	- 5	.1	- .9	Dayton . . .	36	- 6	.1	- .7	Lander . . .	39	+ 4	T	- .3
LA. Baton Rouge . . .	60	- 3	-1.5	- .9	Toledo . . .	31	- 7	T	- .6	Sheridan . . .	37	+ 4	.2	- .2
Lake Charles . . .	61	- 1	T	- .9	Youngstown . . .	30	- 9	.2	- .6	P.R. San Juan . . .	80	+ 4	0	- .6

* Departures are from 30-year means (1931-60).

Based on preliminary reports

CONDENSED STATE SUMMARIES

These summaries provide brief descriptions of condition and activities important on a national scale. Detailed reports of crop and weather conditions during the growing season are contained in State issues of Weekly Weather and Crop Bulletins published by field offices of the Statistical Reporting Service, U.S.D.A. in cooperation with NOAA State Climatologists.

ALABAMA: Mostly cloudy and cold with rain much of the week. Brief clearing with frost and light freeze northern and central sections Wednesday and Saturday. Average temperatures much colder than normal. Rainfall heavy all sections except moderate near coast. Farmers anxious to become active with fieldwork, but several days open weather needed before fields dry enough to support machinery. Limited fieldwork early week well drained upland soil, but general rains Thursday brought operations to standstill statewide. Limited acreage corn and watermelons planted extreme southern counties first of week—only limited transplanting tomatoes Houston-Geneva County area. Setting tobacco got underway south-central counties. Delayed blooming, minimized freeze damage to peaches. Warm weather needed for pastures and small grains to reach their potential. Feed supply short, but livestock holding up well.

ARIZONA: No snow. Skies mostly clear and temperatures above normal. Strong winds and blowing dust some agricultural areas. No precipitation. Cotton planting active southern Yuma County and central areas. Small grains making satisfactory progress. Many fields headed in southwest and central areas. Early sorghum planting emerging Yuma. Planting, field preparations later sorghum plantings continued other areas. Alfalfa making favorable growth warmer Desert Valleys. Cutting active Yuma area. Cantaloupes making good growth Yuma. Thinning generally completed. Carrots, onions making good progress. Spring lettuce harvest active Salt River Valley, Pima and Pinal Counties. Spring lettuce making good growth Cochise County. Valencia orange harvest continued Yuma and Salt River Valley. Limited grapefruit movement. Past full bloom Yuma area, full bloom Salt River Valley. Most frost-damaged trees putting on good new growth. Lower elevation, desert ranges very dry and providing limited feed. Higher elevation range feed prospects only fair. Pumping, hauling stockwater required many areas. Cattle sales up some areas due lack spring grass.

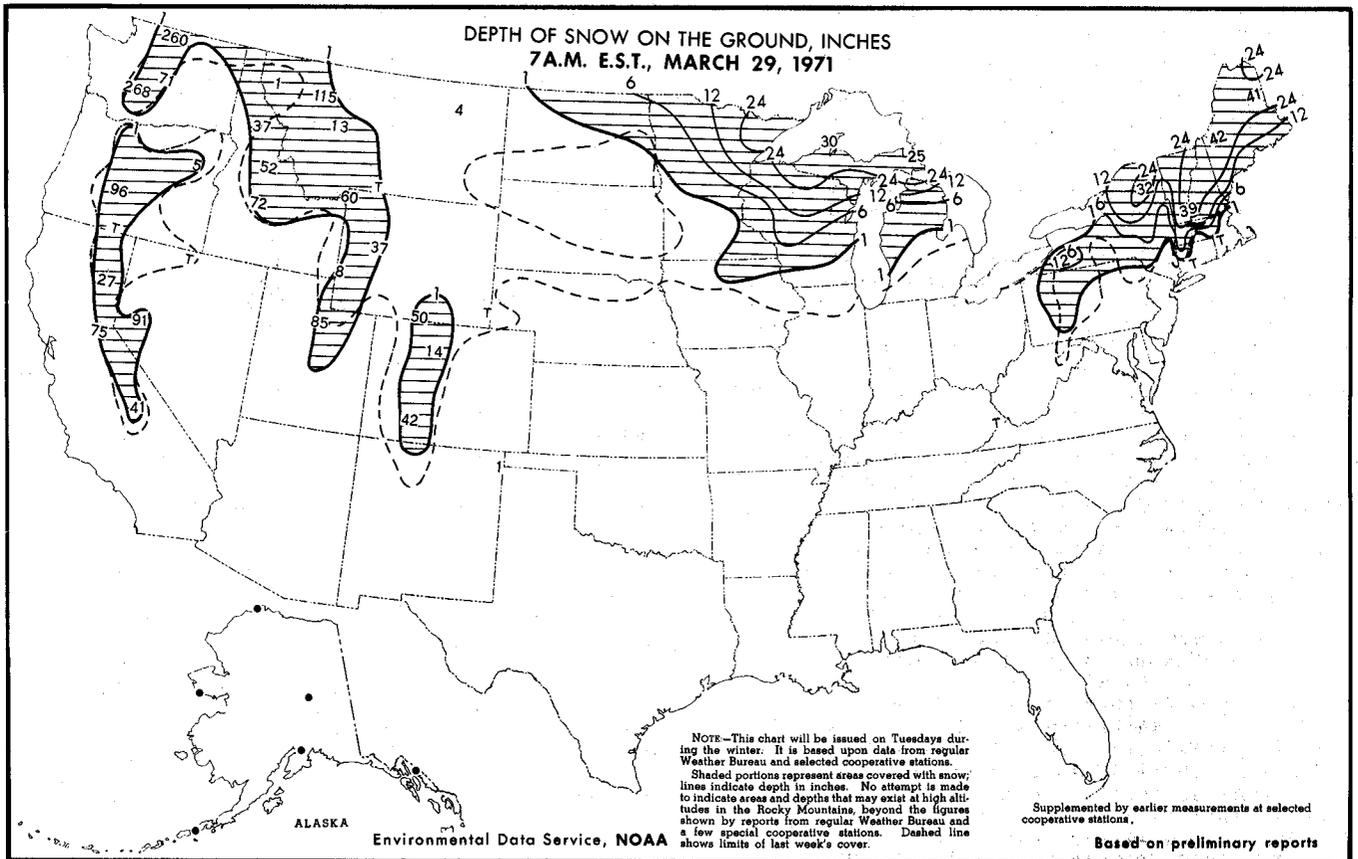
ARKANSAS: Weekly mean temperatures about 8° below normal, from low 40's north to low 50's south. Daily extremes 21° to 79°. Precipitation late in week exceeded 0.50 inch all but extreme west and northwest. Over 1.00 inch in northeast, central, and extreme south. Heaviest 2.08 inches. Snowfall near end of week, 2 to 4 inches over north-central and northeast. Seedbed preparation made fair progress east and south until rain and snow stopped activities late week. Winter grains making mostly good growth. Alfalfa weevil control measures underway south. Spinach harvest active west. Pastures furnishing most of livestock feed requirements south. Livestock good.

CALIFORNIA: Rain several days northern half, with heavy amounts in central Sierras and on north coast. Warmer temperatures, especially in desert and interior basins. Average temperatures 2° to 4° above normal most areas and 8° above normal in high desert. Precipitation amounts 2.00 to 8.00 inches on north coast, 1.00 to 2.00 inches in Sacramento Valley and 3.00 to 7.00 inches in central Sierra Nevadas. Small grain fields central valley and Southern California heading out. Some

lodging Sacramento Valley. Fertilizing and weed control general. Alfalfa cutting for hay central and southern areas; some green chopping. Planting cotton continues San Joaquin Valley and Southern California. Sugar beet planting continues; overwintered sugar beet harvest well along. Some field corn showing; stands look good. Most central and southern dryland farming areas showing stress due lack moisture. Irrigating continues as needed. Rains curtailed cultural activities orchards and vineyards. Early varieties peaches, nectarines, plums petal fall stage. Prunes and pears full bloom. Apples beginning blossom. Grapes showing green tips most areas; Coachella Valley vineyards full foliage. Harvest navel oranges normal progress. Valencia oranges—sizing well; coloring rapidly. Grapefruit and lemon harvests continue. Northern ranges excellent; southern ranges drying. Milk and egg production normal. Asparagus Delta district increasing volume with good weather; Imperial shipments declining. Broccoli-cauliflower Salinas and Santa Maria expected lighter. Imperial carrots good volume. Celery Ventura and Orange Counties moderately active. Imperial lettuce ends this week; Palo Verde increasing, Santa Maria and Bakersfield getting underway. First potato harvest Edison district expected this week. Strawberry volume Southern California increasing. Processing tomato plantings continues interior valleys.

COLORADO: Temperatures well above normal most areas. Near-record highs in 80's at lower elevations on Friday. Light to moderately heavy snow central and north mountains and extreme northeast mixed with rain some areas. Several periods high winds. Spring work started all areas, except extreme northeast and mountain areas where snow again delayed soil preparation. Condition winter wheat and barley good. Seeding oats and barley underway. Some light wind damage to fall grains southeast areas. Surface soil moisture generally short to adequate. Moisture supplies increased northeast and decreased southeast area. Livestock good to excellent. Range and pasture condition fair. Newborn calves and lambs good condition. No major problem with weather or disease.

FLORIDA: Temperatures averaged 4° to 8° below normal northern sections and 2° to 5° below normal southern and central sections following arrival of cold air mass on weekend of 20th and 21st. Light showers accompanied weak front on 23d and 24th over north and central Florida and again on 26th. Rainfall averaged nearly 1.00 inch in north Florida and 0.20 inch in central Florida. Drought conditions continue south Florida with only scattered showers. Wet soils north Florida delayed field crop planting. Small grains progressing well, tobacco planting active. Drought in Everglades continues. Inadequate rain south half delaying seasonal growth grass. Pastures north improving. Most livestock fair. Most citrus trees excellent condition. Abundant leaf growth. Cold and dryness making blooming erratic. Orange harvest slow grapefruit declining. Vegetable shipments steady. Most commodities other than melons available, variable quantity. Frost damage March 21 was minor most areas except to corn, beans, and muck-



land areas north. North central replantings followed wind cold damage of early March was moderate during week.

GEORGIA: Light rain beginning of period. Moderate to heavy rain south and central and snow sleet and freezing rain north Thursday and Thursday night. Snow depths reached 10 inches in several north-eastern counties for heaviest fall so late in season. Snow changed to freezing rain in north-west and north-central Thursday night with extremely heavy damage to trees and utility lines. Glaze extended as far south as Griffin with heaviest damage in metropolitan Atlanta area and northeastward to the Gainesville and Athens areas. Thousands of residents were without electric power for as much as 48 hours. Total precipitation ranged from 1.00 to 2.00 inches in southeast and 2.00 to 4.00 inches most other areas. Showers again at end of period. Cool most of week with lows slightly below freezing north and slightly above in south on 1 to 3 days. Averages ranged from 6° to 10° below normal. Soil moisture excessive over much of State. Land preparation, transplanting tobacco, seeding corn, and early truck crops, top dressing small grains and spraying peach orchards active where conditions permit. Small grains and pastures mostly good, though growth very limited.

HAWAII: Rainfall increased during week causing interruptions some farm activities. Winds stronger than usual, but damage to crops light. All but sugar plantation full operation. Pine-apples making fair to good progress with light harvesting. Supplies continue light for bananas

and papayas, but adequate for vegetables. Cattle and pastures fair to good. Range feed ample.

IDAHO: Temperatures averaged near normal except slightly below Panhandle. Precipitation above normal throughout State with heaviest amounts generally in lower valleys, particularly near Snake River. Amounts ranged from 0.18 inch at Salmon to 0.98 inch at Pocatello. Fieldwork restricted by wet soil. Annual grasses and small grains making some growth. Livestock generally good. Calving and lambing well along. Hauling seed potatoes important activity.

ILLINOIS: Precipitation mostly less than 0.10 inch over State. Temperatures averaged 6° to 8° below normal north and central, and 8° to 10° below south. No snow on ground. Livestock continue good. Winter wheat and pastures generally good condition. Fieldwork starting as fields dry. Main activities include machinery maintenance, routine livestock chores, and oat seeding.

INDIANA: Cool dry week. Temperatures averaged 5° to 10° below normal and ranged from 15° in north on 24th to 65° in south on 28th. Snow flurries in north on 24th, light showers in south on 26th. Some soils with frozen layers extreme north but soil temperatures increase to low 40's southward to Ohio River. Soils sufficiently dry for disking and fertilizing central and south. Wheatfields beginning to green and tree buds swelling in southwest.

IOWA: Cold dry week. Temperatures averaged mostly 5° to 10° subnormal. Coldest 24th, 1° at New Hampton. Warmest 27th, 70° at Sioux City.

Precipitation negligible to 0.10 inch southwest. Snow fell at midweek southwest. Streams are high and in some localities out of bank.

KANSAS: A snow storm at midweek brought 2 to 8 inches snow to much of northern and eastern Kansas. Weekly precipitation totals very light southwest quarter of State, generally 0.10 to 0.75 inch elsewhere. Weekly mean temperatures above normal northwest, below seasonal elsewhere. Winds 30 to 40 m.p.h. in parts western Kansas March 26 and 27, front on 28th caused gusts to 45 m.p.h. as it swept across State. Oats and spring barley seeding some progress, but behind usual. Oat seeding 32% completed, compared with 73% year earlier and the 1960-69 average of 48%. Barley seeding 17% completed, well behind 43% year ago and average of 44%. Some alfalfa seeded and preparations made for sugar beet seeding. Midweek snows provided some moisture central and eastern counties, but winds dried out topsoils western areas. Wind damage to wheat mostly light to moderate. Wheat still lacking top growth and some infestation mustard reported. Spring calving and farrowing progressed normally despite storm. Some early lambs marketed. TGE infection in hogs scattered areas. Pasture and ranges grazed down and need moisture west. Feed supplies mostly adequate, but some areas short of dry forage with slow development of grass.

KENTUCKY: Unseasonable cold, warming on 28° averaging 5° to 10° below normal. Precipitation generally very light. Totals from trace to 0.45 inch. Driest week in about 4 months. Snow flurries daily one or more sections 22d to 26th. Snowfall night of 25th to 1 inch parts of Bluegrass and 3 to 4 inches parts of northeast. On 28th very light showers and isolated thunderstorms west and central. Precipitation for month to date less than 50% normal most sections. Continued cold holding back vegetation. Pastures and small grains greening, but showing little growth. Tobacco bed seeding well underway, but burley growers still awaiting legislature to determine poundage quotas. Spring plowing progressing as ground dries.

LOUISIANA: Second cool week. Temperatures averaged 4° to 8° below normal north and central, 0° to 4° below normal south. Warm, cool, warm again central and south, then colder and moderating over weekend. Temperature extremes: 83° Natchitoches Monday, 34° Oak Grove Wednesday. Thunderstorms Thursday, heaviest in northeast and again early Monday. Weekly rainfall less than 0.30 inch southwest and southeast, locally more than 1.00 inch other areas. Greatest 1-day total, 1.27 inches St. Joseph, 8 a.m. Friday. Fieldwork limited by showers and cool weather. Additional moisture would be beneficial northwest. Land preparation active on several days, some fertilizer and herbicides put down and fields rowed up for planting. Some corn and rice planted, unusually cool weather slowed germination and growth. Corn 15% planted, rice about 10%. Sugarcane beginning to show good stands, growth behind normal. Wheat and oats good to excellent, Irish potato stands good, growth slow. Strawberries good condition, production still light, quality fair. Tomatoes being transplanted south, but still in cold frames north. Spraying peach trees active. Pasture feed average, rye grass providing excellent grazing. Some light feeding of cattle. Livestock good condition.

MARYLAND AND DELAWARE: Cold week, especially 24th to 26th. Temperatures averaged 7° to 11° below

normal. Precipitation mostly 0.25 to 0.75 inch. Snow on 22d to 24th and 26th totaled up to 12 inches in Garrett County area. Snow on 26th also reached as much as 5.5 inches in southern Maryland and southern Eastern Shore. Elsewhere generally traces. Cooler weather slowed winter grain growth and tobacco bed germination. Fertilizer spreading continues active. Plowing nearly done southern shore, becoming active other areas. Peach buds swelling. Maple syrup making underway west.

MICHIGAN: Unseasonably cold, intermittent snow, sleet and some light rain south dominated Michigan's weather. Snow depths most Upper Peninsula locations increased with maximum depths locally over 30 inches as week ended. Snow depths diminished slowly over northern portions of Lower Peninsula. Temperatures averaged from 3° to 6° below normal Upper Peninsula, and from 6° to 10° below normal northern Lower Peninsula. Precipitation totaled 0.25 to 0.75 inch Upper Peninsula and northern Lower Michigan to generally less than 0.25 inch in southern portions of Lower Peninsula.

MINNESOTA: Cold week with temperatures averaging near 5° below normal. Little to no precipitation except for a snow storm which moved across the northern part of State late in period. Snowfalls of 2 inches in northwest gradually increased to 14 inches at Ely in northeast. Snow depths of 6 inches to 24 inches exist in north-central, northeast, and northern part of central and east-central regions.

MISSISSIPPI: Scattered light showers Sunday and Monday, mostly in central and south. Rain Thursday. Weekly totals Friday morning varied from under 0.10 inch near coast to over 2.00 inches in parts of northern and central sections. Cold front moved through State Monday. Weekly temperatures averaged below normal, ranging from about 12° below normal in north to near 3° below normal in coastal area. Weekend fair except for some rain Sunday afternoon or night. Weekend amounts mostly 0.40 inch or more ranging from 0.01 McComb to 1.48 inches at Columbia. Soil moisture adequate to surplus southeast, elsewhere mostly surplus. Only 1 1/2 days suitable fieldwork. Winter wheat and oats fair to mostly good condition; with 30% wheat and 29% oats jointed. Spring plowing 22% completed. Irish potatoes, peach trees, pastures and livestock mostly fair to good. Truck crops fair condition.

MISSOURI: Week began dry and mild, turned colder at midweek and ended with temperatures close to or slightly below normal. Precipitation generally 0.05 inch to as much as 0.35 inch, occurring after the change to colder at midweek. Two days suitable fieldwork; fall and spring plowing 37% complete. Wheat mostly fair condition. Pastures fair for early season, but growth limited due cold weather. Soil moisture adequate.

MONTANA: Windy and relatively warm west to cold for season northeast. Precipitation variable, generally dry eastern divisions, but some substantial snowfall again western mountains most days. Coldest 7° at Great Falls and Cut Bank 23d. Warmest 67° Broadus 26th. Calving and lambing making good progress. Death loss below normal. Nearly all range livestock continue to receive supplemental feed. Livestock feed good supply. Wind damage to winter wheat light.

NEBRASKA: Cold and snowy through Friday, warm over weekend. Precipitation beneficial to fall-

sown crops but delaying field operations. Small amount stalk shredding and fertilizer spreading accomplished. Surface soil moisture adequate to surplus and only 10% indicated shortage sub-soil moisture. Winter wheat and rye greening, but intermittent snow and cold temperatures slowing plant development. Adverse weather caused discomfort to livestock with some losses of newborn.

NEVADA: Temperatures averaged 4° to 6° above normal ranging from 1° above normal at Owyhee to 11° above normal in Las Vegas and Fallon. Generally moderate precipitation averaging 0.70 inch in northwest and 0.30 inch in northeast, and ranging from trace at Yerington to 1.23 inches at Sheldon. None in south. Snow in mountains. Ground cover melting fast elsewhere. Land preparation for spring planting continues. Harvest green onions continues, and radishes making favorable progress Moapa Valley. Livestock remain good, with calving and lambing continuing. Stockwater and feed supplies adequate. Ranges fair to good and starting to turn green on lower elevations.

NEW ENGLAND: Week very dry, cold and sunny. No precipitation except some snow in eastern Maine on 21st, 27 and 28th. Temperatures averaged from 4° to 6° below normal along coast to 8° to 12° below normal in Vermont except near normal in northern Maine. Many lows near or below zero in northern and western portions March 26 to 28. Continued below-normal temperatures have minimized flow maple sap.

NEW JERSEY: A cold dry week with temperatures averaging from 4° to 10° below normal. In northwestern counties some readings dipped into the upper teens on 28th. Precipitation averaged under 0.20 inch over north and 0.30 to 0.40 inch over southern and coastal sections. Light snowfall overnight on 22d was confined to central and southern areas with reports of up to 2 inches in central sections. Excessive topsoil moisture combined with subnormal temperatures has delayed soil preparation and planting operations. Some lettuce, onions planted south Jersey. Pastures just starting to show green.

NEW MEXICO: Dry spell continues with 2d consecutive rainless week until scattered showers Sunday night. Much warmer with average temperatures to more than 10° above normal. Minimums early in week. Maximums on Friday and Saturday with 95° at southeastern plains localities. Moisture short to very short. Irrigated wheat, barley, livestock fair to good. Dryland wheat fair to poor, moisture needed. Spring vegetables alfalfa good. Calving continues active. Sheep shearing nearing completion. Supplemental feeding continues, some areas low on stockwater. Land preparation, irrigation active.

NEW YORK: Very cold and dry week. Maximums mid-20's to low 30's interior Upstate from 23d through 25th but moderating generally to 40's by 28th. Minimums 0° to 5° below zero northern half and 50° to low teens southern plateau on 26th and 27th with 25° to low 30's on Long Island. Precipitation very light all sections. Snow flurries persistent lee of Great Lakes early half of week. Little change in deep snow cover remaining in eastern and northern interior.

NORTH CAROLINA: Statewide snow 26th with accumulations 1 to 10 inches except south coast. Heaviest general post equinox snow in 24 years. Rain over weekend. Total precipitation averaging 1.00 inch. Cold most of period averaging much below normal. Freezing most areas mornings of 24th through 26th with some readings below 20° mountains and north portion. Rather windy at times. Some cold damage to small grains and tobacco beds. Soil moisture generally adequate. Small grains mostly good. Pastures good and green except mountains. Flue cured tobacco beds fair to good. Border belt near transplanting, seeding burley beds. Irish potato planting well advanced east, conditions good. Feed and hay situation improving. Farm activities include top dressing, land preparation were halted March 26 by snow.

NORTH DAKOTA: Temperatures averaged 2° below normal southwest to 8° below normal northeast. Little or no precipitation south and west central, 0.20 to 0.50 inch elsewhere, mostly over weekend. Moderate snow and rain showers northeast corner State caused some discomfort among livestock especially young calves and lambs. Farmers repaired equipment and buildings, hauled grain and hay.

OHIO: Twelve-day cold spell ended 28th. Daily mean temperatures during this period averaged about 6° to 8° below normal. Precipitation widespread 22d, 23d. Snow northern half of State evening 22d and on 23d. Weekly precipitation amounts mostly in 0.15 to 0.55 inch range with heavier amounts falling in northwest. Farm activities increased during week with some plowing and spreading fertilizer. However, fieldwork still very limited. Other activities included hauling manure, machinery preparation, and repairing fence.

OKLAHOMA: Windy, mostly dry week. Temperatures averaged 1° to 5° below normal except 1° to 2° above normal Panhandle. Very hot dry air invaded southwest part of State Saturday, 104° at Frederick Saturday was week's maximum temperature and topped previous high March temperature in Oklahoma of 103°. Precipitation averaged from trace northwest part of State to 0.20 inch east-central and southeast. Light snow fell in several eastern counties Wednesday. Greatest snow fall 0.8 inch at Stilwell. Wheat crop deteriorated substantially western 1/3 and in critical need moisture within next 2 weeks. Crop mostly poor to fair. Crop held about steady other areas. Wheat 41% poor, 27% fair, 31% good, 1% excellent; - sharply below year ago. About 14% crop jointing, compared 21% year earlier. Greenbug infestation heavy southwest. Oats and barley also deteriorated western 1/3 Oklahoma. Dry winds hastened depletion surface soil moisture now rated 86% short, 14% adequate. Seedbed preparation active for summer row crops. Fruit trees continue bloom, some freeze damage few eastern localities. Livestock condition held steady, mostly fair to good. Supplemental feeding still required. Early season grasses and clovers furnishing some grazing, but native range grasses short and spring grazing prospects poor western Oklahoma if moisture not received.

OREGON: Sunny days and cool nights at first of week followed by 4 to 5 wet days at close. Temperatures averaged mostly 2° to 4° above normal. Minima in Cascades 7° to 10°, east of Cascades 17° to 29°, western valleys and coast 29° to 42°. Maxima 51° to 70°. Precipitation totaled north-

east quadrant 0.30 to 0.60 inch, remainder of State 0.90 to 2.30 inches except south coast 3.00 to 4.30 inches. Gusty winds 70 to 80 m.p.h. caused scattered damage statewide on 26th. Fieldwork western Oregon continues slow due wet weather. Plowing and seeding spring wheat and oats as weather permits. Fertilizer being applied grain and grass fields. Orchard work continues. Supplemental feeding livestock continues.

PENNSYLVANIA: A cold dry week. Canadian high pressure center dominated entire week. Quite cold with little day-to-day variation until warmup Sunday. Temperatures averaged 8° below normal. High, 64° Pittsburgh 28th; low, 6° three locations 25th and 27th. Precipitation very light with instability showers and snow flurries along windward side of Alleghenies resulting in 0.25 inch water equivalent end of week. Little or no precipitation elsewhere. Spring plowing where soils permitted. Limited seeding of spring oats underway. Tapping maple trees continues.

PUERTO RICO: A dry week with only light showers islandwide. Rainfall averaged 0.46 inch or 0.38 inch below normal. No rain some areas of western interior and south coast. Highest weekly total 2.15 inches in heavy showers extreme west coast. Crop moisture near normal except southern divisions and some areas of northern and interior divisions where too dry for normal crop development. Temperatures averaged 76° to 77° on coast and 70° to 71° interior. Highest maximum 92°, lowest minimum 51°. Sugarcane harvesting made good progress, except some areas west where heavy showers delayed operations. Coffee plantations active seeding and fertilizing. Tobacco curing operations progressed well. Pastures much improved extreme west due heavier showers, but only fair to good other zones due lack moisture. Minor crops active with fieldwork, soil preparation, and fertilizing. Generally good abundance all crops on market.

SOUTH CAROLINA: Temperatures averaged 8° to 10° below normal for week as lows in 20's were registered in colder locations. Precipitation values ranged from 1.50 to 3.00 inches with the largest totals through central part of State. Snow fell in northern half of State on 25th. Largest amounts were in extreme northwest where Pendleton-Clemson area had 10.5 inches accumulated on the ground. About 9 inches of this total fell in less than 7 hours. Soil moisture continued abundant. Tobacco plant beds fair to good condition--transplanting on the way but very little acreage set. Supply plants believed ample. Corn, watermelon, and cucumber planting in progress. Vegetable planting lower coastal area full swing with some early snap beans up. Tomato plants small, but supply believed adequate. Small grains fair to good, booting some areas. Extent cold weather damage to peach orchards unknown.

SOUTH DAKOTA: Temperatures averaged from near normal in west to 8° below normal in east. Extremes ranged from 3° at Summit on 23d to 73° at Oelrichs on 26th. Precipitation fell as light rain or snow scattered through week with totals generally 0.10 inch or less in lower elevations but up to about 0.20 inch in Black Hills. Snow cover on 26th was mostly a trace or less but spotty areas reported 2 to 4 inches with up to 8 inches in northern Black Hills. Additional

moisture received will put topsoil in good condition for spring. Caring for livestock remains main farm activity, but farmers also busy preparing machinery for fieldwork which should get underway in week to 10 days.

TENNESSEE: Cold week. Temperatures averaged 10° to 12° below normal with largest departures east. Precipitation totaled 0.75 inch in northwest and 2.50 inches in extreme southeast. Most occurred on 25th as light rain and snow, with thundershowers on 28th. Wet, soggy fields unable to support machinery; has caused slight delay spring plowing. Pastures and small grains making good progress. Grass tetany caused some cattle deaths. Small grains fair. Plant growth and development about normal. Pastures not yet providing much forage. Some limited grazing few areas. Tobacco bed seeding behind last year. Approximately 65% seeded compared 85% last year. Spring plowing slightly behind last year's pace, 45% complete. Livestock good condition. Some on pastures in few areas. Supplemental feeding continues. Days suitable fieldwork 2.4. Soil moisture 57% surplus, 43% adequate.

TEXAS: A few isolated showers of 0.50 inch or more fell in northeast Texas Sunday. Otherwise little or no precipitation fell during week. Drought conditions continued all but eastern 1/4 of State. Record breaking high temperatures for so early in season occurred at many locations Saturday and Sunday. Inadequate soil moisture continues main topic for discussion among Texas farmers. Planting Lower Valley, South Texas, Coastal Bend lagging week to 10 days behind last year's planting schedule as drought and near drought conditions prevail. Planting activities Blacklands, Cross Timbers, East Texas continue ahead last year. Culling, supplemental feeding operations remain high as growth spring grasses slow. Main activities were preplant irrigation, planting spring crops, and tending livestock. Percent planted to date: - sorghum 22, 14 year ago; corn 30, 12 year ago; cotton 6, 7 year ago; rice 41, 4 year ago. Onion harvest becoming active Lower Valley. Shipments increasing with peak volume mid-April. Onion quality very good, but size somewhat smaller than normal. Onions approaching maturity Laredo, Coastal Bend with harvest expected start early April. Cabbage, carrot harvest active Lower Valley. Winter vegetable harvest nearing completion Winter Garden. Irrigated spring vegetables good growth in warm temperatures South Texas. Dryland watermelons deteriorating South Texas because drought. East Texas planting watermelons, transplanting tomatoes. High Plains planting potatoes, onions. Citrus harvest continues active.

UTAH: Few scattered areas of precipitation northwest portion middle of period. Otherwise little or no precipitation. Local moderate to heavy amounts over and near northern mountains. Rising trend in temperatures to average 2° to 9° above normal. Land preparation and planting early crops progressing rapidly. Topsoil and subsoil moisture favorable most areas. Irrigation water supply both reservoirs and streamflow adequate for season most areas. Farm flock lambing nearing completion. Range outfit lambing started. Calving well along. Marketing apples and potatoes from storage nearly completed. Some seed potatoes moving out southern Utah. Care and feeding milk cow herds and poultry flocks, cattle and sheep on winter rangelands, valley farms, and feedlots continue major activity.

VIRGINIA: Temperatures above normal first and last days and below normal remainder. Rain Monday and Tuesday and up to 12 inches of snow late Thursday and Friday. Snow Friday halted fieldwork. Planting oats, hays, pastures, Irish potatoes and tobacco beds continued. Cool weather slowed peach bud development; limited bud damage occurred with low temperatures. Tobacco plant beds not doing so well as year ago. Recent temperature fluctuation resulted some livestock respiratory problems. Lice becoming more numerous.

WASHINGTON: Strong winds all areas 26th. West of Cascades: Maximum temperatures in 50's, minimums in 30's. Rain in lowlands, snow in mountains latter half week. Precipitation amounts 1.00 to 3.00 inches interior valleys, 4.00 to 5.00 inches coastal areas. Planting few early vegetables starting. Planting tree seedlings, strawberries and raspberries underway. Hay supply adequate. East of Cascades: Maximum temperatures 45° to 55°, minimums 25° to 35°. Rain latter half week. Most agricultural areas received 0.50 to 0.75 inch precipitation. Planting sugar beets, potatoes and spring wheat continues. Pruning and spraying northern orchard areas. Alfalfa and fall-seeded cereals growing slowly. Hay supply adequate.

WEST VIRGINIA: Extremely cold winterlike week with average temperatures more than 10° below normal. Lows in teens March 25 with -10° Canaan

Valley. Some warmup over weekend with readings in 60's March 28. Low pressure area moved south of State evening March 25 but gave southern sections 3 inches snow and mountain areas up to 7 inches. Snowy week in northern mountains as Canaan Valley had almost 25 inches. Elkins seasonal snowfall now totals over 100 inches and is new record for this century. Additional rain and snow kept soil condition wet during week. Pastures continuing to make good progress. Spring planting will begin soon as soil conditions permit.

WISCONSIN: Weather continuing on the cool side. Precipitation generally light and falling as rain or snow on Saturday. Snow cover melting at very slow rate. Frost penetration into soils diminishing and frost leaving ground in some areas with pavements suffering. Farmers hauling manure and getting seeds and fertilizers ready. Livestock wintered well.

WYOMING: Light to heavy snow occurred over most of State. Bondurant the most moisture with 1.38 inches. Temperatures averaged near normal after a cold start. Maxima were mostly low 40's to low 60's west of Divide, high 50's to 70° east. Minima were mostly 10° to -20° west of Divide, -5° to -20° east. Temperature extremes were 70° at Chuckwater, Wheatland, and Glenrock and -24° at Bondurant. No unusual stock death losses. Calving proceeding normally. Water and range prospects good. Fieldwork just beginning.

Growing Degree Days and the 1971 Growing Season

As the 1971 growing season approaches and farmers make plans for sowing this year's crops, the staff of the Weekly Weather and Crop Bulletin is also busy completing plans for providing up-to-date weather and crop information for farmers and general agricultural interests.

Again this year, beginning in next week's Bulletin, we will publish weekly maps of accumulated growing degree days (GDD). These GDD are calculated according to the definition

$$\text{GDD} = \frac{\text{daily max } (\leq 86^\circ\text{F}) + \text{daily min } (\geq 50^\circ\text{F})}{2} - 50^\circ\text{F}$$

Maximum temperatures above 86°F are entered as 86° , and minima below 50°F are entered as 50° . This modification to the usual growing degree day definition is designed to take into account the differing response of plants to quite high or quite low temperatures. This adjusted 50°F method of calculating GDD was introduced through the Bulletin in 1969, and last season the Hybrid Seed Corn Industry adopted it as a basis for a uniform maturity rating system.

As an aid to corn growers and seed suppliers in their selection of suitable corn hybrids for a given region, we are reprinting, on the following pages, weekly mean cumulative GDD for 47 stations. These mean values, accumulated from March 1, are based on daily temperature data for the 20-year period 1949-68.

The mean GDD listed in these tables for a given date may be compared with actual values shown on the Total GDD map for the same date, as one method of evaluating the progress of the current growing season. Maps showing GDD departures from the mean will be published at intervals in the Bulletin.

Also, using the data in these tables, mean GDD for any desired period during the growing season may be easily determined. For example, the mean GDD for the period between the average date of last spring freeze and average date of first fall freeze can be calculated by taking the difference between the mean cumulative GDD values on those two dates. At Williamsport, Pa., for instance, the average date of last spring freeze is May 3, while the average date of the first 32° reading in the fall is Oct. 13. From the accompanying table we find that the mean cumulative GDD values at Williamsport are 243 on May 3 and (interpolating* between the Oct. 11 and Oct. 18 values) 3029 on Oct. 13. Thus, the mean accumulated GDD at Williamsport during the May 3-Oct. 13 period is $3029 - 243$ or 2786. This method was used to obtain the maps on pages 18 and 19.

*A simple interpolation may be used with these tables. At Williamsport, for example, the mean GDD are 3011 on Oct. 11 and 3076 on Oct. 18. Dividing the difference (65) by 7 days per week gives an average of 9 GDD per day during that week. Thus, the mean GDD value for Oct. 13 is $3011 + 18 = 3029$.

J. J. Rahn

MEAN GROWING DEGREE DAYS (ADJUSTED 50° BASE):
ACCUMULATED WEEKLY MARCH 1 TO INDICATED DATES

Station	Mar. 8	Mar. 15	Mar. 22	Mar. 29	Apr. 5	Apr. 12	Apr. 19	Apr. 26	May 3
West:									
Phoenix, Ariz.	76	160	252	352	458	579	710	839	974
Fresno, Calif.	50	102	164	232	309	391	481	570	663
Denver, Colo.	13	30	52	83	117	152	199	255	311
Pocatello, Idaho	4	7	15	30	51	77	113	148	188
Glasgow, Mont.	1	2	7	18	35	54	85	117	159
Pendleton, Ore.	8	20	41	66	99	142	187	231	281
North Central:									
Des Moines, Iowa	5	14	23	41	67	94	138	194	259
Minneapolis, Minn.	0	1	4	11	25	40	71	109	162
North Platte, Nebr.	10	24	39	67	100	133	180	236	296
Omaha, Nebr.	8	20	33	58	91	127	178	244	316
Fargo, N. Dak.	0	0	2	8	17	30	54	85	134
Huron, S. Dak.	2	5	12	26	46	70	108	154	210
Green Bay, Wis.	0	1	3	7	17	28	55	85	125
Madison, Wis.	1	3	8	17	33	53	89	132	186
South Central:									
Fort Smith, Ark.	41	87	131	191	269	348	437	551	664
Dodge City, Kans.	20	46	76	121	172	222	286	365	442
Topeka, Kans.	18	42	63	101	148	194	254	337	418
Wichita, Kans.	22	50	77	121	177	231	297	388	474
Shreveport, La.	61	132	203	282	384	488	593	728	866
Columbia, Mo.	18	39	58	93	137	184	245	330	417
St. Louis, Mo.	19	41	60	97	142	190	254	345	436
Oklahoma City, Okla.	35	76	119	174	246	318	400	505	605
Amarillo, Tex.	33	78	123	180	244	308	385	474	560
Corpus Christi, Tex.	95	210	324	445	587	728	878	1049	1229
Fort Worth, Tex.	57	122	191	271	369	470	578	710	838
Midland, Tex.	57	128	200	282	376	473	578	700	822
Midwest:									
Chicago, Ill.	5	10	18	35	36	81	124	177	238
Moline, Ill.	5	10	18	36	61	90	135	192	261
Peoria, Ill.	8	16	25	46	74	105	152	214	284
Indianapolis, Ind.	12	26	39	64	95	128	175	250	324
Louisville, Ky.	22	48	71	108	156	207	272	370	466
Flint, Mich.	2	5	9	19	35	53	87	127	175
Grand Rapids, Mich.	1	5	10	20	37	55	89	131	185
Columbus, Ohio	12	26	38	64	95	129	176	246	320
Northeast:									
Portland, Maine	0	1	1	4	12	24	41	65	94
Albany, N.Y.	1	4	6	16	33	51	84	130	179
Binghamton, N.Y.	1	3	5	14	28	41	66	105	145
Syracuse, N.Y.	2	5	8	19	36	51	83	126	174
Harrisburg, Pa.	8	17	28	52	83	116	163	228	295
Philadelphia, Pa.	8	20	31	57	91	125	175	238	302
Pittsburgh, Pa.	10	21	32	55	82	111	154	217	287
Williamsport, Pa.	4	10	15	33	58	84	126	182	243
Richmond, Va.	29	61	89	137	194	254	327	425	517
Southeast:									
Macon, Ga.	58	127	195	278	375	477	580	715	858
Raleigh, N.C.	39	82	118	174	240	311	389	497	604
Memphis, Tenn.	39	85	127	183	258	337	422	539	659
Nashville, Tenn.	35	74	109	158	222	288	363	474	585

MEAN GROWING DEGREE DAYS (ADJUSTED 50° BASE):
ACCUMULATED WEEKLY MARCH 1 TO INDICATED DATES

May 10	May 17	May 24	May 31	June 7	June 14	June 21	June 28	July 5	July 12	July 19
1123	1274	1442	1614	1794	1976	2172	2378	2593	2817	3045
767	877	1008	1139	1276	1411	1569	1732	1895	2066	2243
378	447	524	613	709	819	937	1068	1212	1360	1510
247	305	378	456	540	630	734	846	965	1101	1244
209	274	347	429	517	613	716	821	934	1073	1217
345	418	504	592	698	795	913	1033	1159	1303	1460
340	428	525	629	753	897	1046	1201	1369	1535	1705
224	295	374	458	565	691	822	954	1103	1252	1409
366	440	523	617	722	846	977	1115	1271	1424	1580
405	502	607	722	854	1007	1165	1327	1504	1677	1855
186	250	325	404	503	612	724	839	968	1108	1253
272	345	425	514	621	743	870	1001	1150	1305	1462
176	234	302	374	466	573	683	797	923	1050	1185
255	325	406	491	597	719	845	977	1119	1258	1406
794	929	1081	1240	1406	1589	1774	1964	2159	2356	2553
537	634	741	865	997	1154	1318	1487	1667	1847	2026
519	623	741	867	1006	1168	1333	1503	1685	1862	2042
582	691	816	952	1100	1271	1447	1628	1819	2010	2196
1020	1178	1348	1525	1706	1902	2100	2300	2504	2712	2916
519	622	741	864	1003	1168	1330	1501	1681	1857	2039
541	647	770	899	1047	1220	1389	1566	1752	1932	2119
728	849	988	1137	1294	1475	1658	1844	2039	2233	2428
667	770	889	1019	1156	1311	1478	1649	1830	2010	2187
1411	1600	1794	1998	2200	2412	2626	2840	3055	3270	3487
988	1140	1308	1486	1670	1871	2072	2278	2488	2702	2916
964	1110	1263	1431	1603	1788	1978	2171	2364	2558	2754
313	391	481	579	701	843	984	1142	1310	1470	1639
344	429	526	629	755	898	1045	1200	1365	1524	1691
367	454	554	660	788	938	1085	1245	1415	1576	1746
411	499	602	708	834	986	1132	1293	1462	1623	1792
569	677	801	932	1073	1239	1399	1572	1752	1926	2110
239	302	375	455	555	676	795	924	1064	1197	1338
252	321	398	482	588	717	841	976	1121	1259	1408
404	490	593	697	818	964	1104	1260	1424	1581	1749
135	181	237	304	386	470	563	668	787	903	1032
244	313	393	478	586	702	820	963	1110	1248	1402
198	253	320	387	476	580	683	805	938	1058	1197
236	300	376	457	559	677	794	930	1075	1212	1360
377	463	563	667	792	936	1075	1239	1410	1573	1748
384	475	576	681	811	955	1094	1262	1436	1604	1785
364	442	533	625	736	869	994	1140	1295	1438	1595
318	397	485	576	686	814	937	1083	1237	1380	1537
620	733	858	984	1120	1279	1430	1608	1786	1962	2147
999	1149	1314	1484	1656	1842	2029	2225	2421	2616	2814
718	839	976	1113	1255	1420	1579	1757	1936	2113	2298
793	935	1094	1257	1427	1618	1804	1999	2198	2398	2599
705	831	974	1120	1276	1454	1626	1810	1998	2134	2376

MEAN GROWING DEGREE DAYS (ADJUSTED 50° BASE): **
ACCUMULATED WEEKLY MARCH 1 TO INDICATED DATES

Station	July 26	Aug. 2	Aug. 9	Aug. 16	Aug. 23	Aug. 30	Sept. 6	Sept. 13	Sept. 20
West:									
Phoenix, Ariz.	3274	3499	3721	3943	4161	4373	4582	4792	4986
Fresno, Calif.	2422	2603	2773	2946	3115	3274	3436	3592	3734
Denver, Colo.	1663	1818	1971	2118	2256	2394	2512	2630	2730
Pocatello, Idaho	1389	1535	1677	1815	1943	2062	2172	2283	2372
Glasgow, Mont.	1366	1511	1658	1794	1925	2037	2135	2229	2300
Pendleton, Ore.	1611	1768	1919	2071	2214	2337	2465	2584	2685
North Central:									
Des Moines, Iowa	1880	2057	2228	2384	2535	2688	2822	2942	3044
Minneapolis, Minn.	1572	1732	1889	2030	2167	2303	2418	2519	2600
North Platte, Nebr.	1740	1906	2068	2216	2357	2503	2625	2740	2840
Omaha, Nebr.	2039	2222	2401	2566	2724	2889	3031	3159	3268
Fargo, N. Dak.	1405	1551	1696	1828	1957	2082	2186	2278	2353
Huron, S. Dak.	1623	1783	1942	2088	2229	2373	2491	2598	2687
Green Bay, Wis.	1324	1463	1597	1714	1828	1948	2057	2151	2228
Madison, Wis.	1557	1708	1853	1986	2117	2249	2368	2471	2560
South Central:									
Fort Smith, Ark.	2754	2958	3157	3349	3540	3726	3905	4070	4229
Dodge City, Kans.	2211	2398	2587	2761	2929	3103	3257	3399	3531
Topeka, Kans.	2231	2420	2608	2779	2949	3120	3274	3414	3542
Wichita, Kans.	2392	2590	2788	2971	3148	3328	3493	3645	3784
Shreveport, La.	3124	3333	3542	3747	3951	4150	4345	4529	4709
Columbia, Mo.	2226	2414	2598	2769	2937	3107	3263	3404	3535
St. Louis, Mo.	2313	2507	2696	2872	3046	3220	3381	3527	3661
Oklahoma City, Okla.	2629	2831	3032	3226	3415	3603	3779	3941	4095
Amarillo, Tex.	2368	2552	2736	2911	3080	3250	3407	3553	3690
Corpus Christi, Tex.	3704	3922	4138	4356	4573	4784	4998	5206	5411
Fort Worth, Tex.	3132	3350	3567	3781	3990	4196	4397	4584	4766
Midland, Tex.	2950	3149	3347	3541	3734	3920	4101	4270	4436
Midwest:									
Chicago, Ill.	1814	1989	2158	2316	2473	2631	2778	2905	3023
Moline, Ill.	1863	2034	2198	2350	2499	2652	2787	2904	3014
Peoria, Ill.	1922	2098	2266	2421	2574	2730	2871	2996	3110
Indianapolis, Ind.	1967	2142	2308	2464	2618	2770	2915	3041	3161
Louisville, Ky.	2301	2489	2673	2845	3018	3186	3353	3497	3630
Flint, Mich.	1483	1628	1765	1893	2016	2145	2263	2364	2452
Grand Rapids, Mich.	1560	1712	1858	1993	2125	2260	2387	2494	2590
Columbus, Ohio	1917	2085	2247	2399	2553	2703	2849	2973	3087
Northeast:									
Portland, Maine	1164	1293	1411	1532	1646	1755	1856	1945	2018
Albany, N.Y.	1557	1710	1851	1990	2123	2252	2378	2481	2568
Binghamton, N.Y.	1334	1473	1601	1724	1844	1960	2077	2169	2245
Syracuse, N.Y.	1511	1662	1805	1943	2072	2204	2333	2438	2525
Harrisburg, Pa.	1925	2105	2270	2433	2593	2747	2902	3031	3148
Philadelphia, Pa.	1969	2154	2323	2493	2660	2820	2985	3120	3244
Pittsburgh, Pa.	1756	1917	2068	2214	2356	2497	2635	2751	2856
Williamsport, Pa.	1697	1858	2006	2152	2294	2432	2569	2683	2784
Richmond, Va.	2335	2521	2701	2881	3056	3224	3394	3539	3675
Southeast:									
Macon, Ga.	3014	3214	3415	3612	3808	3997	4185	4363	4532
Raleigh, N.C.	2489	2678	2863	3046	3227	3399	3572	3725	3868
Memphis, Tenn.	2804	3011	3214	3411	3604	3792	3974	4143	4303
Nashville, Tenn.	2573	2770	2962	3145	3330	3508	3683	3842	3990

MEAN GROWING DEGREE DAYS (ADJUSTED 50° BASE):
ACCUMULATED WEEKLY MARCH 1 TO INDICATED DATES

Sept. 27	Oct. 4	Oct. 11	Oct. 18	Oct. 25	Nov. 1	Nov. 8	Nov. 15	Nov. 22	Nov. 29	Dec. 6
5168	5347	5511	5664	5802	5930	6040	6141	6218	6297	6372
3878	4016	4137	4250	4352	4446	4526	4596	4643	4683	4716
2815	2901	2981	3052	3111	3161	3193	3228	3252	3273	3292
2452	2525	2608	2663	2707	2739	2757	2771	2776	2780	2781
2366	2427	2479	2529	2563	2591	2606	2615	2620	2623	2624
2785	2863	2926	2981	3026	3057	3074	3087	3097	3109	3115
3133	3218	3289	3371	3427	3467	3489	3512	3527	3534	3539
2666	2725	2777	2837	2875	2901	2912	2921	2927	2928	2929
2923	3004	3081	3156	3213	3261	3288	3316	3334	3349	3360
3362	3450	3527	3614	3674	3721	3748	3775	3792	3802	3810
2413	2468	2515	2565	2595	2616	2627	2632	2635	2635	2635
2761	2830	2890	2955	2998	3030	3048	3063	3072	3076	3078
2291	2346	2389	2442	2474	2495	2506	2513	2520	2521	2522
2633	2703	2759	2823	2863	2890	2907	2920	2929	2931	2934
4378	4508	4628	4747	4843	4925	4981	5045	5097	5138	5169
3641	3749	3847	3941	4010	4069	4105	4144	4172	4195	4213
3655	3756	3849	3947	4020	4077	4111	4150	4178	4197	4211
3906	4019	4121	4224	4300	4359	4396	4437	4467	4488	4504
4881	5034	5173	5309	5422	5521	5595	5674	5751	5814	5864
3651	3756	3847	3944	4014	4069	4103	4144	4173	4192	4207
3784	3892	3984	4081	4151	4205	4239	4278	4308	4326	4340
4241	4367	4482	4597	4685	4759	4808	4865	4908	4942	4971
3813	3926	4029	4127	4205	4273	4317	4372	4414	4451	4484
5614	5798	5978	6154	6312	6452	6573	6691	6811	6917	7012
4940	5094	5234	5376	5493	5592	5665	5746	5817	5877	5926
4593	4733	4864	4990	5093	5182	5246	5319	5381	5437	5483
3123	3211	3283	3363	3415	3451	3473	3494	3512	3519	3524
3108	3193	3264	3345	3400	3439	3461	3484	3501	3508	3515
3209	3295	3368	3448	3503	3542	3564	3589	3607	3615	3621
3269	3360	3437	3519	3578	3618	3644	3672	3695	3706	3714
3751	3859	3947	4041	4113	4166	4201	4241	4276	4296	4310
2527	2595	2652	2710	2752	2778	2796	2808	2820	2825	2828
2668	2740	2799	2862	2903	2931	2946	2961	2974	2979	2983
3193	3282	3357	3436	3495	3533	3561	3585	3608	3620	3627
2087	2145	2192	2236	2271	2293	2308	2315	2324	2328	2330
2648	2717	2776	2833	2877	2905	2923	2934	2945	2950	2953
2313	2372	2417	2468	2503	2524	2539	2548	2558	2562	2564
2606	2677	2733	2790	2835	2863	2882	2896	2910	2917	2921
3247	3336	3412	3485	3540	3578	3609	3631	3650	3659	3667
3349	3444	3530	3606	3669	3712	3749	3775	3800	3815	3825
2946	3027	3092	3160	3211	3243	3267	3288	3310	3320	3327
2869	2946	3011	3076	3126	3158	3182	3197	3209	3215	3219
3794	3901	3997	4087	4160	4219	4272	4318	4363	4393	4415
4692	4839	4972	5095	5203	5292	5370	5441	5517	5574	5617
3997	4114	4217	4314	4395	4460	4518	4568	4623	4658	4683
4452	4584	4701	4816	4907	4981	5035	5093	5148	5187	5217
4125	4248	4354	4458	4540	4604	4650	4700	4746	4776	4800

Spring Freeze Probabilities and Length of the Growing Season

One of the suggested cultural practices for corn growers, to help minimize losses due to the Southern Corn Leaf Blight, is to plant early. Given favorable soil and weather conditions, the major consideration in many areas will be the danger of a late frost, which could nullify any advantage of an early planting.

As a guide not only to corn producers, but to growers of all agricultural crops, we are publishing the accompanying maps of freeze probabilities. The maps show the dates in spring after which the probability of a 32° or lower temperature occurring is 50%, 25%, and 10%, respectively.

Spring and fall freeze probability data have been used to help prepare the maps on pages 18 and 19, showing mean GDD for the period between date of a given freeze probability in spring and date of a similar freeze probability in fall (the date before which the probability of 32° or lower is a given value). Mean GDD for other periods of interest may easily be computed from the tables on pages 12-15.

Some basic rules of probability may be useful at this point. For example, the probability of a growing season (frost-free period) lasting from the mean date (50% probability) of last spring freeze to the mean date (50% probability) of first fall freeze is not 50%, but only 25%. The laws of probability state that the probability of 2 independent events occurring (in this case a spring freeze and a fall freeze) is equal to the product of the two probabilities, i.e....

Probability (Pr) of A and B both occurring =
Pr of A occurring X Pr of B occurring.

Therefore:

Pr of last spring freeze occurring before
mean date = .50
Pr of first fall freeze occurring after mean
date = .50
Pr of last spring freeze occurring before mean
date and first fall freeze occurring after
mean date = .50 X .50 = .25 or 25%

Similarly, the probability of the growing season extending from the 25% frost date in spring to the 25% frost date in fall is 56%*, while the probability of a frost-free period between the dates

of 10% freeze probability is 81%. For example, if the date at which there is only a 10% probability of further frost in the spring is May 15, and the date by which there is only a 10% probability of a frost having already occurred in the fall is October 15, then the probability of a growing season lasting from May 15 to October 15 is 81%. If the same area had 25% freeze probability dates of May 7 and October 23, the probability of a May 7-October 23 growing season would be 56%.

*Pr of no frost after 25% date in spring = .75
Pr of no frost before 25% date in fall = .75
Pr of Frost-free period between 25% dates =
.75 X .75 = .56 or 56%

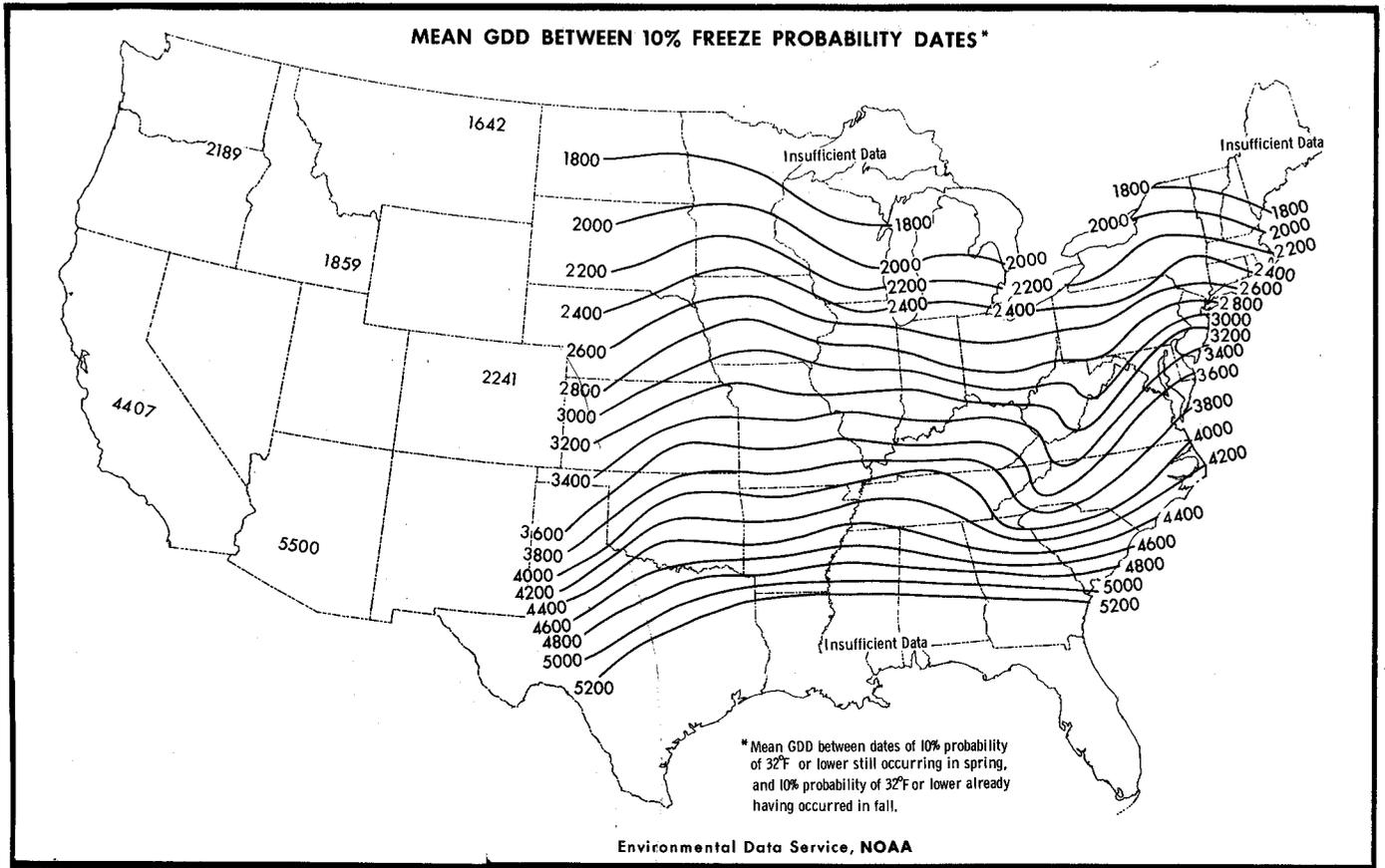
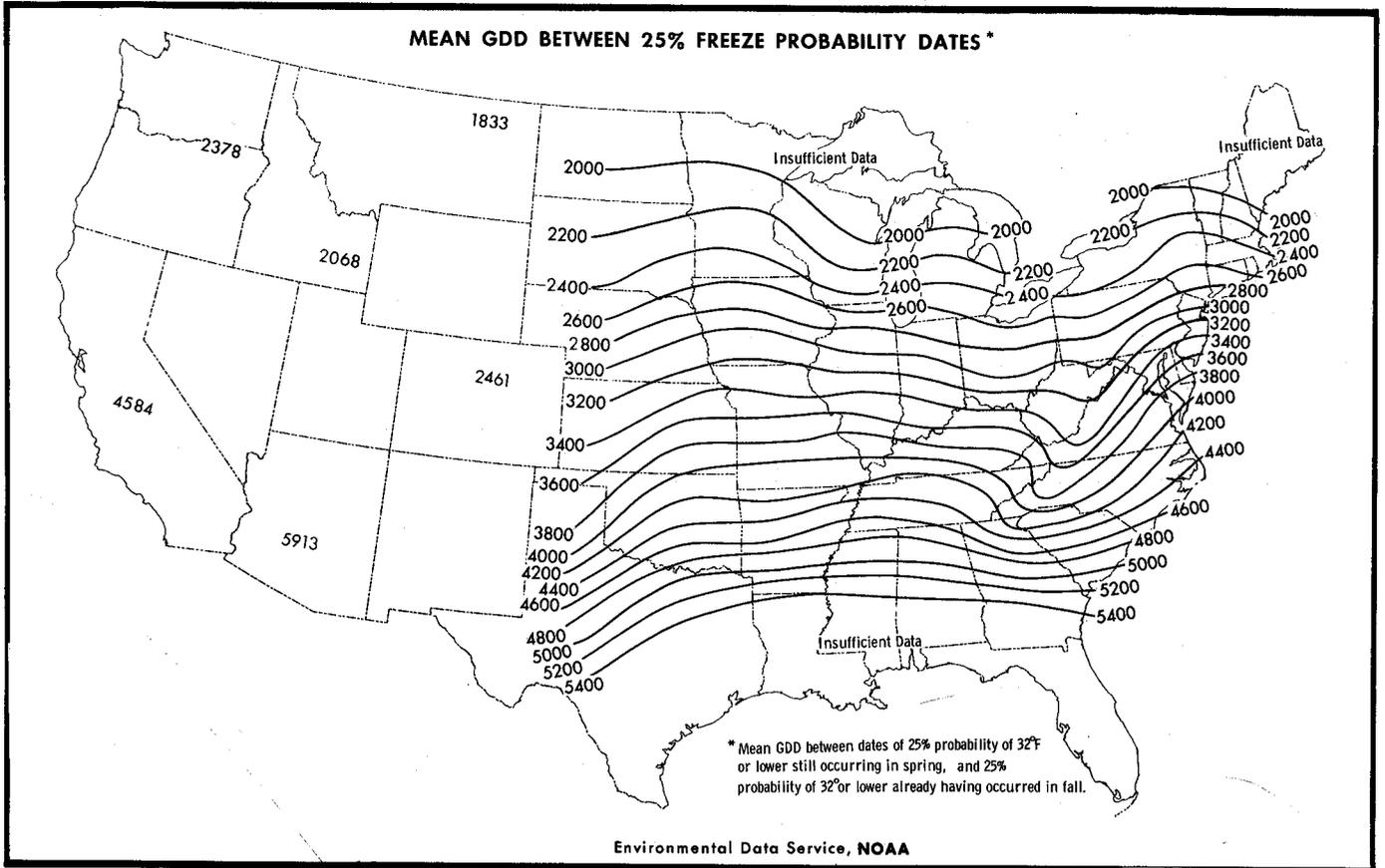
Note:

Because of the scale of the maps on the following pages, the data are naturally smoothed and cannot account for local, small-scale differences. Most states have compiled more detailed freeze probability data, available through NOAA State Climatologists, agricultural experiment stations, extension service personnel, university libraries, etc. Since minimum temperatures are strongly affected by terrain features, even the most detailed state maps cannot account for all local variations. However, growers who have been in an area for some time are usually aware of the local temperature characteristics.

The 50% spring freeze probability (mean date of last spring freeze) map differs somewhat from the corresponding map in the standard climatological atlas. In the current maps we have given less weight to airport or downtown data from larger cities, and have relied more on data from less urban stations which more nearly reflect conditions in farming areas. Also, no attempt has been made to analyze the coldest locations in mountainous areas of the eastern U.S., although the general effect of higher elevations is of course accounted for. No analysis was attempted in the mountainous western U.S., where data for selected stations are plotted as an indication of the variability encountered.

The mean GDD maps are based on the 47 stations for which data are available (see pages 12-15), and are thus most useful for regional, rather than small-scale, interpretation.

J. J. Rahn



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