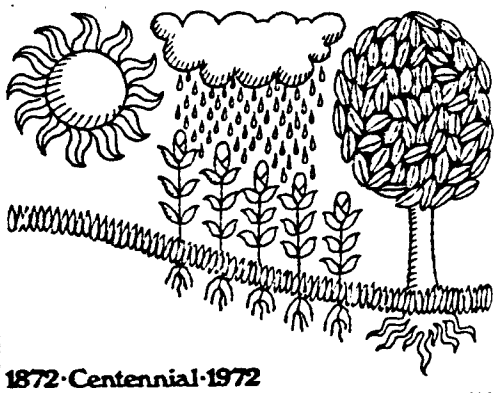

Weekly Weather & Crop Bulletin

U. S. DEPARTMENT OF COMMERCE
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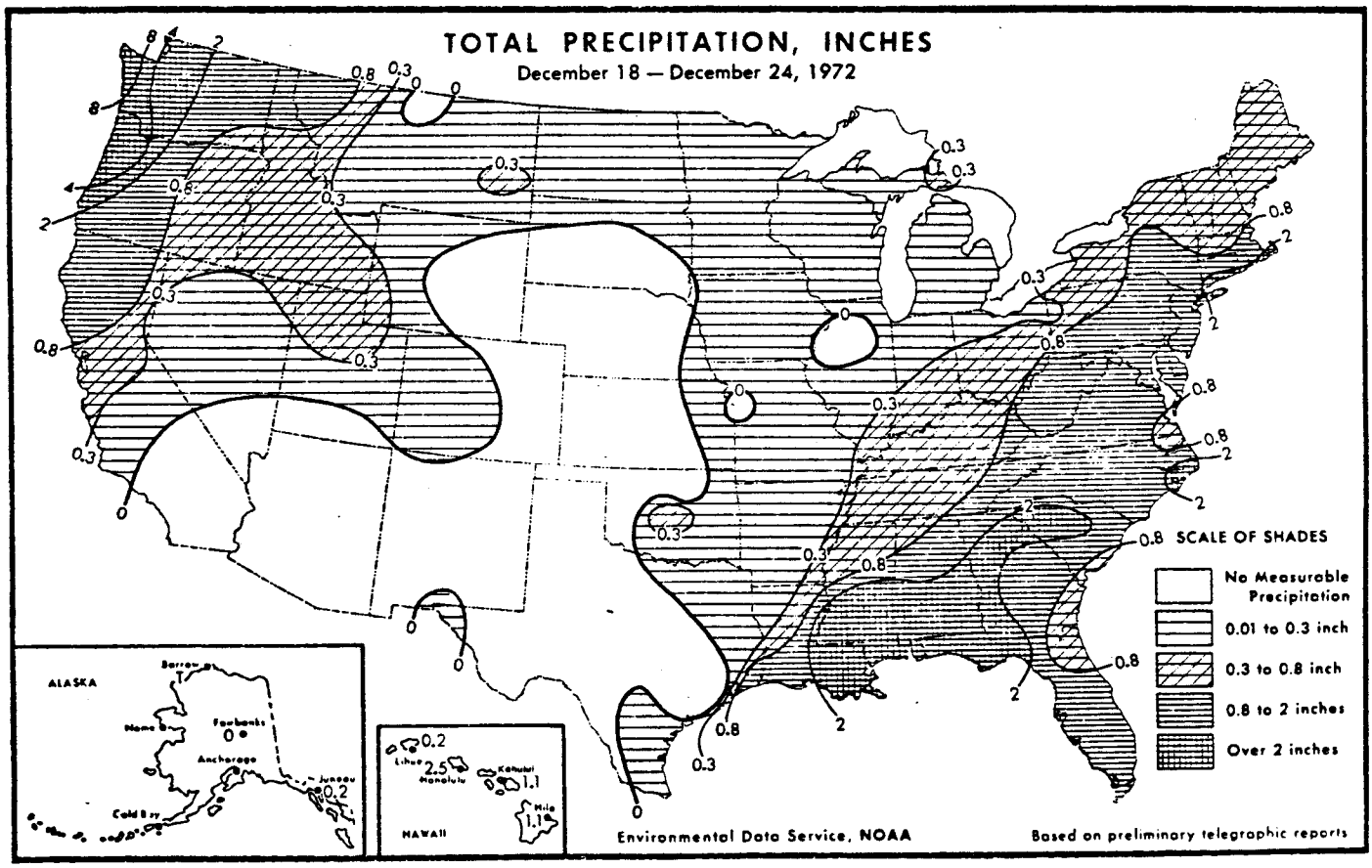
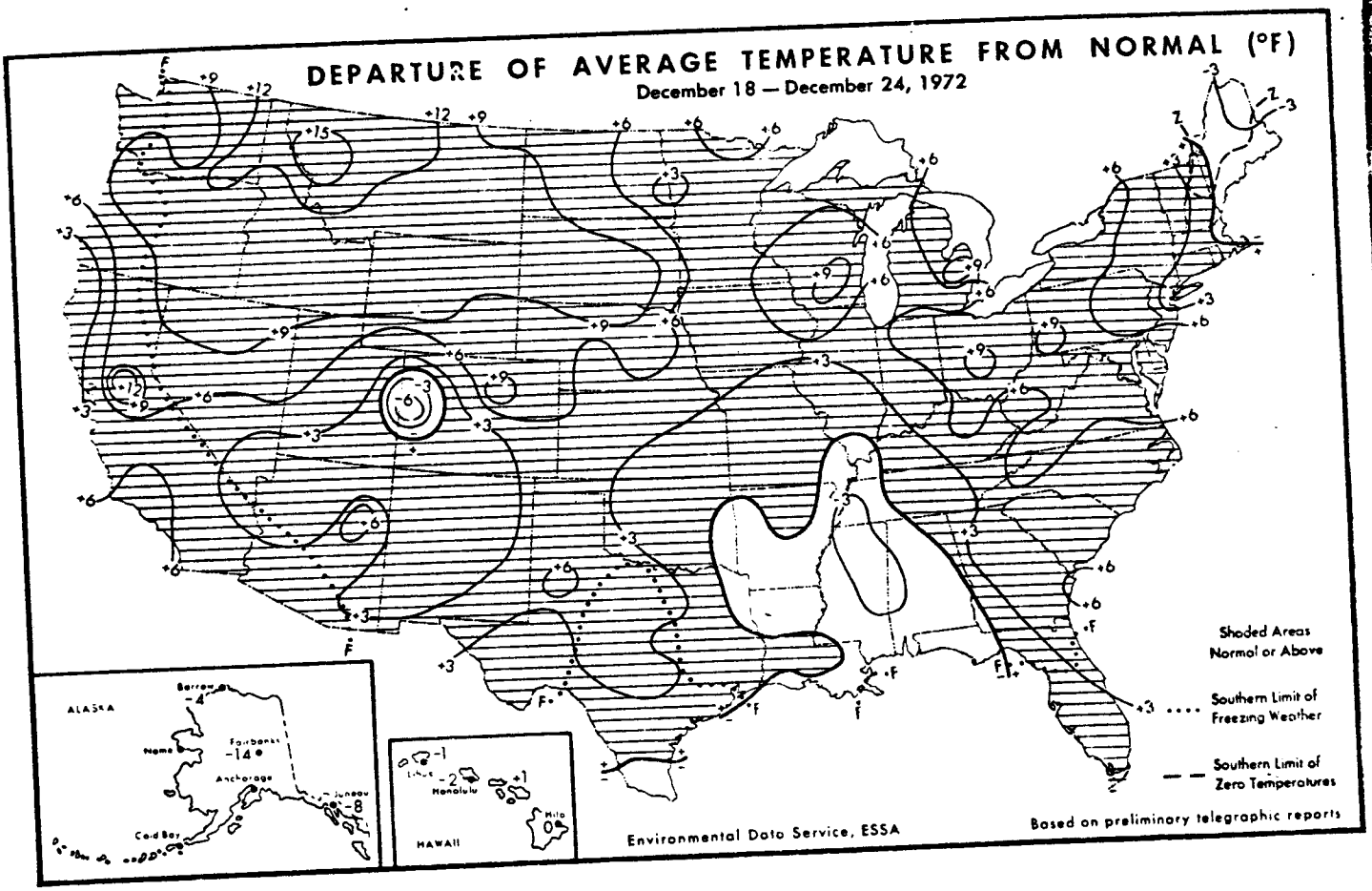


HIGHLIGHTS: A warming trend early in the week ended the bitter cold spell. Heavy rain fell along the Washington Coast; generous rain fell in portions of the Deep South. No rain fell in the Southwestern Deserts and only light sprinkles or snow flurries occurred over much of the Great Plains.

PRECIPITATION: A storm centered off the coast of British Columbia early in the week moved southward to the Washington Coast by midweek and intensified. It caused rain along the coast with snow in the nearby hills and mountains. By midweek the heavy rain in the Pacific Northwest was accompanied by strong winds. Light snow fell over the northern and central Rocky Mountains and from the northern Great Plains to the Great Lakes. Treacherous mixtures of snow, freezing rain, freezing drizzle, and fog hampered travel by automobile from the northern and central Great Plains to the Mississippi River Valley and the Great Lakes. Snow accumulated to a foot or more in spots in interior New England. Thunderstorms accompanied by heavy rain occurred in the Deep South. Up to 5.00 inches or more fell in spots in Mississippi and Alabama Wednesday and early Thursday. As the weekend approached, more severe thunderstorms threatened the Deep South and the Pacific storm became more intense.

The weekend brought rain to the Pacific Northwest with snow in the western Mountains, treacherous mixtures of snow with freezing rain or freezing drizzle accompanied by strong winds from the central Great Plains to the Great Lakes, and combinations of drizzle and fog from the southern



Great Plains to the middle Atlantic Coast. Rain snow, clouds, or fog covered much of the area from the Mississippi River to the Atlantic Ocean. In general, snow fell in the northern portions, freezing precipitation glazed the area south of the Snow Belt, and rain, drizzle, and fog occurred farther south.

Weekly rainfall totals ranged from heavy, up to more than 8.00 inches, along Washington Coast, to light sprinkles or snow flurries over the northern Great Plains. The Far Southwest received no rain and only light amounts fell in the Great Plains. More generous precipitation occurred over the Appalachians, the Atlantic Coastal Plains, and the Deep South.

TEMPERATURE: Bitter cold continued over much of the Nation early in the week. Subfreezing temperatures occurred over northern Florida, 32° at Jacksonville, Monday morning. Moisant Airport, New Orleans, La., registered 31° Monday. Subzero weather occurred in northern Maine and in the central Rocky Mountains. Warmer weather returned to Florida Tuesday and by midweek, maximums reached the 60's and 70's, generally with 84° at Palm Beach Thursday. A warming trend over the western Great Plains pushed afternoon temperatures in the 40's and 50's.

The warming trend continued through the rest of the week and brought average temperatures to above normal over almost the entire Nation. Maine, extreme eastern Massachusetts, and the Lower Mississippi River Valley. Much of the country averaged 6° to 12° or more warmer than normal.

L. W. Dye

BEST WISHES FOR THE NEW YEAR

NATIONAL AGRICULTURAL SUMMARY

AGRICULTURAL HIGHLIGHTS: Harvesting progress for corn and soybeans was slow last week due to poor harvesting conditions. * Cotton harvesting increased in Texas, but was slowed by wet weather in the Southeast. * Winter wheat made some growth in the southern Great Plains for the first time in several weeks. * California citrus suffered considerable losses from freezing weather earlier this month.

SMALL GRAINS: Winter wheat made some growth in the southern Great Plains as milder weather returned. The wheat crop remains in good to excellent condition throughout the Great Plains with adequate to surplus moisture supplies. Some farmers in Texas and Oklahoma took advantage of the open weather last week and seeded the last few acres of wheat. Wheat seeding in Texas is now 99 percent complete compared to 100 percent last year. Late small grain seeding continues to be delayed by wet weather in the southeastern part of the Nation, but is gaining momentum in Arizona. Milder temperatures melted most snow covering winter wheat in Nebraska, while the eastern plains of Colorado remain mostly snow covered. Heavy rains and warmer temperatures melted snow in Washington and Oregon, boosting soil moisture for winter wheat; but also causing some erosion.

CORN: The Nation's lagging corn harvest continued to make very slow progress during the week before Christmas with 86 percent of the total acreage harvested compared to 83 percent a week earlier. Mild, drizzly weather and muddy fields in the North Central States hampered corn harvesting which increased only 3 points to 85 percent complete while the Southern States also gained only 3 points to 94 percent complete. In the West North Central States about 92 percent of the corn acreage is now harvested. In Iowa, the Nation's leading corn producing State, the corn harvest slowly advanced to 92 percent complete. Corn picking moved ahead in Nebraska to 90 percent complete and in Missouri to 78 percent complete. Harvesting progress in the East North Central States was slower and is much further behind normal at 75 percent complete. Frozen soil allowed some early morning and late evening harvesting progress early in the week, but a gradual thaw returned fields to mud. Corn harvesting increased 3 points to 85 percent complete in Illinois and to 65 percent complete in Indiana.

COTTON: Mild, dry weather returned to Texas last week and permitted farmers to resume cotton harvesting now 65 percent complete compared to 56 percent a week earlier. Rain and drizzly weather prevailed for the eighth consecutive week from Louisiana to Virginia delaying completion of the cotton harvest. Farmers in the Carolinas got into the fields early in the week--cotton harvesting is 90 percent complete in North Carolina and 93 percent complete in South Carolina. Rain kept Mississippi farmers out of the fields with harvesting 87 percent complete. Farmers in Arkansas are making every effort to harvest the remaining 10 percent of cotton acreage, but fields remain boggy and progress is slow. Unfavorable wet conditions persisted in Louisiana where harvest is 90 percent complete and in Missouri and Tennessee. Cotton harvesting continued in the San Joaquin Valley of California, but wet fields were hampering harvest in the central valley.

SOYBEANS: It was another week of slow progress for the Nation's exceptionally late soybean harvest, now 81 percent complete compared to 79 percent a week earlier. Mild temperatures and cloudy damp weather in the North Central States thawed frozen soil and made fields boggy--harvesting at 83 percent complete was held to a 1 point gain. The East North Central States continue to lag far behind with only 76 percent of the soybean acreage harvested while the West North Central States inched forward to 90 percent completion. In Illinois, the Nation's leading soybean producing State, combining advanced 3 points to 90 percent completion. Very little progress occurred in other East North Central States. The Iowa soybean harvest is nearing completion at 96 percent finished while Missouri advanced 3 points to 72 percent complete. Wet weather in the South held soybean harvesting to 78 percent complete, a 3-point gain over the previous week. Dry weather last week in Arkansas permitted farmers to advance combining of soybeans to 80 percent complete, but progress was slow. Rain kept combines parked in Mississippi where harvesting remains 67 percent complete.

OTHER CROPS: Sorghum grain harvesting became more active in the Great Plains with the return to normal temperatures and drier weather, but muddy fields continue to hinder progress. Harvesting in Texas is nearing completion at 98 percent complete, while Kansas and Missouri are both 79 percent complete. Nebraska sorghum grain combining advanced to 90 percent complete, while limited combining occurred in Oklahoma and wet field conditions slowed harvesting in California.

Fruits and Nuts: Florida citrus tree and fruit conditions are excellent, but freezing weather in California earlier in the month has taken its toll. Reports indicate from 50 percent to 60 percent of the San Joaquin Valley naval orange crop is damaged with cullage heavy and some lots going directly to processing. Valencia oranges, lemons, tangerines also suffered heavy losses. Citrus in southern California received little damage. Rain continues to hamper pecan harvesting in Mississippi now 91 percent complete.

Vegetables: Florida vegetable crops suffered considerable wind and sandburn damage from cold high winds December 16 and 21. Some acreage of young peppers and cucumbers will be lost. Some bloom and fruit drop has occurred in tender vegetables such as tomatoes and beans. Lettuce harvesting is active in the Imperial Valley of California while celery harvesting is active in the Oxnard area and in southern California.

PASTURES AND LIVESTOCK: The return of milder temperatures and dry weather was most welcome to livestock producers in the Great Plains and Mountain States. Livestock care and feed requirements were reduced in most areas as more grazing became available from harvested grain fields and other pasture. Grazing of winter wheat and other small grain pastures continued to be limited throughout the southeastern quarter of the Nation due to wet conditions.

Arlon M. Scott
Agricultural Statistician

Temperature and Precipitation Data for the Week Ending Midnight, l.s.t., December 24, 1972

States and Stations	Temperature °F Average	Temperature °F Departure*	Precipitation Inches Total	Precipitation Inches Departure*
ALA.Birmingham	46	- 1	1.1	0
Mobile	53	- 1	2.1	+ .9
Montgomery	50	+ 2	2.4	+1.3
ALASKA.Anchorage	---	---	---	----
Barrow	-17	- 4	T	- .1
Fairbanks	-23	-14	0	- .1
Juneau	20	- 8	.2	- .8
Nome	--	---	---	----
ARIZ.Flagstaff	30	0	0	- .4
Phoenix	56	+ 5	0	- .2
Tucson	54	+ 3	0	- .2
Winslow	38	+ 6	0	- .1
Yuma	59	+ 5	0	- .1
ARK.Fort Smith	39	- 2	.2	- .5
Little Rock	42	0	.2	- .7
CALIF.Bakersfield	55	+ 7	T	- .2
Eureka	49	0	1.4	- .2
Fresno	51	+ 5	T	- .5
Los Angeles	65	+ 7	0	- .6
Red Bluff	50	+ 4	.8	- .2
San Diego	62	+ 5	0	- .6
San Francisco	53	+ 4	.4	- .5
Stockton	58	+13	.5	- .2
COLO.Denver	42	+10	T	- .1
Grand Junction	22	- 6	.1	0
Pueblo	35	+ 3	T	- .1
CONN.Bridgeport	33	+ 1	2.1	+1.4
Hartford	30	+ 1	.9	+ .2
D.C.Washington	44	+ 7	1.5	+ .9
FLA.Apalachicola	56	0	3.5	+2.8
Ft. Myers	65	0	.9	+ .6
Jacksonville	60	+ 4	.7	+ .2
Key West	72	+ 2	1.1	+ .7
Lakeland	63	+ 1	2.4	+1.9
Miami	69	+ 1	1.0	+ .6
Orlando	64	+ 3	1.5	+1.0
Tallahassee	54	0	3.3	+2.4
Tampa	63	+ 1	1.6	+1.2
GA.Atlanta	49	+ 4	2.4	+1.3
Augusta	50	+ 3	1.4	+ .6
Macon	53	+ 5	1.0	+ .1
Savannah	57	+ 6	.7	0
HAWAII.Hilo	72	0	1.1	-2.4
Honolulu	72	- 2	2.5	+1.7
Kahului	73	+ 1	1.1	- .1
Lihue	71	- 1	.2	-1.0
IDAHO.Boise	44	+12	.7	+ .4
Lewiston	45	+10	.7	+ .4
Pocatello	39	+12	.5	+ .3
ILL.Cairo	37	- 2	.6	- .2
Chicago	33	+ 5	T	- .4
Moline	32	+ 6	T	- .4
Peoria	31	+ 3	T	- .4
Rockford	32	+ 8	0	- .4
Springfield	32	+ 1	T	- .4
IND.Evansville	36	0	.4	- .3
Fort Wayne	34	+ 7	.1	- .4
Indianapolis	34	+ 4	.4	- .2
South Bend	35	+ 8	T	- .5
IOWA.Burlington	31	+ 3	T	- .3
Des Moines	28	+ 4	1.1	+ .9
Dubuque	29	+ 7	.1	- .3
Sioux City	29	+ 5	T	- .2
KANS.Concordia	35	+ 4	T	- .2
Dodge City	39	+ 5	T	- .1
Goodland	35	+ 6	T	- .1
Topeka	36	+ 3	T	- .3
Wichita	36	+ 1	T	- .2
KY.Lexington	43	+ 8	.6	- .2
Louisville	41	+ 5	.5	- .3
LA.Baton Rouge	54	+ 1	2.6	+1.5
Lake Charles	54	0	.8	- .5
New Orleans	54	- 1	2.8	+1.9
Shreveport	47	- 2	.1	-1.1
MAINE.Caribou	9	- 4	.3	- .2
Portland	23	- 1	.4	- .5
MD.Baltimore	41	+ 6	1.6	+ .9
MASS.Boston	30	- 1	1.1	+ .3
Chatham	27	---	2.4	----
MICH.Alpena	31	+ 8	.1	- .3
Detroit	33	+ 5	.1	- .4
Flint	34	+10	.1	- .3
Grand Rapids	31	+ 4	.1	- .3
Houghton Lake	29	+ 6	.1	- .3
Lansing	31	+ 5	T	- .4
Marquette	27	+ 4	.1	- .3
Muskegon	33	+ 4	.1	- .3
S.Ste.Marie	26	+ 6	.3	- .2
MINN.Duluth	17	+ 4	.2	- .1
Internatl Falls	15	+ 7	.1	- .1
Minneapolis	21	+ 4	T	- .2
Rochester	24	+ 7	T	- .2
St. Cloud	17	+ 2	T	- .2
MISS.Jackson	48	+ 1	2.9	+1.7
Meridian	47	+ 5	2.7	+1.5
MO.Columbia	32	+ 1	.1	- .3
Kansas City	34	+ 1	T	- .4
St. Louis	34	0	.2	- .2
Springfield	37	+ 1	T	- .5
MONT.Billings	38	+10	.1	0
Glasgow	26	+ 9	.1	0
Great Falls	39	+12	.2	+ .1
Havre	34	+13	T	- .1
Helena	37	+13	.1	0
Kalispell	39	+15	1.1	+ .8
Miles City	33	+10	.3	+ .2
Missoula	39	+16	.7	+ .5
NEBR.Grand Island	33	+ 7	T	- .1
Lincoln	33	+ 3	T	- .2
Norfolk	32	+ 8	T	- .1
North Platte	31	+ 4	T	- .1
Omaha	31	+ 5	T	- .2
Valentine	35	+11	T	- .1
NEV.Ely	34	+ 8	.2	0
Las Vegas	45	+ 1	0	- .1
Reno	39	+ 8	.1	- .1
Winnemucca	39	+10	.2	0
N.H.Concord	24	+ 1	.4	- .3
N.J.Atlantic City	42	+ 7	1.2	+ .5
Trenton	39	- 5	1.3	+ .6
N.MEX.Albuquerque	37	+ 1	0	- .1
Roswell	45	+ 7	0	- .1
N.Y.Albany	30	+ 5	.7	+ .1
Binghamton	30	+ 5	.9	+ .4
Buffalo	32	+ 6	.5	- .2
New York	37	+ 2	1.4	+ .6
Rochester	35	+ 8	.4	- .2
Syracuse	32	+ 6	.8	+ .1
N.C.Asheville	46	+ 6	1.1	+ .4
Charlotte	46	+ 4	1.4	+ .5
Greensboro	44	+ 5	1.3	+ .6
Hatteras	52	+ 4	3.1	+2.0
Raleigh	46	+ 5	1.4	+ .7
Wilmington	51	+ 3	1.7	+ .9
N.DAK.Bismarck	24	+ 7	.1	0
Fargo	13	0	T	- .1
Williston	24	+ 9	.1	0
OHIO.Akron-Canton	37	+ 8	.4	- .1
Cincinnati	39	+ 6	.6	+ .1
Cleveland	35	+ 6	.2	- .3
Columbus	39	+ 9	.6	+ .1
Dayton	37	+ 7	.3	- .2
Toledo	33	+ 6	.1	- .3
Youngstown	34	+ 6	.3	- .2
OKLA.Okla. City	42	+ 2	.4	+ .1
Tulsa	39	0	T	+ .9
OREG.Astoria	52	0	5.4	+2.2
Burns	36	+ 7	.5	+ .2
Medford	44	+ 7	1.2	+ .4
Pendleton	49	+13	.5	+ .2
Portland	51	+10	4.8	+3.4
Salem	52	+11	4.9	+3.2
PA.Allentown	34	+ 4	1.2	+ .5
Erie	34	+ 6	.5	- .1
Harrisburg	37	+ 5	1.1	+ .5
Philadelphia	39	+ 6	1.3	+ .7
Pittsburgh	39	+ 9	.8	+ .2
Scranton	33	+ 5	.9	+ .4
R.I.Providence	31	+ 1	1.8	+1.0
S.C.Charleston	54	+ 5	.7	+ .1
Columbia	52	+ 6	2.2	+1.4
Greenville	48	+ 5	2.2	+1.2
S.DAK.Aberdeen	24	+ 8	T	- .1
Huron	29	+11	T	- .1
Rapid City	37	+10	0	- .1
Sioux Falls	27	+ 7	T	- .1
TENN.Chattanooga	43	+ 1	1.3	+ .1
Knoxville	45	+ 4	1.1	+ .1
Memphis	39	- 3	.3	- .9
Nashville	52	+11	.6	- .4
TEX.Abilene	50	+ 4	0	- .3
Amarillo	44	+ 5	T	- .2
Austin	56	+ 4	0	- .6
Beaumont	54	0	1.3	+ .1
Brownsville	62	- 1	T	- .4
Corpus Christi	61	+ 2	T	- .5
Dallas	51	+ 3	T	- .6
Del Rio	54	+ 2	0	- .3
El Paso	47	+ 4	.2	+ .1
Fort Worth	51	+ 4	T	- .6
Galveston	57	0	1.3	+ .3
Houston	55	+ 2	T	-1.0
Lubbock	47	+ 6	0	- .2
Midland	48	+ 2	0	- .2
San Angelo	52	+ 5	0	- .2
San Antonio	56	+ 3	T	- .4
Victoria	58	+ 1	T	- .7
Waco	50	0	T	- .7
Wichita Falls	48	+ 4	0	- .3
UTAH.Blanding	30	+ 1	T	- .3
Salt Lake City	36	+ 6	.4	+ .1
VT.Burlington	24	+ 5	.6	+ .2
VA.Lynchburg	45	+ 7	1.4	+ .6
Norfolk	48	+ 6	.6	0
Richmond	47	+ 8	1.1	+ .4
Roanoke	47	+ 9	1.9	+1.2
WASH.Colville	39	+12	1.2	+ .8
Omak	36	+11	1.0	+ .7
Quillayute	48	+ 7	8.3	+4.5
Seattle-Tacoma	50	+ 9	3.5	+2.1
Spokane	42	+13	1.1	+ .6
Walla Walla	50	+13	1.1	+ .7
Yakima	39	+ 8	.9	+ .6
W.VA.Beckley	40	+ 6	1.3	+ .4
Charleston	42	+ 5	1.2	+ .5
Huntington	42	+ 5	.8	+ .1
Parkersburg	42	+ 7	1.0	+ .4
WIS.Green Bay	28	+ 8	.2	- .1
La Crosse	28	+ 8	.1	- .2
Madison	31	-10	T	- .3
Milwaukee	30	+ 6	.1	- .2
WYO.Casper	36	+ 9	T	- .1
Cheyenne	37	+ 8	T	- .1
Lander	34	+11	0	0
Sheridan	38	+12	T	- .1
P.R. San Juan	79	+ 2	.5	- .5

* 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 Climatologists.

ALABAMA: Much cloudiness with occasional rain and drizzle. Extensive statewide rains Wednesday and and Wednesday night - heavy central and south where 2.00 to 3.00 inch amounts were common and more than 6.50 inches at Elba and Brewton in south. No freezing temperatures after Monday morning, week averaged 4° above normal. Highest 74° at Dothan and Geneva Wednesday. Continued wet weather limited fieldwork. Practically no pregress made with harvest of remaining cotton, corn, and soybean fields. Small grains in good to excellent condition with very little damage from cold weather early in week. Limited amounts of land turned in spring Irish potato area as planting time nears. Livestock went into winter in fair to good condition. High cost of concentrates forcing many stockmen to feed increased quantities of hay and roughage. Supplies of these feeds generally adequate, but short in several southern counties. Marketings of cattle and calves were seasonally below previous week and also off from a year earlier.

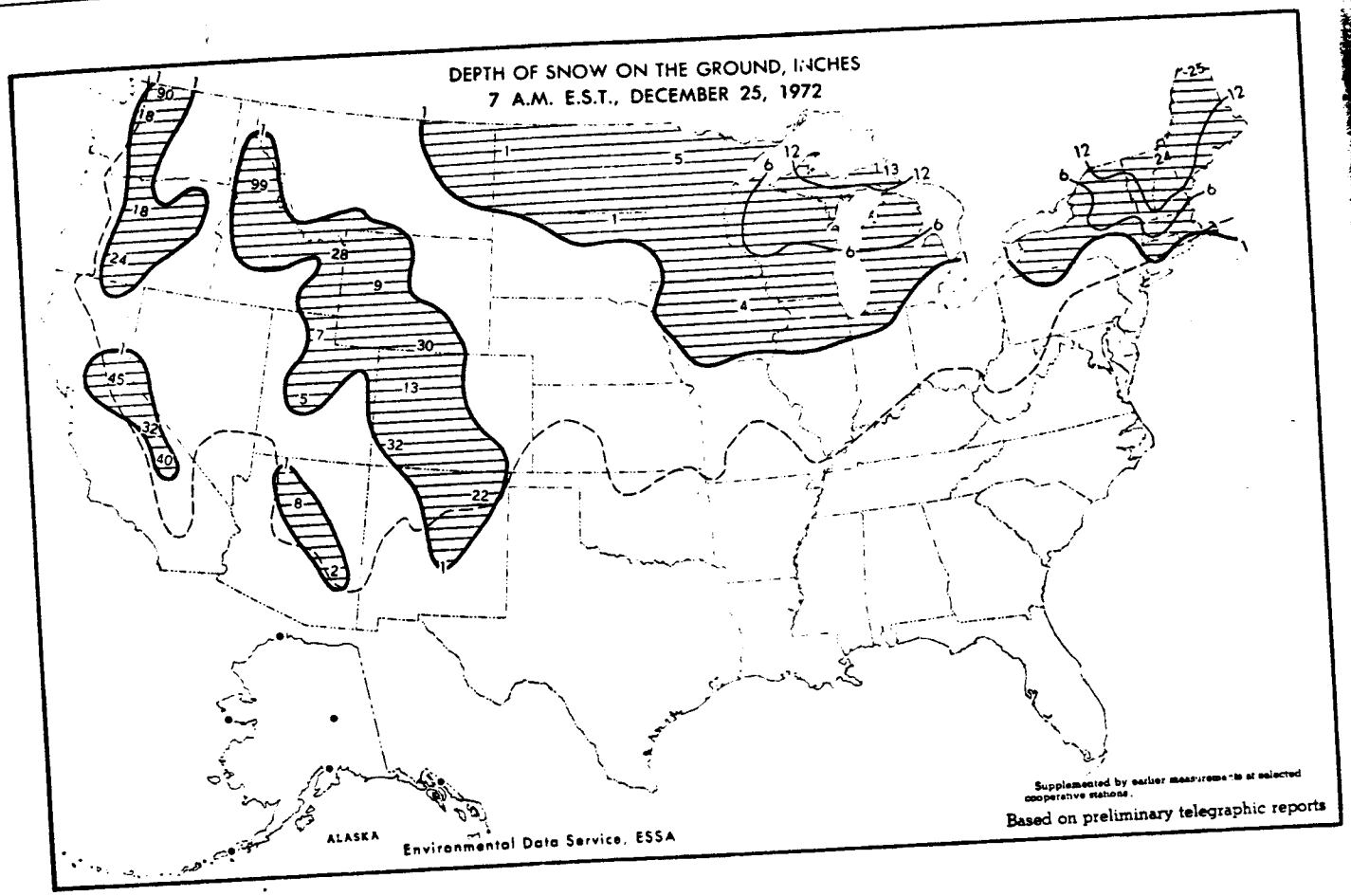
ARIZONA: Skies clear most of week and temperatures slightly above normal. Freezing temperatures occurred in colder parts of Salt River Valley on 2 nights and remained above freezing throughout week in Yuma area. No precipitation anywhere in State. Cotton harvest in final stages; cleanup, residue disposal operations well underway. Sorghum harvest virtually complete, good yields reported. Sugarbeet harvest satisfactory. Small grain planting gaining momentum. Harvest lettuce, mixed vegetables continued Salt River Valley, Yuma areas. Recent temperatures favorable. Navel and sweet oranges, Minneola tangelos, lemons, and limited grapefruit harvest active Yuma, Salt River Valley. Market conditions generally good all varieties except grapefruit. Groves escaped appreciable damage from recent freezing temperatures. Ranges fair to mostly good; warmer temperatures promoted feed growth lower elevation and desert ranges. Cattle, calves good statewide. Sheep, lambs on desert pastures fair to good; on northern Indian reservation fair.

ARKANSAS: Temperatures averaged near normal ranging from 3° above normal southeast to 2° below normal north. Highest 70° at Camden on 19th. Lowest 16° at Fayetteville on 22d. Precipitation 0.50 inch or less except 1.00 to 2.00 inches in narrow band across southern Arkansas about midweek. Most precipitation 2.17 inches at Hot Springs. No precipitation at Harrison. Dry and cool weekend. Wet fields continue to delay harvest. Boggy field conditions a major problem. Farmers making every effort to salvage what they can as weather permits. Cotton picking about 90% complete and approximately 80% soybeans combined. Unharvested crops show further deterioration. Small grains fair to good condition; too much water for plants many fields, soft fields limiting grazing. Livestock situation satisfactory with winter feeding in progress.

CALIFORNIA: Much warmer throughout State, first week since mid-October above normal. Previous week one of coldest on record. Moderate to heavy rains most days northern half. Santa Ana conditions south of Tehachapis locally severe on 25th. Cold wet weather slowed fieldwork. Harvest rice, milo continues conditions permitting. Cotton harvest continues San Joaquin Valley, desert areas. Wet fields hampering operations central valley. Navel orange harvest continues, cullage heavy, some lots going directly to processing. Reports indicate 50% to 60% of navel oranges San Joaquin damaged. Valencia oranges, lemons, tangerines also suffered heavy losses. Citrus, avocado districts in southern California received little or no damage, except desert valleys. Pruning trees, vines active. Broccoli and cauliflower light Salinas Valley; some fields diverted from fresh to processing. Carrots active desert valleys. Celery nearly complete Salinas Valley, active Oxnard and southern California. Lettuce active Imperial Valley. Some transplanting of onions Stockton. Potatoes slow Stockton and central valley. Foothill pasture improving, movement of sheep to foothill ranges active. Lambing and calving active. Heavy losses of sheep and lambs to coyotes in Sacramento Valley. Supplemental feeding continues. Marketings of livestock increased to slow depletion of supplemental feed and poor feedlot conditions. Stockwater supplies good. Egg production better due to warmer weather.

COLORADO: Cold western slope. Alamosa 10° below normal. Fraser reported -31° on 16th. Warmer on eastern slope. Maximum 63° on 22d in Denver. Precipitation light or none eastern plains, heavier in mountains, light in west. Dry over weekend. Additional crop stubble and pasture available to livestock. Harvest of corn and sorghum progressing where machines can travel the fields. A few sugar beets may be harvested if drying weather prevails. Many areas eastern plains snow covered, drainage of melted snow poor due to frozen ground. Some alfalfa and pastures covered with ice, may be lost from lack of oxygen. Supplemental feeding livestock all areas. Considerable stress to livestock; condition fair. Livestock losses substantial, especially young cattle and calves shipped in from warmer climates.

FLORIDA: Temperatures near normal as warming trend early part of week offset cold temperatures of December 16 and 17. Frontal passage midweek accompanied by thunderstorms and isolated tornadoes brought 24-hour precipitation totals greater than normal monthly totals to many stations. Rainfall averaged over 2.00 inches north and central sections and 1.00 to 1.50 inches south sections. Small grain growth good. Sugarcane harvest progressing, growth of young plant cane good. Weather favored growth of pastures most of week. Cattle good, calving active. Citrus tree and fruit condition excellent aided by rains of long duration and low intensity. Fruit color advancing, harvest slowed by Christmas. Cold high winds, December 16 and 21, caused considerable wind and sandburn to most vegetable crops. Some acreage losses of young peppers, cucumbers, watermelons in southwest areas. Considerable bloom and small fruit drop in beans, cucumbers, peppers, eggplant, tomatoes, along with scarring of fruit. Rains of 1.00 to 4.00 inches in north and north-central areas detrimental to cabbage crop. Potato planting delayed in Dade and Hastings area.



GEORGIA: Clear and cold beginning of period. Increasing cloudiness Tuesday and continued cloudy and mild remainder of week. Temperatures averaged 4° to 8° warmer than normal. Measurable rain on 3 to 5 days with amounts ranging from over 2.00 inches much of north to less than 0.50 inch extreme southeast. Soil moisture adequate to excessive. Condition of small grains and pastures fair to good. Land preparation and fall seeding delayed. Wet weather delayed completion of cotton, corn, soybean, and pecan harvest. Livestock condition fair to good.

HAWAII: Cool, showery most areas. Low temperatures slowed crop growth and maturity. Wet fields hampered farm operations. Production of fruits and vegetables steady. The 1972 sugarcane harvest about over. Planting and other farm operations continue pineapple plantations weather permitting. Pastures and cattle in fair to good condition.

IDAHO: Very cold last week gave way north at the beginning of period and elsewhere on 1st and 2d days to average as much as 11° above normal for week. Snow depths increased only at the higher elevation stations. Precipitation general and mostly above normal with only a few stations in the Upper Snake River Valley and eastern highlands reporting less than normal. Greatest weekly totals reported by Fairfield, with 1.39 inches and Emmett with 1.49 inches. Livestock pens turned to mud as warm weather and rains returned. Some low-lying lands flooded as ice jams and runoff created high water in major rivers of the State. In the north rains created erosion problems due to frozen ground underneath. Some cattle losses are occurring due to pneumonia and other respiratory diseases compounded by wet weather. Potato and onion marketing resumed activity.

ILLINOIS: After a bitter cold weekend on 16th and 17th, with temperatures averaging around 20° below normal across the State, a warming trend developed on Monday. By midweek, temperatures were averaging above normal with maximum readings in 30's and 40's. The higher temperatures were accompanied by fog, drizzle, and some rain. Most of the precipitation came on 19th and 20th and generally totaled in 0.25 to 0.50 inch range over central and southern Illinois and less in the north. Below-normal temperatures, freezing ground allowed some harvesting early in week. Warmer temperatures and muddy fields later halted activities. Corn harvest about 85% complete. Stalks still standing well most areas. Soybean harvest nearly 90% complete. Ice cover on fields made combining almost impossible. Grain sorghum very little progress--80% complete. Soil moisture adequate 29%, surplus 71%. Nearly 2 days suitable limited fieldwork.

INDIANA: Warm compared to previous weeks. Most days cloudy and several very foggy. Many hours of light rain or drizzle. Poor drying conditions prevailed. Two days suitable for fieldwork. Topsoil and subsoil moisture surplus. Frozen soils allowed some harvest early in week, but gradual thaw returned fields to mud. Corn 65% harvested, 5 weeks behind average. Soybeans 60% combined. unchanged from previous week and now 9 weeks behind average.

IOWA: Mild cloudy week with light precipitation. Fog statewide 19th and 20th. Some glazing mostly on weekend. Snow cover 6 to 8 inches north-cen-

tral; elsewhere generally 4 inches or less. Harvest slowly nearing completion. Slightly less than 5 days suitable for fieldwork last week. Corn harvest advanced to 92% complete. Corn drying and storage continues well behind schedule. Soybean harvest 96% complete. Grain sorghum harvest 88% complete. About 93% of popcorn harvested. Statewide, only about 1/4 of intended fall plowing was accomplished due largely to excess moisture.

KANSAS: Over 2 weeks bitter cold weather ended just after midmonth. Temperatures last week averaged normal to above normal. Greatest departures western 1/3 with means 5° to 6° above seasonal that area. Daily maxima over State generally 30's to 50's and minima mostly 20's and 30's. No significant precipitation. Fall crop harvest progressed moderately before fields thawed last week. About 79% sorghum grain combined, 74% week earlier, usual near completion by this date. Corn 88% harvested 84% week earlier. Soybean harvest 85% completed, 3 points above week earlier. Wheat made a little growth, remained mostly good to excellent. Surface and subsoil moisture adequate to surplus. Livestock care and feed requirements reduced somewhat as temperatures moderated and some cattle moved to stubble fields. Supplemental feeding still relatively heavy. Limited wheat acreage pastured due to lack of top growth or muddy conditions. Feed grain hay and forage supplies reduced considerably by heavy feeding recent weeks, but still mostly adequate.

KENTUCKY: Mostly sunny 18th, cloudy thereafter with rain one or more areas daily. Temperatures averaged near normal in west and 4° to 8° above normal elsewhere. Weekly rainfall totals, a little over 0.50 inch most areas and 1.00 to about 1.50 inches southeast. In western Kentucky, Lower Ohio River and Lower Green River above flood stage all week. Poor harvest conditions continued. Soybeans about 75% harvested statewide, still not over 60% complete extreme western counties. Yields reduced on soybeans still in field, as much as 10% of acreage could be total loss. Corn harvest more advanced, about 85% complete, remaining corn standing better than soybeans. Losses could run as high as 5%, but yields generally excellent before weather damage. Normally, most corn and soybeans out of fields by mid-December. Tobacco markets closed for holidays--stripping active under favorable conditions. Late wheat seedings further delayed, acres seeded much less than originally planned.

LOUISIANA: Temperatures averaged 1° to 3° above normal except slightly below normal southeast. Mild first of week with moderate to excessive rains Wednesday. Rain was especially heavy central and south. Cooler end of week as skies slowly cleared. General freeze Christmas morning north and central and scattered frost in south. Temperature extremes: 77° Lafayette Tuesday; 28° Monroe Christmas. Weekly rain totals less than 1.00 inch northwest, near 1.00 inch to more than 5.00 inches other sections with most places 1.50 to 3.00 inches. Greatest 1-day total, 5.15 inches measured Thursday morning at Alexandria. Completion of harvest further delayed by heavy rains at midweek. Sugarcane harvest progressed slowly in the mud, but little or no cotton and soybeans harvested. About 10% of cotton and soybeans and 15% sugarcane still in the field. Most winter pastures too wet to graze, but pasture feed about average. Most cattle receiving roughage and supplements. Livestock generally good condition.

MARYLAND AND DELAWARE: Temperatures, below normal beginning of week and warming at middle of week, averaged 3° to 5° above the seasonal normals. Extremes: Upper 50's to low 60's, upper teens except between 3° and 10° in west. Precipitation continued heavy for 7th straight week again falling mostly in form of rain. Totals ranged from 1.25 to 2.25 inches, heaviest in north-central and western Maryland. Rains continue to hamper harvest, little change from previous week. Still approximately 5% of corn and 20% of soybeans unharvested. Topsoil and subsoil moisture adequate to surplus.

MICHIGAN: Continued cloudy, warmer, small amounts of precipitation occurring daily. Temperatures averaged 5° to 8° above normal Lower Peninsula, 3° to 8° above normal Upper Peninsula. Precipitation: Less than 0.15 inch both Peninsulas except near 0.75 inch eastern Upper Peninsula. Snow depths at end of week: None Southeast to 9 inches northern Lower Peninsula; 9 to 16 inches in Upper Peninsula. Little progress with corn and soybean harvest during last 2 weeks. Deep snow and wet fields prevented harvest. Freezing rain and snow caused additional lodging of corn and soybeans making harvest more difficult. For State, 58% corn for grain and 56% soybeans harvested. In south-central and southeast counties, only 46% corn and 48% soybeans harvested.

MINNESOTA: Warmer week with temperatures above normal varying from 2° above normal in west-central and central to 8° above normal in south and northeast. Extremes: 43° and -16°. Precipitation generally less than 0.10 inch water content except northeast with less than 0.25 inch water content. Snow depth December 26 generally less than 2 inches along borders of northwest and north-central districts and in southwest district, 3 to 6 inches rest of State.

MISSISSIPPI: Minimum temperatures on 17th and 18th caused freezing weather across State. Lowest 11° on 18th at Tupelo. Temperatures averaged 3° to 6° below normal. On 20th, tornado at 12W of Magnolia in Glading community. Many locations reported some flash flooding. The greatest 1-day amount of 5.48 inches was measured on 21st at Laurel. Weekly precipitation totals varied from under 0.75 inch in northern 1/3 to 2.50 inches up to 5.50 inches in remainder of State. Over week end: Seasonal temperatures, mostly fair, and little or no rain. Soil moisture surplus to excessive. About 0.3 day suitable for fieldwork. Limited harvest activities first of week in a few areas. Cotton 87%, corn 92%, soybeans 67% and pecans 91% harvested. Extremely wet fields make winter grazing very boggy. Hay and rouhage supplies mostly adequate. Feed grain supplies short to adequate, most adequate.

MISSOURI: With few periods of sunshine, temperatures briefly rose to 40's and 50's. By midweek, cloudiness had kept readings in 30's. Most stations averaged near to slightly below normal, the warmest in 3 weeks. Precipitation not significant except in Bootheel where an additional 0.50 inch. Warmer weather has softened the ground which is hampering harvest. Only 1 day suitable for fieldwork. Corn 78% harvested, up 4 points from last week. Soybeans 72% complete, a 3-point increase from previous week. Grain sorghum 79% harvested, up 2 points from last week. Wheat fair to good condition. Soil moisture is mostly surplus.

MONTANA: Mild weather with temperatures averaging 10° to 17° above normal. Strong winds hit parts of

eastern Montana almost daily. More than normal precipitation western division with amounts from 0.65 inch to over 1.00 inch. Rest of State, averaged normal to slightly below normal precipitation. Winter wheat condition fair central Montana, good elsewhere. Light wind damage due to poor snow cover protection. Livestock good condition with mild temperatures, adequate water, and open grazing in most counties. Supplemental feeding remained at 85%.

NEBRASKA: Week was dry and mild; no measurable precipitation. Temperatures averaged 4° to 12° above normal; largest departures from normal in west. Cold spell was broken on 18th and followed by mild weather. Most of snow cover melted during mild spell. Extremes: -20° Madison on 16th to 62° at Burwell on 22nd. On weekend 23d and 24th, cold air drove temperatures over eastern 2/3 of State back to seasonal normal. Rain and freezing rain in southeast on 23d. Harvest continued to show progress. Fields muddy, necessitating early morning and late evening harvest. Fuel shortages for grain drying slowing harvest in some areas. Corn harvest is 90% complete, moisture content of grain harvested averaged 21%. Unharvested corn in good condition, very little field loss to date. More than 50 million bushels of corn remain in the fields. Sorghum harvest advanced to 90% complete, progress very slow, most remaining fields lodged severely. Approximately 14 million bushels sorghum remain to be harvested. Soybean harvest 94% complete, harvest will resume when other crops have been harvested or conditions permit. Winter wheat in good condition with adequate to surplus soil moisture. Livestock in good condition and continue to graze harvested fields. About 20% of reports indicate below-average hay and forage supplies on hand, with remainder average or above.

NEVADA: Temperatures 6° to 9° above normal all divisions except extreme south which was normal. Light to moderate precipitation in north; none in south. Snow in mountains. Ground cover melted locally. Cotton harvest over 80% complete in Pahrump Valley. Farming activities limited to routine chores and caring for livestock. Most livestock weathered early winter storms and below normal temperatures in good condition. Feed supplies utilized faster than normal which will strain hay supply before winter is over.

NEW ENGLAND: Very cloudy and wet with daily precipitation. Temperatures averaged mostly 2° to 8° above normal except near to somewhat below normal in Maine. Considerable fog, drizzle and, in many areas, glazing from freezing drizzle during week. Travel conditions very poor over holiday weekend. Total precipitation 0.25 to 0.75 inch in north but mostly 1.00 to 2.00 inches in southern three States. No heavy snow this week but several light snows maintained total cover at near last week's depth in most of north and central, but depths generally decreased in south.

NEW JERSEY: Mild and wet. Temperatures averaged from 4° to 7° above normal. Readings ranged from upper teens to the mid-40's. Rain nearly every day with heaviest on 22d. Weekly totals averaged 1.30 inches over most of State except around 2.00 inches along coast. Station totals varied from 1.20 to 2.40 inches with heaviest amount at Cape May Court House. High tides in Cape May County caused the most severe flooding in that area since storm of March 1962.

NEW MEXICO: Only very light scattered precipitation in northwest. Much warmer in north. Temperatures averaged above normal except locally in extreme northwest. Warming to maximum temperatures on Friday. Variable minimum temperatures with most lowest temperatures on Sunday. Cotton, sorghum harvest windup reactivated with more favorable weather. Late fall-seeded grain growth retarded due to cold weather. Livestock, ranges good; supplemental feeding general in snow cover areas.

NEW YORK: Temperatures warming early on 18th after previous cold weekend. Continued mild remainder of week with little day-to-day temperature change. Maximums in 30's to low 40's through 24th except near 20° northern 1/3 on 20th Minimums averaged above normal. Very cloudy with precipitation daily 19th through 22d. Heaviest amounts on 21st with 0.70 to 1.10 inches southeast and south-central ranging down to 0.30 to 0.50 inch in St. Lawrence Valley and western 1/3. No snowfall of consequence. Snow cover melted in valleys and lower elevations southern half by weekend. Snow depth in north country decreasing from 12 to 20 inches on 17th down to 10 inches or less by 24th.

NORTH CAROLINA: Fair and cold at first, becoming cloudy and mild. Temperatures averaged near normal. Rain 21st and 22d averaged 1.00 inch. Showers some areas other dates. Most farmers harvested crops few days early week as extreme cold froze fields allowing machinery to work. However, farmers had time for Christmas shopping later in week as rains once again halted late-season harvesting. Cotton harvest forged ahead--now 90% picked, behind normal, but equal to last year. Soybean combining reached 82% completion, which is slightly ahead of last fall. Excessive surface water causing damage some fields, few beans sprouting.

NORTH DAKOTA: Milder temperatures and occasional light rain or snow. Highs above freezing in central and west on 2 to 6 days. Colder on week-end with subzero lows in east. Temperatures averaged 5° above normal in east and 7° to 12° above normal in central and west. Precipitation totals mostly near 0.10 inch. Snow cover at end of week, 1 to 2 inches except trace in southwest. Livestock in good condition, no appreciable shrink in absence of storms or extreme cold. Farm roads open and feed supplies accessible. Farmers busy caring for livestock.

OHIO: Warming trend on Monday and mild weather with above-freezing temperature continued through balance of week. There were no important day-to-day changes in temperature with overnight lows generally in 30's and daytime high in upper 30's to 40's; highest reported temperature was 48° at Chesapeake on Thursday. Dense fog prevailed over much of State on Wednesday and Thursday. Rain Tuesday and Wednesday produced amounts ranging from 0.14 inch at Toledo to slightly over 0.50 inch at Cincinnati and Columbus. Some light rain Thursday but eastern section of State received considerably heavier amounts with 0.63 inch near Marietta and 0.67 inch at Chesapeake. Precipitation during past week along with previously saturated soil continue to slow harvest operation. Some progress at night and early morning when ground surface was frozen hard enough to support harvesting equipment. This type of progress was limited by mild temperatures later in the week. Handling of corn and soybeans after harvest has

been very important due to high moisture content. When harvesting operations not permitted maintenance and feeding of livestock are other major activities.

OKLAHOMA: Temperatures averaged above normal west and near or below, central and east. Little or no precipitation west and north but light to moderate rains southeast corner of State. Following weeks of rain, snow, and ice, a dry week with near normal temperatures got rid of snow in north and allowed ground to firm in south. Progress of harvest was confined to some cotton stripping in the southwest and limited sorghum combining. Standing crops continued to deteriorate. Few fields of wheat seeded in southwest and other ground prepared. Small grains showed some growth, but grazing limited. Native grasses poor feeding value. Slightly higher cattle condition reflects better weather.

OREGON: Freezing rain preceded sharp warming as mild week provided mostly heavy daily rain statewide. Temperatures averaged 5° to 9° above normal. Minima 5° to 33° east, 27° to 52° west. Maxima 46° to 66°. Rain melted 3- to 10-inch snow cover except higher elevations. Precipitation totaled 0.50 to 1.50 inches eastern half, 4.00 to 6.00 inches elsewhere except 7.50 to 8.70 inches north coast and northern Cascades. Rain after the low temperatures of previous week has caused flooding on low-lying crop land along the Snake River. Storms have also caused flooding of coastal tide lands. Farm activity has been very limited; some fruit tree pruning, heavy feeding of livestock continues, early lambing getting underway. Fruit market remains strong. Too early to determine freeze damage, if any, to fruit, nut, and fall-seeded grain crops.

PENNSYLVANIA: After a brief taste of winter previous weekend, unseasonably mild, cloudy, and wet conditions returned to Pennsylvania Monday and remained through the week. Temperatures averaged 6° to 8° above normal with small diurnal variations. Maxima mostly in 30's and 40's and minima 20's and 30's. Almost daily precipitation as rain totaled 1.00 to 1.80 inches except extreme west and nothern tier counties where somewhat less. This week's precipitation at Harrisburg has boosted the annual total to a record 58.50 inches. Snow cover throughout State has disappeared except few northern areas. Routine winter farm chores.

PUERTO RICO: Dry cool week. Rainfall averaged only 0.36 inch or 0.30 inch below normal. Highest weekly total, 2.15 inches, in eastern mountains. Rest of Island generally less than 0.50 inch. Crop moisture conditions near normal all divisions except some zones in northeast too wet and parts of south too dry. Temperatures averaged 76° on coast and 71° interior divisions with mean departure of 1.7° below normal. Highest maximum, 93°; lowest minimum, 53°, the coldest minimum this season. Sugarcane developing well all zones, except few fields in northeast where cultivation retarded by heavy showers early in week. Preparations for 1973 harvest continued. Coffee harvesting in final stages and general cleaning activities have now begun. Tobacco planting made good progress. Pastures generally good to excellent all zones, except some pastures still too wet in northeast where they sustained some damage by cattle trampling. More rain needed in parts of south for normal development. Minor crops developing well and good abundance on market with winter citrus beginning.

SOUTH CAROLINA: Temperatures averaged 2° below normal most areas and near normal along the south coast. Northwest stations had minimum temperatures near 15° on 17th and 18th. Rainfall was heavy at end of week with 0.75 to 1.75 inches coastal plains and 2.00 inches or more in Piedmont and mountains. Rain and boggy fields continue to hinder planting and harvesting. Cotton 93%, soybeans 81%, sorghum grain 96% harvested. Wheat and oat pastures good condition. Wheat 80% planted, 82% emerged. Oats 91% planted, unchanged from previous week, 89% emerged.

SOUTH DAKOTA: Mild dry week over most of State. Temperatures averaged from 6° above normal in northeast to 14° above normal in northwest. Extremes ranged from 5° at Conde on 21st to a record high of 65 at Winner on 22d. Light precipitation of 0.05 inch or less fell over most areas of State except heavier amounts mostly as rain end of week in northwest. Snow cover end of week ranged from zero in most of south to about 4 inches in northeast. Moderating temperatures made more fuel available for grain drying, but situation is still not good. High moisture corn that would keep during colder weather is now in danger of spoiling, and fuel supply for grain drying is still short. Light snow cover could be problem for fall-seeded grains. Livestock remain in good condition with ample hay and adequate feed grain supplies.

TENNESSEE: Temperatures averaged zero to 4° below normal west; 5° to 10° above normal Cumberland Plateau and Eastern Mountains. Occasional light rain or drizzle. Totals mostly between 0.50 and 1.00 inch but ranged from less than 0.25 inch in west to over 1.50 inches parts of east. Farmers continued to spot harvest their fall crops last week. Fields remain soft and weekend rains did not help situation. Tobacco markets were closed for holidays, but little burley remains to be sold. Livestock farmers increased feeding rations last week with coming of winter.

TEXAS: Except for light rain in East Texas and a few heavy showers along the Upper Coast first of week, mild, dry weather prevailed throughout the period. Farmers resumed cotton and sorghum harvest on High and Low Plains. Some farmers seeding last few acres wheat while weather permits. Farmers in southern 1/2 of State topdressing oat crops with nitrogen. Major crops percent harvested: cotton 65, last year 49; sorghum 98, last year 99; soybeans 95, last year 99; peanuts 100, last year 100; sugarbeets 83, last year 68. Wheat 99% planted, 100% last year. In the Lower Rio Grande Valley light supplies of green peppers and tomatoes still available. Cabbage movement slow due to poor market. Some early carrot fields being dug. Some early fields of onions may be ready for harvest by late February. Potato seeding underway. At Laredo carrots, and cabbage continue to make good growth. In the Winter Garden harvest of cabbage, carrots, lettuce and spinach gaining momentum. Pecan harvest gaining momentum again in north-central Texas where cold, wet weather hampered harvest for several weeks. Citrus supplies continue to increase with gift fruit reaching peak volume. Export fruit is expected to increase as season progresses. Quality of fruit remains good.

UTAH: A series of weak storm fronts swept across northern Utah during past week accompanied by scattered showers of light rain or snow in the Valleys and heavier snow in the mountains.

Little or no precipitation in southern and eastern sections. The storms swept out the very cold air from the lower valleys and average temperatures rose from much below normal to just 1° or 2° below normal. Good weather permitted farmers and ranchers to conduct usual functions during past week. Care and feeding of cattle and sheep in feedlots and on valley farms, dairy cattle, and poultry flocks continue leading activities. Turkey plants completed processing 1972 crop. Sugar processing will resume full force right after start of new year. Sorting, grading, and marketing of potatoes, dry onions, and apples from storage continue. Irrigation water supply for 1973 expected to be best ever.

VIRGINIA: Mild and damp after extreme cold of previous weekend. Above-normal temperatures and heavy precipitation. Topsoil moisture 90% surplus. Some harvest mostly in east and southeast of remaining corn, soybeans and grain sorghum. Need drying weather or frozen soils to get some lowland acreage. Unharvested crops deteriorating; some acreage may not be harvested. Pastures unusually good for this late date, but shift to winter rations increasing. Lambing and calving progressing well, but muddy wet conditions causing difficulties. Marketing of sun and fire-cured tobacco active through holiday close on December 21. Preparing leaf including burley for markets when reopening. Fruit growers increasing pruning work; other activities included caring for poultry, feed preparations, maintenance jobs, butchering, record keeping, hunting, and completing preparations for Christmas.

WASHINGTON: Western Washington: With from 1.00 to 9.00 inches of rain and above normal temperatures, rivers overflowed and fields were soaked. Little field work. Stock good and feed supply generally adequate. Eastern Washington: Snow melted off by 1.00 to 2.00 inches of rain and temperatures 2° to 10° above normal. This left ranches in mud and farmers with wet and sometimes eroding fields. Moisture penetration has been good in areas where thawing has been completed.

WEST VIRGINIA: Few hours sunshine December 24; otherwise heavy cloudiness prevailed throughout period with snow flurries December 16 to 17 and rain December 19 to 22 and 26. Weekly precipitation totaled almost 2.00 inches. Near zero temperatures December 16 to 17 but maximum temperatures near 50° every day after rains began December 19. Major farm activities were caring for livestock and routine chores. Livestock in good condition, but supplemental feeding continued to increase. Corn harvest not completed in some areas due to wet weather.

WISCONSIN: Cloudy and foggy weather. Temperatures above normal after the extreme cold of first half of December. Several days of good case weather for the States tobacco farmers. Snow cover settled somewhat with depths ranging between 1 inch in the southeast and about 10 inches in north-central counties. Frost depths 2 to 4 inches over most of State. Farm activities generally limited to care and feeding of livestock.

WYOMING: Mild weather returned after a very cold period. Little moisture fell except higher mountains. Bondurant reported the most moisture with 1.90 inches. Temperatures averaged near to 10° above normal, maxima mostly 35° to 45° west of Divide and Upper Platte Drainage, 45° to 60° elsewhere. Temperature extremes: 60° at Torrington and Red Bird, and -25° at Bondurant. Farm activity included feeding and care of livestock. Most livestock reported in good condition. Feed and forage supplies mostly adequate.

WWCB Centennial Year Comes to a Close

This issue of the Weekly Weather and Crop Bulletin is the last in this, the Centennial Year of the Bulletin. One hundred years ago, on November 16, 1872, the Signal Corps published a 2-page summary of the weather entitled the Weekly Weather Chronicle. The publication has continued through a myriad of changes in name, organization, and physical makeup (WWCB 58(51):11), but the primary purpose of the publication has always been to report the current crop and weather conditions across the country.

To observe this century of service to agriculture, numerous activities have taken place during the past several months through the Departments of Commerce and Agriculture, the two agencies that cooperate to prepare the Weekly Weather and Crop Bulletin. The primary objectives of the efforts were to increase public awareness of the service that is available and point out that the Bulletin provides an unequalled service in reporting current crop and weather conditions. Another major objective was to show how two major government agencies, through mutual cooperation, are able to provide a service that neither agency could provide alone. In total, we wanted to demonstrate how agricultural meteorology can help to develop an environment in which food can grow and man can survive.

One of the highlights of the entire effort was the Weather and Crop Service observance and reception held at the Smithsonian Institution on September 7, 1972. Over 200 persons attended the reception which was sponsored by some 24 members of the agricultural community. The Honorable Earl Butz, Secretary of Agriculture, presented certificates of appreciation to volunteer crop observers Floyd and Boyd Bishop of Meade County, South Dakota, and country extension agent James Robinson from Aroostock County, Maine. Mr. Howard Pollock, Deputy Administrator of NOAA, represented Secretary of Commerce Peter Peterson, and presented a certificate of appreciation to Mr. Frank Street of Henderson, Kentucky and the Bronze Medal for 33 years of meritorious service to Mr. Lucius W. Dye, Editor of the Weekly Weather and Crop Bulletin.

The key to the entire crop weather service program is the volunteer crop and weather observer. Although only a single representative from each group was honored, the honor was intended to reflect the dedicated efforts of thousands of observers across the country.

The Centennial edition of the Weekly Weather and Crop Bulletin was presented at the Smithsonian ceromonies. This special edition includes a number of factual stories presenting the history of the crop and weather reporting services, and examples of how the information is used.

The success of all the Centennial efforts came about as the result of the tireless activities of a great number of individuals. The staff of the Bulletin would like to thank all the people who assisted in this effort.

R. E. Felch

WEATHER HIGHLIGHTS—1972

Lucius W. Dye

1. A number of weather-related disasters took the lives of hundreds of our citizens and caused billions of dollars property damage.
2. Bone-chilling cold gripped much of the Nation in January, February, and December.
3. Autumn rains delayed the harvest of corn and soybeans in the Corn Belt.
4. A severe drought occurred in the Southwest in the spring and early summer.

WINTER: Bone-chilling cold prevailed over the northern Great Plains through most of the winter. Temperatures over that area averaged 4° to 9° colder than normal. In contrast, most of the area south of a line from Yuma, Ariz., to Burlington, Vt., averaged warmer than normal through the winter months. Southern Mississippi, nearby parts of neighboring States, and the eastern half of the Florida Peninsula averaged 4° to 5° warmer than normal.

January was cold from the northern Rocky Mountains to the Great Lakes and southward to Oklahoma and northern Arkansas. A massive outbreak of cold arctic air pushed into the northern Rocky Mountains and northern Great Plains early in the month and, by the 4th, subzero weather had reached the Texas Panhandle. By January 6, almost the entire Nation was in the "deep freeze." Mild weather continued only in the Deep South and in Florida. At midmonth, moist southerly winds warmed the eastern half of the Nation. Southern Florida was especially balmy with nighttime temperatures in the 70's. A few days after midmonth, two large polar highs--one over the Great Basin, the other in the East--caused clear sunny weather over much of the country. Brisk southerly winds behind the eastern High warmed the central and southern Great Plains. Bitter cold plunged southward over mid-America in the last week of the month.

Cold weather gripped almost the entire Nation in the first week of February. The Far West and the northern and central Rocky Mountains warmed in the second week but bitter cold continued over much of the Great Plains, the Great Lakes Region, and the Ohio River Valley. Most of the Nation averaged warmer than normal in the third week. Temperatures over the southern Great Plains were expecially mild. The West and South continued mild in the last week of February but bitter cold prevailed from the northern Great Plains to the Atlantic Ocean.

Heavy rains fell along the northern Pacific Coast. This is not unusual; winter is the rainy season in the Pacific Northwest. Also not unusual were the deep snows that occurred in the nearby hills and mountains and eastward to the Great Plains, the flurries in the Great Lakes Region, nor the heavier snows that fell in the Appalachians. The time distribution of precipitation over the East was not quite normal. For instance, precipitation over the Northeast was only about half of normal in January but near or above normal in February. Heavy rains fell in the Deep South in January. At the other extreme, large areas in the Southwest received less than 25% of normal in January and February.

The weather was comparatively tranquil on New Year's Day but two storms got underway on January 2. One of these brought heavy snow to the Northwest, especially to southeastern Idaho, western Montana, and the Big Horn River Valley in Wyoming. The second storm spread wet weather over the eastern third of the Country. Snow fell from northern Illinois to northern New England. Freezing rain iced an area south of the snow belt and thunderstorms dotted the land from the Ohio River Valley to the Gulf of Mexico. By January 4, snow or sleet was falling over a belt extending from New Mexico to New York and Pennsylvania. Moist tropical air, overriding the cold arctic air, released snow, sleet, and freezing rain that marked the advance of the cold air. Deep drifts, icy roads, and strong winds hampered automobile travel.

At midmonth, moist southerly winds brought clouds and rain to a large area from the southern Great Plains to New England. A few tornadoes occurred in the South. Blizzards swept across the central Rocky Mountains. Fog, light rain, and drizzle blanketed the middle Atlantic coast and a large and powerful storm gained strength in the Pacific Northwest.

Precipitation slackened briefly a day or so after midmonth but near the end of the third week of January, a new outbreak of cold air poured into Montana bringing heavy snow accompanied by strong winds. The snow area spread eastward across the Great Plains to the Upper Mississippi River Valley. Southerly winds caused cloudy skies, showers, and thunderstorms from the Ohio River to the Gulf of Mexico. Snow, mixed with sleet and freezing rain, slicked the highways and made travel difficult over a narrow strip which separated the snow zone on the north from the showers and thunderstorms on the south. Heavy rains west of the Cascades completed the gloomy picture.

The last week of the month brought more snow to the Rocky Mountains and the nearby Great Plains. Ice again coated wires, trees, pavement, and other outdoor objects south of the snow belt. Heavy rains soaked the Northwest. Blizzards occurred across the central Great Plains and Great Lakes Region and spread eastward to New York and New England. Generous rains fell in parts of the Deep South.

Two major storms were in progress in the first week of February. The first, centered over the central Great Plains and moving toward the Great Lakes, caused snow over an 8-State area from Colorado and New Mexico to the middle Mississippi River Valley while an Atlantic storm soaked the Atlantic seaboard with heavy rain accompanied by gales. Snow fell in the higher Appalachians and north of the rain belt. A storm over the East produced widespread precipitation in the second week of February. A large storm brought miserable weather to the eastern third of the Nation shortly after midmonth. Large waves pounded the coast. One to 2 feet of snow fell in the northern and central Appalachians. Blizzards raged in many areas. Deep snow drifts blocked highways and byways and stranded hundreds of motorists. A series of winter storms paraded across the northern States in the last week of the month. Snow at Stampede Pass, Wash., accumulated to 16 feet. Heavy rains produced flash floods in eastern Kentucky, southern West Virginia, and western North Carolina. A coal-slag dam in Logan County, W. Va., broke. Water rushed down Buffalo Creek carrying away houses, automobiles, and people. Dozens of persons were drowned and hundreds became homeless.

SPRING: Most of the Nation west of a line from Roseau, Minn., to Savannah, Ga., averaged warmer than normal in the Spring months, March to

May. Parts of the Great Basin, the central Rocky Mountains, central Oklahoma, and central and southern Texas averaged 2° to 4° warmer than normal. The Great Lakes Region, the Ohio River Valley, the Northeast, and the Middle Atlantic States were slightly cooler than normal.

Most of the Nation averaged warmer than normal in March. The main exceptions were a large area from Wisconsin to New England and a smaller area from Ohio to northern Alabama.

Arctic air poured into the northern Great Plains in the last few days of February and by March 2, subzero weather had reached Iowa. Devils Lake, N. Dak., registered 28° below zero on March 2. The leading edge of the cold air marched southeastward and by March 6 had reached the Atlantic Coast. Jacksonville, Fla., recorded 33° on March 6.

A storm center moved from southern Alberta to the Great Lakes region near the end of the first week of March and continued on to Quebec and Ontario early in the second week. Cold arctic air pushed into the northern Great Plains and spread southward and eastward. A long front marked the advance of the cold air. Southerly winds warmed the area south of the front. Cold northerly winds behind the eastward-moving storm brought falling temperatures. In some places, the winds, gusting to 50 m.p.h., picked up snow and dust which reduced the visibility to less than 2 miles. Mild weather continued along the Gulf of Mexico. The Far Southwest was hot.

Warm weather prevailed over most of the Nation in the third week of March. The warm temperatures melted the snow rapidly in western North Dakota. The rapid snow melt, combined with ice jams on some streams, caused severe flooding of lowland fields, highways, and a few suburban areas. Rising waters on the Cannonball River forced 30 families in the western part of Mott, N. Dak., to evacuate their homes. At Beulah, N. Dak., the water was in 200 homes and some families moved out. Severe flooding also occurred at Hazen and Zap, both in North Dakota.

Near the end of the third week of March, a large High was centered over the Great Plains. Warming occurred in the central Rocky Mountains on the back side of the High. Northerly winds kept afternoon temperatures in the 30's and 40's east of the High from the Great Lakes to the Ohio River. Northerly winds and deep snow kept temperatures low over the north-central States in the last few days of March. In contrast, the South warmed to the 70's and 80's.

April temperatures averaged near or above normal over the western edge of the Great Plains from Montana to Texas, over the central and southern Rocky Mountains and across the South from central and southern California to Florida. It was cooler than normal over the Pacific Northwest, in the Great Lakes Region, and along the Atlantic Coast from New England to Georgia.

Temperatures were quite changeable. In general, the West was warm and the East was cool in the first week. The reverse was true in the second and third weeks. Cool weather prevailed over most of the Nation in the last week of April.

May temperatures averaged above normal over the West and the northern States and cooler than normal across the South. Cool weather predominated over the first 2 weeks of May. The last half of the month was very warm.

The Southwest was very dry. Many localities in the Southwest received no rain in the first 5 months of 1972; others received only light sprinkles. Totals in the Far Northwest ranged from 4.00 to 16.00 inches, most of which fell in March and April. Except in the Far Northwest, only a few localities received more than 4.00 inches of rain in the 3-month period, March to May. East of the Rocky Mountains, 3-month totals ranged from 4.00 inches to 12.00 inches or more. Totals were in the 4.00-to-12.00-inch range over most of the Great Plains and exceeded 8.00 inches from the eastern edge of the central Great Plains eastward and southeastward to the Atlantic Ocean and the Gulf of Mexico.

Except in the dry Southwest, the weather was fairly typical in early March. Storms and fronts distributed the rains fairly well over the Nation. A few tornadoes occurred in the South. Heavy rains produced floods in western New York, western Pennsylvania, extreme southeastern Ohio, West Virginia, and the eastern portions of Kentucky and Tennessee early in March. Miserable mixtures of snow, sleet, and freezing rain fell along an area that separated snow on the north from rain over the south. The mixtures slicked the highways and byways and made automobile travel dangerous.

About midmonth, a storm centered south of the Great Lakes moved eastward to the Atlantic Ocean spreading wet and windy weather from the Great Lakes to the Ohio River Valley and eastward to New England. About the time the storm reached the Atlantic Ocean, another disturbance developed in the Oklahoma Panhandle. It set off thunderstorms in the central Great Plains, dust storms in the Texas Panhandle, and moving eastward across the Ohio River Valley, it spread light snow over the Upper Great Lakes, rain and thunderstorms from the lower Great Lakes to the Gulf of Mexico, and heavy snow over New York and portions of New England. Utica, N.Y., received 14 inches of snow in 6 hours early on March 15.

More disagreeable weather occurred in the last half of March: Snow in the North, dust storms, sandstorms, and thunderstorms in the South, and mixtures of rain, snow, sleet, and freezing rain sandwiched between. Gusty winds, blowing snow, and drifting snow snarled automobile traffic, delayed air travel, and closed schools. Moline, Ill., received 11 inches of snow on March 29.

Winter tarried in April. Rain fell along the northern Pacific coast on many days. Snow fell in the nearby hills and mountains. Cold air masses produced snow flurries in the northern Great Plains, thunderstorms and a few tornadoes in the South, and dust and sandstorms in the thirsty Southwest.

May was dry in the Southwest and parts of the Northwest. In contrast, too much rain delayed planting crops in the northern Great Plains. A "cloudburst," on the night of May 11, dumped up to 10.00 inches of rain north of New Braunfels, Tex., sending a 30-foot wall of water down Blueders Creek into the Comal and Guadalupe Rivers washing away people, houses, and automobiles. More than a dozen persons drowned; a few others were washed away and presumed lost. Property damages were estimated at $20 million.

SUMMER: Summer temperatures averaged warmer than normal over most of the area west of the Rocky Mountains and cooler than normal from the Rocky Mountains to the Atlantic Ocean. The Far West averaged warmer than normal in each of the 3 months, June to August. June was warmer than normal over mid-America but July and August were relatively cool. The East averaged cooler than normal in each of the 3 months with two minor exceptions. New York and New England averaged warmer than normal in the early part of the summer and the eastern Gulf and the southern Atlantic Coasts were

slightly warmer than normal in August.

June temperatures averaged within a few degrees of normal over most of the Nation. Most of the East, southeastern Arizona, southern New Mexico, and western Texas averaged 1° or 2° cooler than normal. Most of the rest of the Nation averaged 1° or 2° warmer than normal.

A warming trend occurred over the Great Plains early in June. Temperatures climbed to the 90's over the central and southern Great Plains and summer weather continued over much of that area until after midmonth. Cool air moved into the northern Great Plains shortly after midmonth dropping afternoon temperatures about 20°.

The Southwestern Deserts continued hot through most of the month, typical for June. Maximums in the warmest localities exceeded 100° on most afternoons. Furnace Creek, Calif., registered 124° on June 29. This is 10° cooler than the all-time record for California (and the United States), 134°, recorded at Greenland Ranch, Calif., July 10, 1913.

Cold air moved into the north-central Great Plains early in July ending the heat wave which had been in progress over that area. Norfolk, Nebr., registered 95° on July 1 but only 66° on July 2. Near the middle of the first week, a cold front stretched from northern Utah through the Texas Panhandle to New England. Early morning temperatures north of the front were in the 30's and 40's. Maximums reached the 60's. These temperatures are 15° to 20° cooler than normal for early July. Warm humid air drifted northward south of the front. Temperatures averaged about 30° warmer than in the cool air. A large High pushed into the central Great Plains. It helped hold temperatures down over the East but the West warmed. By July 5, Havre, Mont., had warmed to 80°. This was 10° warmer than Birmingham, Ala. The High weakened and moved off the Atlantic Coast. It pumped 90° heat northward. By the middle of the 2d week of July, summer heat prevailed over most of the Nation. Afternoon temperatures reached the 90's over most of New York and New England. Boston, Mass., registered 94° on July 12.

At midmonth, cold air moved into the central Great Plains. Salina, Kans., recorded 107° on the 14th but only 70° on the 15th. The heat intensified in the Northwest. The Dalles, Oreg., recorded 101° on the afternoon of July 16. Blistering heat continued in the Sacramento Valley of California. Red Bluff, at the northern end of the Valley recorded 118° on the 14th and Stockton registered 114°, the warmest Stockton has ever been. Furnace Creek, Death Valley, Calif., recorded 128° on both the 14th and 15th.

Shortly after midmonth the Bermuda High moved westward from a position about 600 miles northeast of Bermuda. By the 21st, it had become quasi-stationary over the western Carolinas. The very light but generally southerly winds on the west side of the High spread warm, humid, hazy weather over the eastern half of the Nation. The light thunderstorms in the moist air brought little relief from the heat, humidity, and atmospheric pollution. Patches of light early-morning fog dotted the eastern half of the Nation on most mornings and the rising sun was reddish orange due to the pollutants in the air. In the last week of July, a cold front brought relief to the Northeast after almost 2 weeks of humid 90° heat. A few days before the end of July, the front became stationary from Utah to the middle Atlantic coast. The Southeast continued hot but the North was comfortably cool.

August was a cool month over most of the Nation. The western portions of the central and southern Great Plains averaged 3° to 6° cooler than normal. The Northwest and the Deep South averaged slightly warmer than normal. The Far West averaged warmer than normal early and late in August and cooler than normal at midmonth. The opposite regime prevailed over mid-America. This area was cool early and late in August and warm in the third week.

Storm systems sweeping across the eastern half of the Nation caused quick temperature changes and some large diurnal temperature ranges. The Southwestern Deserts continued hot. Furnace Creek, Death Valley, Calif., registered 121° on the afternoon of August 8. The soil temperature was 194°. In contrast, autumn temperatures were noted in the high Rocky Mountains. Big Piney, Wyo., registered 30° and Leadville, Colo. 31°, Tuesday morning, August 22.

In general, summer rainfall totals were less than 4.00 inches west of the Rocky Mountains, between 4.00 and 8.00 inches over the western Great Plains, and more than 8.00 inches over the eastern half of the Nation. Numerous spots over the East received more than 16.00 inches of summer rain. Over the Florida Peninsula, the 3-month totals ranged from 16.00 to more than 26.00 inches. Totals were mostly between 50% and 150% of normal. An important exception was parts of southern California where the normals are small. This area has a "Mediterranean" climate; most of the rain falls in winter with almost none occurring in summer. The light rains which did fall were several times the summer normals.

Almost the entire area from Oregon to the Continental Divide and southward to the Mexican Border received less than 1.00 inch of rain in June. Most stations in that large dry area received less than 0.50 inch. Elsewhere over the Nation, the rainfall was very unevenly distributed and ranged widely. A large area from central New York to central Virginia received 8.00 to more than 12.00 inches most of which fell from Tropical Storm Agnes in the week ending June 25.

Afternoon thundershowers in the first week of June dotted the dry Southwest--the Mountains and the Deserts. The 0.06-inch rain at Phoenix on the 7th was important because it ended a 160-day period of no rain or only very light sprinkles. Heavy thundershowers at the end of the 1st week of June in west-central Iowa, 3.00 to 5.00 inches in spots, flooded roads and stalled traffic.

Torrential rains in northern and eastern Black Hills on the evening of June 9, caused the worst natural disaster in South Dakota history. The 3.00- to 5.00-inch rains flooded portions of the Keystone, Sturgis, and Rapid City areas.

About 200 persons were drowned. Hundreds were left homeless. Many bridges and many miles of roads and railroad tracks were destroyed. Property damage was in the neighborhood of $100 million. Widespread thundershowers occurred over much of the central and eastern portions of the Nation about midmonth. Generous rains soaked a large area from northeastern Texas to western Indiana where May rainfall was generally less than 50% of normal. Many citizens in parts of Rapid City, S. Dak., left their homes on the 17th after 2.00 to 3.00 inches of rain fell in the area accompanied by winds gusting to 50 m.p.h. Hurricane Agnes played the star roll in the weather news in the 4th week of June. She reached hurricane strength Saturday, June 17, about 300 miles southwest of Key West, Fla. She crossed the Florida Panhandle Monday, June 19. The winds decreased and she was downgraded to "Tropical Storm" Agnes. This powerful storm continued northward dumping 6.00 to 12.00 inches of rain over the Appalachians and eastward to the Atlantic Ocean.

Agnes deluged the central and southern

Appalachians and their eastern slopes and foothills early in the 3d week of June and by midweek was soaking northern Virginia before continuing on to Pennsylvania, New York, and New England. The torrential rains forced thousands of persons from their homes; dozens were drowned. Roads became flooded and bridges were washed away. Property damages were estimated in the hundreds of millions of dollars. Losses in Pennsylvania were estimated at over $1 billion.

Phoenix, Ariz., received a heavy shower, 1.64 inches, on June 21 and 22. This is more rain than ever fell in the month of June at Phoenix. A locality a few miles north of Phoenix Airport received 4.20 inches of rain in 2 1/2 hours. This is one of the vagaries of desert climate--the wettest June of record can follow the driest 5-month period in weather history. The month ended as heavy thunderstorms rumbled across the South, large hail fell in Oklahoma and Missouri, and tornadoes occurred in scattered parts of the Great Plains.

A quasi-stationary front from western New York caused some dismal rainy weather early in July. As the front became active, tornadoes occurred in spots in the Great Plains from North Dakota to Texas. Property damage was light. Thunderstorms developed along the front and in the humid air that lay over the central and southern Great Plains and the middle and lower Mississippi River Valley. Heavy showers doused spots in the central Great Plains about midmonth. Four to 6.00 inches of rain caused streams to rise in western Kansas and south-central Nebraska. A weak tropical storm moved inland near Myrtle Beach, S.C., on the evening of July 11. It dumped 2-day totals of 3.00 to 6.00 inches of rain over the eastern portions of the Carolinas and northward to New England. With the soils already saturated, only moderate showers were required to produce local flooding in some areas.

Vigorous thunderstorms broke out along a quasi-stationary front which, shortly after midmonth, stretched from the Great Lakes to the Texas Panhandle. A few twisters occurred in central Kansas, east-central Iowa, and northern Illinois on the evening of July 17. Some farmsteads were damaged and some cattle injured. Heavy rains and strong winds on the 18th caused property damage west of Chicago, Ill. After the front dissipated another front farther north brought active weather to the northern and central Great Plains. The showers were especially heavy north of St. Cloud, Minn., where 24-hour rainfall totals exceeded 8.00 inches at a few localities. Vigorous thunderstorms caused torrential downpours in South Dakota and Nebraska in the last week of July. Rains in western Tennessee swelled the creeks and small rivers to overflowing.

No rain or only widely scattered light sprinkles fell in California and nearby portions of neighboring States. Early in August an active cold front stretched from the Great Lakes to the central Great Plains. Numerous thunderstorms occurred along the front as it moved southeastward to the Gulf and Atlantic Coasts. Some of the thunderstorms produced heavy rain; some were accompanied by hail and strong winds. One thunderstorm uprooted trees near Lost Nation, Iowa. Others drenched spots in southern Illinois and in eastern Kentucky. More fronts swept eastward from the western Great Plains to the Atlantic Ocean in the second week of August. Thunderstorms occurred along the fronts and from the southern Great Plains to the Atlantic Seaboard in the warm humid air that covered the Southland. Heavy thunderstorms spotted parts of the central and eastern portions of the Nation in the third week of August. The central Great Plains received no rain or only light scattered sprinkles. Heavier showers fell from the northern Great Plains to the Great Lakes and in the warm humid areas in the South. Severe thunderstorms hit Wisconsin and Michigan on the 18th, 19th, and 20th. Fronta thunderstorms continued in the fourth week of August. One of these dumped 1.30 inches of rain at St. Cloud, Minn., in 18 minutes. When rail falls at such intensity, it falls as streams rather than drops. These downpours are called "cloudbursts." The last few days of the month saw more thunderstorms, some moderate to heavy. Tropical Storm Gwen, about 300 miles south southwest of San Diego, Calif., brought some heavy showers to the mountains in the Southwest. Heavy rains also fell in the Southeast. Savannah Ga., received 4.14 inches in 6 hours early August 29 and 3.26 inches fell at Orlando, Fla., on the afternoon of the 30th. Practically no rain fell in the entire month in the Far West. Spots in California received no rain. Monthly totals elsewhere in the Far West were generally less than 1.00 inch. The greatest monthly totals were in northern Florida where some localities received more than 16.00 inches.

AUTUMN: Temperatures averaged below normal over almost the entire Nation in the autumn months. A notable exception was the Southeast where the southern portions of Mississippi, Alabama, and Georgia, and all of Florida averaged warmer than normal. The Florida Peninsula was especially wa Much of the northern and central Great Plains averaged 2° to more than 4° colder than normal.

Generally, September temperatures averaged cooler than normal from Washington and Oregon to the Great Lakes and from California to western Texas. Above normal temperatures predominated from eastern Texas to the middle and southern At lantic coast. A series of cold fronts during th month brought refreshing autumn weather to much of the central and eastern portions of the count while warm, humid air flowed over the southern States.

October temperatures averaged cooler than normal over most of the Nation. The main exceptions included an area from east-central Arizona to the western Gulf Coast and from Louisiana to southern Georgia.

Some quick temperature changes occurred in October due to several cold fronts that crossed the Great Plains. One of these fronts dropped temperatures sharply shortly after midmonth. Southerly winds preceding the front warmed the central Great Plains. The mercury at Wichita Falls, Texas, climbed to 102° on the 17th when Oklahoma City, Okla., warmed to 96°. Neither ci had ever seen such high temperatures so late in the season. Northwesterly winds following the frontal passage dropped the temperatures in Okla homa to the 30's and 40's by the 19th. The free ing line in the East pushed southward across eas ern Tennessee and western North Carolina.

Floridians basked in summer weather during the entire month. In contrast, the mercury at West Yellowstone, Montana, tumbled to zero on th 29th.

November temperatures averaged slightly ab normal along the Canadian Border from Washingto to Minnesota and along the Atlantic Coast from Norfolk, Va., to Key West, Fla. The rest of th Nation was colder than normal in November. A large area from the central and southern Rocky Mountains to the Mississippi River averaged 4° 9° colder than normal. Cold weather prevailed over the Rocky Mountains and Great Plains throu out the month except for brief warming over the

Great Plains shortly before midmonth and over the northern Border States in the 4th week. Subzero weather occurred over the northern Rockies and northern Great Plains late in November and temperatures over the Gulf States dropped to near or below freezing.

Total rainfall during the autumn months ranged from 1.0 inch in Havre, Montana to over 20 inches in parts of Missouri and Arkansas. While the 21.2 inches at Springfield, Mo., was only twice the normal rainfall for the area, the 2.7 to to 12.0 inches that fell over Arizona was over 3 times the normal rainfall, much of it falling during the month of October.

A cold front pushed into the northern Great Plains early in September. The leading edge of the cold air set off showers and thunderstorms. Light rain fell in the cold air behind the front. Heavy rains, 2.00 to 4.00 inches in 24 hours, fell in east-central Kansas on September 1 and 2 causing substantial flooding along Gypsum Creek, Turkey Creek, and the tributaries of the lower Smoky Hill River. Flooding also occurred in south-central New Mexico due to the heavy showers in that area. Meanwhile Tropical Storm Carrie dumped heavy rain over eastern Massachusetts - 8.00 inches southwest of Hyannis Port and over 5.00 inches at Chatham in 6 hours. Showers and thunderstorms, some heavy, occurred about the middle of the first week of September from the southern Great Plains to the middle and southern Atlantic Coast. Near the end of the first week, light showers splattered the Texas Panhandle, northeastern Kansas, and nearby parts of Nebraska, Iowa, and Missouri. Heavy rains splashed down in Illinois and Indiana. Shortly before midmonth a slow-moving front stretched from a Low centered near Hudson Bay, across Lake Superior to the central Great Plains, and westward to another Low centered in northern Utah. Scattered showers and a few thunderstorms, some heavy, rumbled in the vicinity of the front. Especially heavy rains fell in eastern Nebraska and western Iowa. Storm totals exceeding 5.00 inches were common in that area; some locations received more than 10.00 inches on the evening of September 17 and in the early morning of the 18th. One of the largest totals was 21.00 inches at Earling, Iowa. The continued heavy rains in Shelby County, Iowa, caused record river stages along the west and east forks of the Nishnabotna River. The heavy rains in Nebraska, Iowa, Kansas, and Missouri caused important rises on the main stem of the Missouri River. Much rain fell on saturated soil where it was not needed. Frontal thunderstorms continued in the third week of September. A storm in the Pacific Northwest brought rain to the coastal areas and nearby hills and snow in the higher Cascades. Stampede Pass, Wash., measured 5 inches of snow on the ground on the morning of the 18th. About 5.00 inches of rain September 20 and 21 drenched Duluth, Minn. Hail and high winds occurred in Minnesota and Wisconsin. While a band of frontal thunderstorms moved across the Great Plains, air mass thunderstorms dotted the Deep South in the hot sultry air that covered that region.

Northeasterly upslope winds produced heavy snow over portions of Montana on September 24 and 25. Miles City measured 13 inches on the ground on the morning of the 25th. Heavy rains fell at Charles City, Iowa, and at Poplar Bluff, Mo. Mixtures of rain and snow slicked the roads and highways in parts of Idaho and Nevada. Near the end of the month, showers and thunderstorms occurred along a front that stretched from the southern Great Plains to New England and in the warm humid air that lay over the Deep South. The areas that received only light rains in September were the Desert Southwest, southern Georgia, and parts of Florida.

Rainfall in October was very unevenly distributed over the Nation. Hurricane Joanne, about 500 miles south of San Diego, Calif., became Tropical Storm Joanne, and moved across northern Mexico. It became an extra-tropical Low and produced heavy rains over portions of the Desert Southwest. About 3.00 inches of rain fell in the Prescott-Flagstaff, Ariz., area in 24 hours on October 6 and 7. The 4-day total (October 3 to 7) at Phoenix of 1.93 inches is more than 4 times the October normal for Phoenix for the entire month. The heavy rains filled reservoirs but damaged cotton. Another storm off the coast of North Carolina intensified. Onshore winds brought moisture to the hill country of the middle Atlantic States. Almost 11.00 inches of rain fell at Amelia, Va. Three-day totals over interior Virginia for October 5 to 7 ranged from 6.00 to 12.00 inches with slightly lesser amounts in western Maryland and in North Carolina. The intense rains caused serious flooding at Richmand, Va. on the James River and the worst flooding in the 20th Century at Petersburg on the Appomatox River. Weak thunderstorms spattered the central Great Plains in the second week of October. Amounts of rain were mostly light and wide areas in the southern Great Plains received no rain or only light sprinkles. Heavy rains caused flash floods in eastern Arizona and central Oklahoma in the third week of October. Snow fell in the Rocky Mountains and in the lee of the Great Lakes. The heaviest rains in the last week in October fell in East Texas, southern Oklahoma, northern Louisiana, and western Arkansas where some weekly totals ranged from 6.00 to 13.00 inches.

Monthly totals in October ranged widely from less than an inch along the western edge of the northern and central Great Plains to 4.00 to 6.00 inches or more in southeastern Arizona and from northeastern Texas across southern Missouri, Arkansas, and Louisiana to Tennessee. October rains exceeded the October normals over the Far Southwest, over the southern Great Plains, and over portions of the northern Great Plains. The heavy rains in the Desert Southwest shortly after midmonth were several times the normals for the entire month. In the Far Northwest, October precipitation was less than 25% of normal.

November, in general, was a stormy month. Most of the Nation received above-normal precipitation. The main exception was the Northwest. Severe thunderstorms occurred over the middle and lower Mississippi River Valley early in the month. Several storms were in progress at midmonth. One whitened the central Great Plains and the Great Lakes Region before continuing to New England. The second lashed the Pacific Coast before crossing the Rocky Mountains, the Great Plains and the middle Mississippi River Valley. The third brought rain to central California, heavy snow from central New Mexico to the central Great Plains, freezing drizzle or sleet from the central Great Plains to the Lower Mississippi River Valley and scattered thunderstorms over the southern Great Plains. Later in the month, a vigorous storm centered off the northern Atlantic Coast produced heavy rain along the Coast and snow in northeastern New York and northern New England. A storm in the Southwest crossed the central and southern Rocky Mountains and dumped heavy snow on the eastern slopes of the Rockies. More snow fell from the Great Lakes to Tennessee and spread eastward to the northern Appalachians. A variety of precipitation fell from the Mississippi River to the Atlantic Ocean in the last weekend in November.

The last few days of the month brought rain and drizzle to the Pacific Coast, snow from the Upper Mississippi River Valley to the northern Appalachians, and rain or drizzle along the Gulf and southern Atlantic Coasts.

DECEMBER: Typical winter weather covered much of the Nation in the first three weeks of December. The weekend of December 2 and 3, brought a cold wave as Canadian air poured southward into the northern Great Plains. Subsero weather struck the northern Great Plains Saturday morning and some spots were still below zero Monday morning December 4. Glasgow, Mont., registered 27° below zero. Winds gusting to 70 m.p.h. at Livingston, Mont., dropped the temperature from 52° to 18° in 20 minutes.

Although cold arctic air covered much of the Nation, the Southwest and the Gulf of Mexico Coast were enjoying balmy weather. McAllen, Texas, registered 93° on the afternoon of December 5. By the 6th and 7th, cold air covered much of Texas and temperatures remained mostly in the 30's and 40's. The highest temperature at Amarillo December 6 was 19°. The mercury at Glasgow, Mont., plunged to 40° below zero on the 5th and warmed only to -20° on the 6th.

By December 7, the leading edge of the cold air had reached the Gulf Coast States and the Carolinas. McComb, Miss., registered 33° on December 7 and, on that date, the temperatures at Little Rock, Ark., ranged from 23° in the morning to 29° in the afternoon. Bitter cold continued over much of the west. The mercury at West Yellowstone, Mont., plunged to 40° below zero on December 10. Mild weather continued along the Gulf and middle and southern Atlantic Coasts where afternoon readings ranged generally from the 60's to 80's. The northern Rocky Mountains and the northern Great Plains continued about 30° to 40° colder than normal.

At midmonth, "Old Man Winter" was still doing his "thing", combining cold temperatures, strong winds, ice, and snow. Record warmth in Florida, 87° at Vero Beach on the 14th, was replaced by maximums in the 50's and 60's by the 16th. A large High centered over Illinois poured cold arctic air into the Nation's midsection. Temperatures in Iowa and Illinois dropped to -15° or colder. As the system moved up through New England, some respite from the severe cold occurred in the Northern Great Plains, but another cold front later in the week dropped temperatures there once again. By the 15th, a frigid air mass was wedged over the Nation's midsection between major storms over northeastern and northwestern portions of the country. While a large low pressure system was settled in over the Northeast, three high pressure systems over the middle U.S. poured cold air southward. One High was located just north of the North Dakota-Canada border, one over the Texas-Oklahoma Panhandle, and the third over Utah and Wyoming. A low pressure system over the Pacific battered the coasts of Washington and Oregon. By December 17, the large High had brought clear skies and cold temperatures to much of the Nation. The cold arctic air lowered temperatures below the freezing level into the deep South. Sunday morning the only portion of the U.S. not experiencing freezing temperatures were the southern portion of Texas and the southern 2/3 of Florida. Sunday morning Gainesville, Fla. reported 31°.

As the Christmas weekend approached, the western Great Plains warmed to the 40's and 50's and Florida emerged from the "deep freeze."

The first few days of December brought heavy snow to the Northeast and lighter snow accompanied by high winds from the northern Rocky Mountains to the Upper Mississippi River Valley. Snow at Rumford, Maine, and Bradford, Pa., accumulated to 14 inches and 10 inches fell at Lebanon, N.H., and Binghamton and Utica, N.Y. A cold wave accompanied the snow in the northern Rocky Mountains and northern Great Plains. Winds at Livingston, Mont., gusted to 70 m.p.h. The blizzard conditions made travel difficult or impossible. Farm chores became difficult.

Severe weather spread over much of the Nation near the end of the first week of December. Snow blanketed the northern states from Washington to the California Mountains, the northern and Central Great Plains, the Great Lakes Region, and New England. Rain fell over the Southland and thundershowers popped up along the Gulf of Mexico Coast. Heavy fog covered the parts of the Southeast on some mornings. In some places a belt of freezing rain, freezing drizzle and sleet separated the snow belt on the north from the rains over the south.

Strong winds occurred in places in connection with the massive storm. Winds gusted to 50 m.p.h. or more along portions of the Oregon Coast. Portland, Oreg., clocked gusts of 55 m.p.h. late December 5, and gusts at Detroit, Mich., reached 61 m.p.h. early Wednesday. Snow accumulated to 4 to 11 inches in the Intermountain Region, to 12 inches in some passes in the Rocky Mountains, and up to 12 inches in spots in the northern Great Plains. Wausau, Wisc., measured 12 inches of snow on the ground on the morning of December 6 when the snow was 9 inches deep at Alexandria, Minn. The snow depth reached 19 inches at Houlton, Maine, December 6. The deep snow, the strong winds, and the icy roads made highway travel dangerous in some places and impossible in others. A number of schools were closed because of the inclement weather.

The 11th and 12th were especially stormy. A major storm was centered over the Great Basin. Snow fell from the coastal mountains of Oregon and California to the Great Lakes. Mixtures of snow, freezing rain, and freezing drizzle fell over the middle Mississippi River Valley, the Ohio River Valley, and northeastward to New England. Dense fog covered the western Gulf Coast. Rain fell over the lower Mississippi River Valley. Combinations of the various elements made highway travel difficult and, in some places, dangerous. Flooding occurred in some places where the rain fell on saturated or frozen ground. Freezing rain and snow pelted an area from the southern Great Plains up through the Midwest to New England. Very heavy rains fell over the southeast and eastern Seaboard, and also along the Pacific Coast.

On December 11 freezing rain glazed portions of the southern Plains into the Lower Mississippi and Tennessee Valleys. As the storm system moved northeastward, freezing rain fell over parts of Illinois, Ohio and Michigan. By the 13th, freezing rain, combined with snow in some the areas, extended well up into the England.

On the 14th an intense low pressure system began developing over the northern Gulf. As this Low developed, it moved northward dropping large amounts of rain over the Gulf States, Athens, Georgia received 4.25 inches during the 24-hour period ending on afternoon of the 17th. As the Low moved northward, it dumped heavy rains all along the Atlantic Seaboard.

The low pressure system combined with a second Low over Ontario to drop condiderable snow

over New England. The heaviest snowfall occurred over northern New York, Vermont, and the northern portions of New Hampshire and Maine. Six to 12 inches fell in many areas. The pressure differences between this storm system and the High located over the Great Plains resulted in gale force winds and blowing snow, making travel very treacherous.

In the northwest, the weather was being dominated by a complex low pressure system over the Gulf of Alaska. Gale force winds were felt along the Washington and Oregon coast. Rain fell along the coastal region from northern California to Washington. The storm pushed moisture well into the interior sections of the northwest, much of it falling as freezing rain. Freezing rain fell as far eastward as western Montana, Idaho and Utah.

As the Christmas weekend approached, the Pacific storm intensified and heavy thundershowers drenched parts of the Deep South.

DISASTERS IN 1972

Buffalo Creek, West Virginia, February 26

Heavy rains fell in eastern Kentucky, southern West Virginia, and western North Carolina February 24 to 26. A coal-slag dam in Logan County, W. Va., failed. Water rushed down Buffalo Creek carrying away houses, automobiles, and people. The disaster claimed 118 lives. Four weeks later, 34 persons were still missing. Damages were estimated at $51 million.

Flooding - Beulah, N. Dak.

Warm temperatures in western North Dakota in the third week of March caused the snow to melt rapidly. The rapid snow melt, combined with ice jams on some streams, caused severe flooding of lowland fields, highways, and a few suburban areas. Rising waters on the Cannonball River forced the evacuation of 30 families from their homes in the western part of Mott, N. Dak., on the Knife River. At Beulah, N. Dak., the water was in 200 houses and some families moved out. Severe flooding also occurred at Hazen and Zap, both in North Dakota.

Cloudburst

On the night of May 11, a "cloudburst" dumped 10.00 inches of rain north of New Braunfels, Tex., sending a 30-foot wall of water down Blueders Creek into the Comal and Guadalupe Rivers washing away people, houses, and automobiles. Fifteen persons were drowned. Property losses were estimated at about $20 million. New Braunfels was hardest hit. Lesser damage occurred at Seguin, San Marcos, McQueeney, Martindale, Luling, Belmont, and Gonzales.

Black Hills Disaster

Torrential rains, up to about 7.00 inches in some localities, in the northern and eastern Black Hills Friday night, June 9, caused heavy flooding in the Keystone, Sturgis, and Rapid City areas. Rapid City was the hardest hit. More than 200 persons were drowned. Hundreds were left homeless and property damage was estimated at over $100 million. Many miles of roads, railroad track, and bridges were destroyed. Some livestock were drowned and lowland hay fields in the path of the flood were destroyed. A week later, Saturday, June 17, many citizens in parts of Rapid City left their homes when 2.00 to 3.00-inch rains fell in the area, accompanied by winds gusting to 50 m.p.h.

Hurricane Agnes, June 13 to 24

The rains of Agnes triggered some of the most devasting floods in the Nation's history across the eastern United States. Hardest hit were Virginia, Maryland, District of Columbia, West Virginia, Delaware, New Jersey, New York, Pennsylvania, and Ohio. The Florida Panhandle was also hard hit initially by winds and storm tides. The death toll of 116 included 44 in Pennsylvania. Total damage estimates exceeded $2 billion. Over $1 billion damage occurred in Pennsylvania. Rains in eastern Alabama, Georgia, and the Carolinas ranged from 2.00 to 8.00 inches with the heavier totals along the eastern slopes of the Blue Ridge Mountains. Some flooding occurred in western North Carolina. Rain continued at Big Meadows, Va., after 10.00 inches had fallen. Totals in Virginia and Maryland, ranging from 6.00 to 13.00 inches, caused widespread flooding of streams and creeks. Westminster, Maryland, received 14.68 inches in a 3-day period and 13.65 inches fell at Dulles Airport west of Washington, D.C. Heavy rains spread into Pennsylvania, New York, New Jersey, and Delaware. Many streams and rivers overflowed their banks. The James River, the largest and longest in Virginia, flooded a 200-block area in downtown Richmond. This was the worst flood known to have occurred in Richmond. Other large cities flooded were Wilkes-Barre, Harrisburg, and portions of Pittsburgh, all in Pennsylvania.

PHENOLOGICAL AND METEOROLOGICAL NETWORKS

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Phenology is the study of periodic phenomena in the plant and animal world and their dependence upon climate and weather. The interrelationship between phenology and meteorology has long been recognized. Plants can be considered as living meteorological instruments that integrate the composite effects of weather factors, together with other environment factors, in their growth response.

Phenological observations on selected indicator plants can be used to forecast or estimate the occurrence of succeeding phenological events on other plants or to predict the effect of weather on insects and other organisms. Examples of applied phenology include: (1) Early New England farmers planted corn according to the leaf development of certain forest trees; (2) Long Island vegetable growers today are alerted by county agricultural agents to watch for forsythia bloom in spring which coincides with the arrival of the adults of the destructive cabbage maggot. This aspect of phenology may well become of increased importance in the timing of pesticide applications or other practices in agriculture and forestry in the future.

A phenological network consists of volunteer cooperators observing and recording the date of the occurrence of clearly defined developmental stages, phenophases, of indicator plants. Such phenophases may be observed throughout the vegetative season on a number of plant species, both native and cultivated. Depending on the extent and density of such a network, it is possible to monitor plant development locally, regionally, nationally, or internationally. Using appropriate plant material and suitable phenophases the geographic progression of spring, the "green wave," and the corresponding fall regression in the opposite direction, the "brown wave," can be monitored and areas of relatively early and late crop development determined, provided uniform observations are made on plants with identical genotypes over large areas.

Annual observations, long term average dates, or deviations from established averages can be used to construct phenological maps. Such maps are useful tools for decision making in agriculture and forestry.

Phenology is nothing new. Phenological calendars were in use several thousand years ago in China and Rome to guide farming operations. In more modern times the Swedish botanist Carolus Linnaeus, in 1751, outlined purpose and methodology of phenological observations (8). He advocated the compilation of annual plant calendars based on certain stages of plant development together with climatological observations. Linnaeus established a network of observation sites in several Swedish provinces "to show how areas differ". From this limited beginning, phenological and meteorological observation networks developed in many countries. The first international phenological network together with a meteorological network with observation stations in several European countries was established in 1780 in Germany by the Meteorological Society of the Palatinate (9). More historical details on phenological networks and their association with meteorological observations were presented during a symposium on Phenology and Seasonality Modeling at the 25th annual meeting of the American Institute of Biological Sciences, Minneapolis, Minnesota, August 28, 1972 (5).

In the United States, in the middle of last century the Smithsonian Institution organized a phenological network covering 33 states with about 320 observers. Records are available from 1851 to 1859 (7). In 1904, the U.S. Weather Bureau, which at that time was part of the United States Department of Agriculture, used 20 cooperative weather observers and crop correspondents in Indiana to obtain phenological observations on forest and orchard trees, vines, shrubs, cereals, grasses, and vegetables. The results were published by the Weather Bureau from 1905 to 1908 (10, 11) but no attempt appears to have been made to correlate phenological observations with climatological data. This Weather Bureau effort was discontinued after 1908. At the 1957 workshop on agricultural meteorology, sponsored by the American Meteorological Society and others, a suggestion was made that phenological observations be included in the Weather Bureau's cooperative observer program (3). This proposal has as yet not been implemented.

Since the turn of the century phenological observation networks in many foreign countries have been organized by, and become part of, their national meteorological services. Such arrangements assure uniformity and continuity of observations and their evaluation.

If we consider the close relationship between climatological parameters and plant development it is appropriate to draw a parallel between meteorological and phenological observer networks. Phenological observations can be carried out intensively at a limited number of sites such as in phenological gardens, or extensively at a great number of locations over a wide geographic area. Each type serves its purpose. The intensive study sites can be compared to the Reference Climatological Station Program of the National Oceanic and Atmospheric Administration (NOAA). Extensive phenological networks correspond to the systems of volunteer weather observers.

Just as weather services depend on volunteer observers to take daily records, phenological networks have to utilize the help of volunteer lay observers. It is not very difficult to enlist the help of such volunteers once the nature and importance of accurate phenological observations have been explained. These volunteers derive a satisfaction from being part of, and contributing to, an important nationwide endeavor. Where such national phenological networks exist observers come from many occupations: farmers, gardeners, foresters, students, highway crews, retired people that love to go for walks in the country, etc. These people are either through their occupation or by choice in close contact with nature. Entire school classes often participate under the guidance of their teachers. Phenology thus becomes part of their environmental studies.

A phenological network is not only a parallel to a ground network for weather observations but actually forms an important supplement to it. However, certain fundamental differences between the two types of networks must be recognized. Meteorological observations are made with standardized equipment so that direct comparisons of data between stations can readily be made. The observations characterize the macroclimate of the entire area.

Whenever phenological observations are evaluated we must realize that we are dealing with biological material. The data come from living plants that respond to continuously changing environmental influences which can be separated only with great difficulty if at all into their components. Soil types, topography, exposure, nutrition, etc. affect plant response in addition to parameters measured by meteorological instruments. The need for relatively dense phenological networks thus becomes apparent.

How many observers are needed in a network? The desired accuracy determines how dense a network should be. Many observers are needed where climatic differences, and consequently differences in plant development, show up within short distances. Phenology has an advantage over meteorology: plants are cheaper than instruments. Detailed studies of microclimatic differences can easily be accomplished through a phenological observer network.

In prewar Germany, for example, an existing network was taken over by the German Weather Bureau in 1936 and eventually had a density of about one observer per 50 km^2 (20 square miles). At present in West Germany a fairly evenly distributed phenological network of about 1,700 stations represents a density of one observer for each 90 km^2, or about one observer every 36 square miles (12). Similar situations exist in many other countries where phenological networks in conjunction with meteorological networks serve overall agricultural purposes or specific segments of agriculture.

What is the current situation in the United States? No phenological network exists in the U.S. today comparable to the networks in other countries administered by their national meteorological services. However, renewed interest in phenology in the 1950's resulted in the establishment of phenological networks as part of three regional projects of agricultural experiment stations. The credit goes to the Montana Agricultural Experiment Station where Professor Caprio took the initiative in 1956 (1). This study became part of a regional research project W-48, in which agricultural experiment stations from 11 states of the western region cooperate. This network has now about 2,500 observers. Initially common purple lilac was used as the indicator plant. Later two honeysuckle cultivars were added in order to extend the phenological observations over a considerable portion of the vegetative season.

The study in the western region provided the impetus for regional projects in the north-central and north-eastern regions. While the western study started with existing common lilac plants the north-central and north-eastern projects established plantings of the clonally propagated 'Red Rothomagensis' lilac cutivar, so as to eliminate possible inherited differences in response to environmental effects. The north-central and north-eastern projects were combined, in 1970, as part of the NE-69 project. Alaska, the Canadian province of Quebec, and the Atlantic provinces joined NE-69. This project now accommodates close to 700 observation sites and includes both 'Red Rothomagensis' lilac and the 2 honeysuckles used by W-48 (6).

Figure 1 shows the number of observation sites for each state or province. In the United States the area covered by the W-48 and NE-69 networks is about 88% of the contiguous states. The density of the networks is quite variable and offers room for development particularly in the midwestern states.

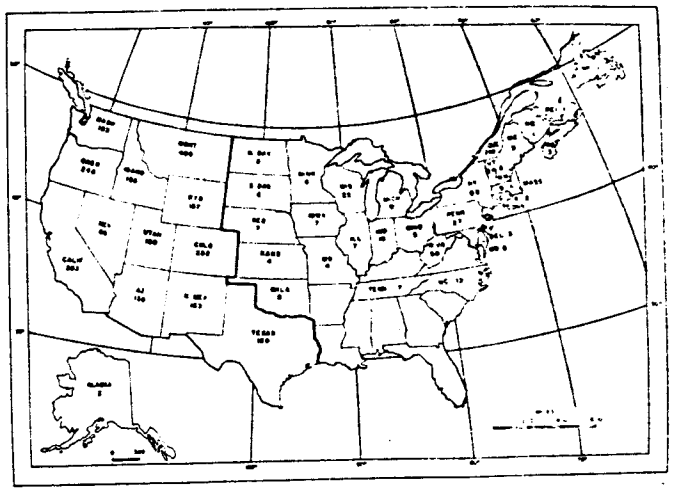

Figure 1. Phenological networks in the western region of the United States (W-48) and in the north-central and northeastern regions (NE-69). Numbers indicate the number of observation sites in each state or province.

We have seen that phenological observation networks using volunteer lay observers have been in existence in various countries for many decades where they form important adjuncts to the meteorological networks. The current efforts of the W-48 and NE-69 regional projects of agricultural experiment stations together with other phenological activities such as state projects in Wisconsin and North Carolina could form the basis for a phenological organization in North America. The funding and personnel policies of agricultural experiment stations carry with them the possibility that regional projects or participation in such projects may terminate prematurely. There is, therefore a need for a unification of the various phenological activities under the direction of some national or international agency that would assure continuation of phenological observations and coordination with meteorological networks. If the number of indicator plants and of observed phenophases were to be increased in a coordinated U.S. and Canadian network, the data could be used for the construction of seasonal phenological maps as part of an overall phenological atlas. Such expansion and coordination would be of importance in agricultural decision-making and could develop into an effective extension of agricultural weather information.

Phenological networks are likely to play an important part in providing additional "ground truth" information for remotely sensed data from earth orbiting satellites. The two regional projects mentioned earlier jointly received a NASA contract to participate in the evaluation and interpretation of imagery received from ERTS-I (Earth Resources Technology Satellite) which was launched in July 1972.

Finally, as a long range view we can visualize international cooperation and coordination of observations from phenological networks. Long term phenological normals can be developed to parallel meteorological normals and as such would serve as a tool for global monitoring of the environment.

NOAA's National Weather Service (formerly Weather Bureau) has been interested in the phenological activities of the agricultural experiment station. NOAA Regional Climatologists serve as voting members and advisors on the technical committees of these projects. The expansion of the W-48 network to include honeysuckles as indicator plants was made possible through a grant from NOAA. Many observation sites were established with the help of state climatologists, and cooperative weather observers frequently serve as volunteer phenological observers. The proximity of phenological sites to existing weather stations facilitates the correlation of data from both types of networks. Reports on phenological studies in the west and the northeast were published repeatedly in the Weekly Weather and Crop Bulletin, most recently in 1971 and 1972 (4, 2).

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