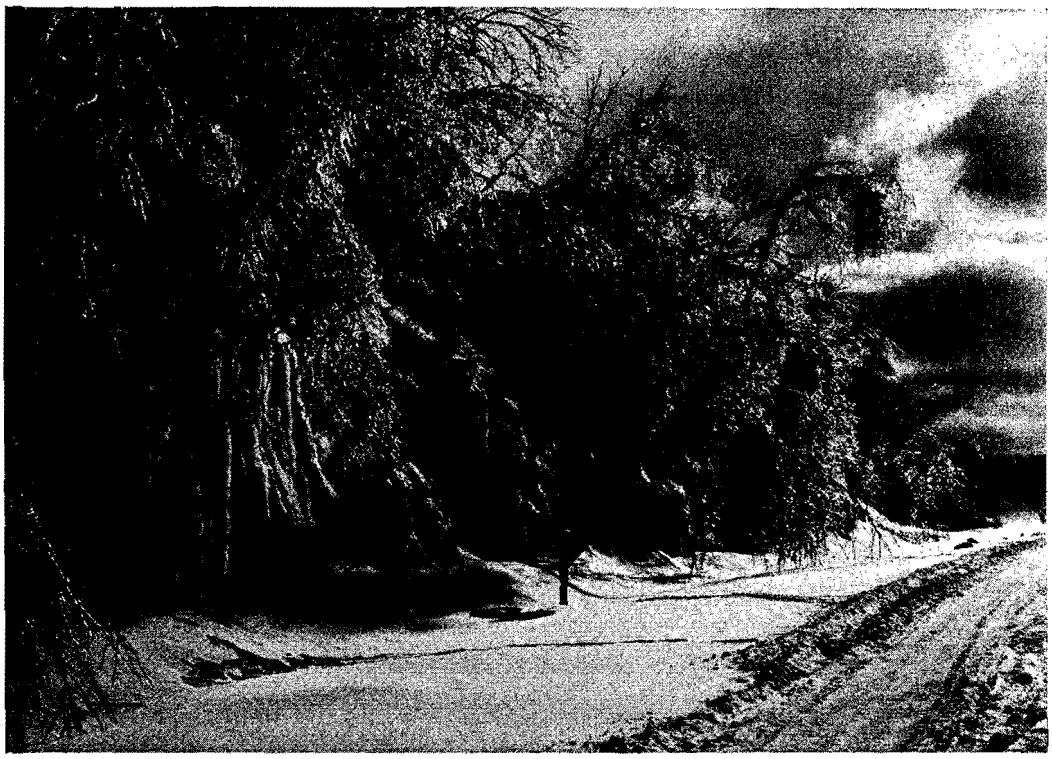


A scene at Nashville, Tennessee, after the ice on the ground had been covered with snow, February 1, 1951. Photograph by Henry Schofield Studio.

The Great Southern Glaze Storm of 1951

BEN W. HARLIN, U. S. WEATHER BUREAU, NASHVILLE, TENNESSEE

DURING THE CLOSING DAYS of January, 1951, one of the most destructive storms in history enveloped the upper and middle South in a great sheath of ice that extended in a strip more than 100 miles wide from Louisiana northeastward to West Virginia. It was the costliest winter storm on record for the southeastern states, and the estimated $100,000,000 damage exceeded all other single storm damage for the region, with the possible exception of hurricane destruction at coastal points.

The glaze storm was associated with a great outbreak of polar air that swept into the central part of the United States from the Canadian arctic during the last week of January. Over the southeastern states the polar air met its first resistance in the form of a tropical air mass from the Gulf of Mexico. These two conflicting air masses were to make meteorological history in many areas, but it was the Southland that suffered most in human misery and property damage.

The scene was set in middle January as a series of Pacific lows moved inland just to the north of Oregon and Washington, while a great high pressure area with a vast reservoir of frigid air remained stationary over Alaska and western Canada. The high began to intensify on January 22nd, building to near record intensity — there were map reports of 1062-mb readings. On January 25th, a rapidly moving low crossed the Pacific coastline and disappeared over the plateau, but another low formed on the front in Nebraska and sped eastward to Ohio in the next 24 hours, with frigid air sweeping down behind it over the plains states to central Texas.

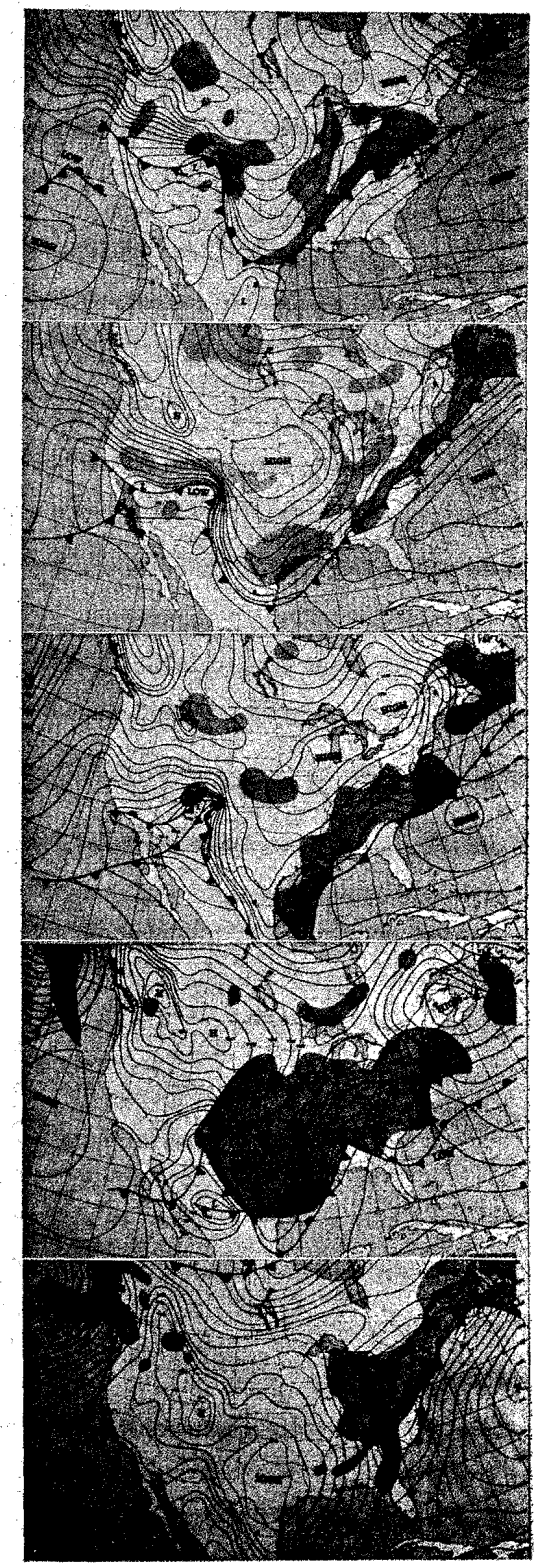
On January 29th a large 1041-mb high was

centered over Nebraska and Iowa. The cold front with several waves along its leading edge had reached the Atlantic Coast, but extended inland over Virginia through the middle South to the western Gulf of Mexico. Some freezing rain, sleet, and snow occurred behind this front as it moved steadily southeastward on the 28th, 29th, and 30th, causing accumulations of ice on trees and wires and a covering of about two inches of mixed sleet and snow on the ground.

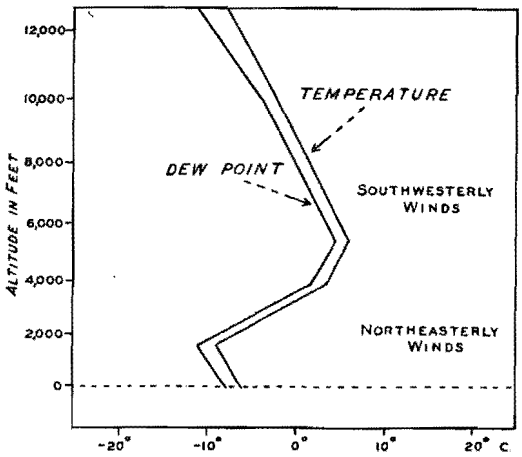
During the forenoon of the 29th, another Pacific low, that was responsible for the final plunge of cold air into the Southeast two days later, moved in over southern California, and in 24 hours had joined with another low which was moving slowly southeastward toward the Gulf. When the trough aloft associated with this disturbance reached the Texas area, a new low developed over the warm waters of the Gulf that was to cause millions of dollars of damage.

On January 31st the Gulf low deepened and commenced a rapid journey northeastward as a wave along the major cold front, reaching Pennsylvania by noon the next day. Light to moderate sleet and freezing rain occurred ahead of the low, but soon changed to snow as the winds shifted to west and northwest, with falls being reported as far south as Burrwood, Louisiana, at the mouth of the Mississippi, and at Daytona Beach in central Florida.

The situation on the 31st was further complicated by an upper cold front that entered the region near noon and moved across the Gulf states during the afternoon as sleet and freezing rain were falling. The upper front's approach to the surface front, with the latter's overrunning warm, moist air, triggered a series of unusual thunderstorms on a line from Kinder, Louisiana, northeastward to Greenwood, Mississippi. The intensity of the precipitation increased rapidly, and the high winds that developed in the thunderstorms sent ice-laden limbs, trees, wires, and poles crashing to the ground. Similar damage occurred in northern Alabama, a large portion of the damage to trees and communications



The surface weather maps for 12:30 p.m. CST, January 28, 1951, to February 1, 1951 (top to bottom). The areas of precipitation are shaded, portions of the southeastern states being included in each case. USWB charts.



A sounding made by rawinsonde at Nashville at 2100 CST, January 30, 1951. Note the below freezing temperatures near the surface, with northeast winds, and the above freezing temperatures above 3,000 feet, with southwest winds. Data from U. S. Weather Bureau.

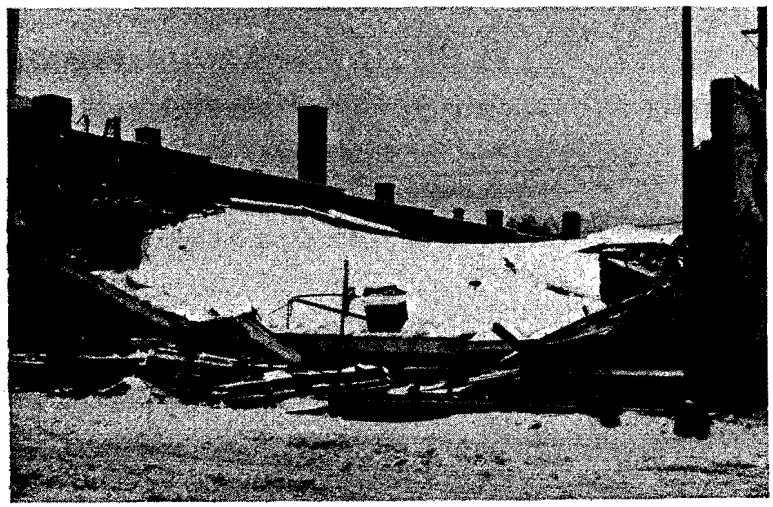
resulting from this unusual combination of high winds following severe glaze. The total precipitation at many points was more than five inches of water.

Farther north over western and central Tennessee, Kentucky, and parts of West Virginia, light to moderate sleet and freezing rain occurred all day and lasted until past midnight. By the afternoon of the 31st the accumulation of rain-soaked sleet on the ground was making travel difficult, even on frequented highways and streets. Many breaks occurred in power and communication lines, so telephones, radios, furnaces, and electric ranges became inoperative. New homes, equipped for electric heat only, were thus rendered uninhabitable. Families whose homes still had stoves or fireplaces were among the fortunate, as resort was made to pioneer methods for cooking and heating.

The Nashville *Tennessean*, in an article by H. B. Tetter carried on February 11th, stated: "Never before in recorded history did winter hit this area with such devastating force to paralyze the everyday life of the community. Never before were so many homes plunged into frigid darkness. Never before were so many faced with hardship and suffering in what was once the security of home, and never before were the complex transportation systems of the area held immovable for such an extended period. The great storm of ice, sleet, and snow struck hardest at Nashville on the morning of February 1, 1951. Ten days later life had not resumed normal activity."

With eight inches of frozen precipitation on the ground by the morning of February 1st, traffic was practically paralyzed in central Tennessee and remained so for three days. Some vehicles with chains were able to move, but their progress was hampered by stalled and abandoned automobiles. Many tourists were stranded for four or five days.

The explanation of the difficult travel conditions lies in the fact that the four to five inches of water-soaked sleet on the ground was at first not frozen into a solid sheet. This layer was then covered with three to four inches of dry snow, and with falling tem-



Ice and snow with five inches of water content proved too much for this roof of a Nashville building. Photograph by Henry Schofield Studio.

Among those forced to resort to primitive methods of cooking, as electrical power failed in Nashville, were Mr. and Mrs. Douglas Roach and their son, Douglas, Jr. Photograph by Bill Preston, courtesy Nashville *Tennessean.*

peratures the mass began to freeze at the top. The snow and sleet would not pack under the weight of vehicles, and the wheels would sink down to the wet pavement and spin. Before roads and streets could be scraped, the sleety mass next to the ground froze into a solid sheet of ice about four inches thick with the dry snow still on top. Three or four days later, after daytime melting of the snow layer and nighttime freezing, the entire covering on the ground became a semitransparent layer of solid ice.

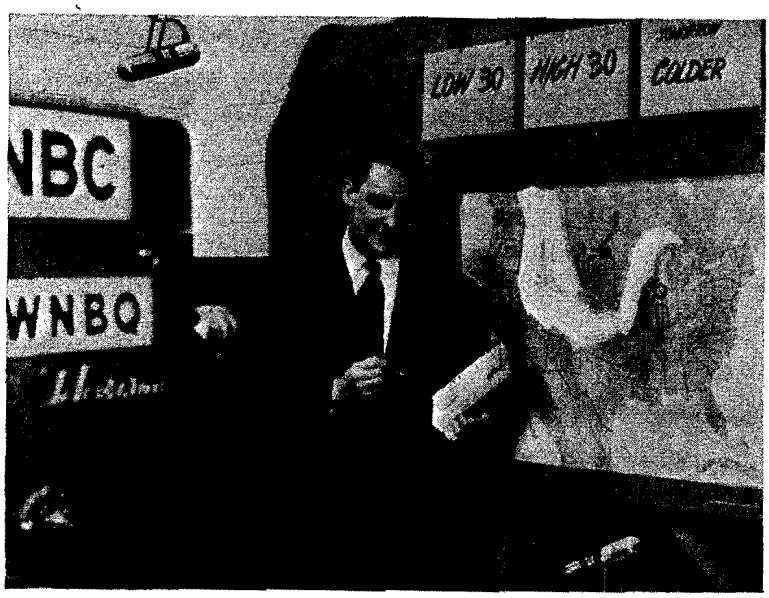
The human toll was great; about 25 persons lost their lives and over 500 were injured through storm-induced accidents. The total storm damage was estimated by the U. S. Weather Bureau to reach approximately 100 million dollars, broken down as follows: forests, 56 million; communications and power lines, 10 million; highways and streets, 15 million; fruit and nut trees, four million; buildings and plumbing, 4.3 million; livestock, three million; truck and grain crops, 1.6 million; and several millions for losses to transportation and business.

The glaze storm of 1951 and the weather events of the following week will long be remembered in the South, since there has been only one other parallel instance in recorded Weather Bureau history. In February, 1899, another similar outbreak of polar air engulfed the entire region, bringing below-zero temperatures and deep snow to extreme southern limits, but there was one fundamental difference between these outbreaks. In 1899, the culprit low formed in the Gulf near Mobile, Alabama, much farther to the east than in 1951. This permitted a deeper penetration of cold, and heavy snows instead of sleet and glaze covered most areas, a condition that is less paralyzing to the life of a modern urban and industrial community. In all, the storm of 1951 was a major disaster for the middle and upper South and appears to have been the costliest ice storm on record.

NEW AVIATION FORECAST SERVICE

An aviation weather forecast by short-wave radio has been started by the Weather Bureau in New York City to assist private flyers. The service, reportedly the first of its kind in this country, will cover the area bounded by Boston, Albany, Harrisburg, and Washington.

The broadcasts will be on the air from 6:00 a.m. to 6:00 p.m. daily. Each forecast will take from three to seven minutes and will be amended hourly. Tape recordings will be used. The information will be transmitted from LaGuardia Field on a frequency of 173.975 megacycles, and then will be retransmitted by automatic pickup at the downtown Weather Bureau office on 162.55 megacycles. The call letters of the new station are KWO35. Amateur weathermen can tune in on these frequencies with the new-type civil defense radiophone receivers or very-high-frequency aircraft receivers.



Telecasting the Weather

CLINT YOULE

Clint Youle, a Chicago weatherman, as he appeared before the cameras on one of his early television broadcasts. WNBQ photo.

A COUPLE OF YEARS AGO a Chicago newspaper asked for a piece on the private life of a television weatherman. As I remember it, my answer mentioned strongly the need for an adequate disguise. Uncle Sam's big city forecasters usually are tucked away in some cramped corner where their closest contact with the ordinary citizen is by telephone. TV weathermen, however, quickly become part of the local scene. They are easily recognized, and the legitimate object of every man's scorn, anger, or jest.

There are, of course, great compensations. One develops tremendous mental agility and the ability to remember facts quickly. Wake any forecaster in the middle of the night, and before you've taken your hand off his shoulder, he'll be saying authoritatively: "dew point in Old Hamswich, 40; in Dry Bone, zero." But wake a TV forecaster, and he'll look you in the eye while explaining that he by no means spoke categorically yesterday when he referred to clear skies — the rain that fell by the ton was the alternate forecast.

Since television appears to be settling down upon us permanently, perhaps we had better examine the still unsettled relationship it has to reporting the weather. Some of the things I've learned in three years before the cameras might be of interest to others considering a move out into the direct line of fire. Here's what I've been putting into 10 minutes.

First, and most obviously, all the available facts: high and low temperatures for the 24-hour period; precipitation amount and its relationship to normal; maximum wind speed; barometric pressure and trend. These are generally printed on a large sheet of paper while "on camera." They give action to what otherwise would be merely talk. And any considerable deviation from normal in any of the facts provides material for extra comment and comparison.

The day's statistics lead naturally into a discussion of the day's weather, the why of the current clouds, snow, heat, or falling barometer. From the local weather, it's a natural step to the overall weather picture throughout the country. Occasionally, I refer to lows and highs; much more often I refer to small, medium, large, or potential storm centers, and masses of warm, hot, or cold air from the Pacific, the southwestern states, or from northwestern Canada. Laymen seem particularly interested in the recent source of their weather.

I presume that most meteorologists would agree that there is more than one forecast possible for any given location at any given time. On days when the chances for a miss are great, I try to show the public the alternate possibilities, the reasons for the alternatives, and the reasons for selecting the one finally chosen. This serves a double purpose. It graphically demonstrates the difficulties

faced by any forecaster, and it makes the viewer much more tolerant of a missed forecast. He's been prepared in advance, and feels as though he himself had participated in the decision and so is partly responsible for its error.

Speaking of missed forecasts, it seems best to admit a failure promptly, then show exactly what happened to cause it. Mail comments on this procedure have been uniformly approving, and a number of viewers have written to say that these explanations, for the first time, have given them an understanding of the problems faced daily by the Weather Bureau. The explanations of misses and the presentation of alternate forecasts are also valuable in providing the viewer with conversation material. Frequently we overhear people on trains, in elevators, and at gatherings explaining in detail to non-viewers just why our January temperature jumped to 65° instead of dropping for a cold wave. People enjoy having extra knowledge, particularly if they can acquire it painlessly and pass it on readily.

This same providing of extra information is the main reason for adding details about weather phenomena, no matter where they occur. If there are winds of 55 miles an hour and blowing dust in Tucumcari, I mention it; and the same goes for hailstones in South Dakota; 40° below zero at Cutbank, or 114° at Yuma. Tornadoes, hurricanes, and violent thunderstorms are, of course, a part of any telecast near the time of occurrence; having been a news editor for 10 years, I know that such items are weather news of top rank.

At frequent intervals, too, I give temperatures or precipitation figures from all sections of the country. That's partly the result of letters from viewers. A steady stream of mail comes from people who formerly lived in New England and want to know about the weather back home; from people whose sons are in the army in Texas or California; from those whose relatives are snowed in at Double Peak, Colorado; from many who plan next year to visit the New Mexican caverns and want to be posted in advance on the local weather. Apparently, a majority of the viewers are interested in their local weather first, their fellow citizens' weather second.

Human nature provides another reason for telling weather outside the local area. A man who's been grumbling in Chicago over shoveling six inches of snow seems to be comforted a bit to learn that Duluth has 24 inches of snow and more falling. Or, in summer the tired and hot Chicago housewife feels a bit more cheerful when she learns that Dallas has just had its tenth straight day of 100-degree temperatures.

Then there are the folks with special interests dependent upon weather — the skiers, the flyers, the fishermen, the golfers, the picnickers, transportation agencies, and so forth. In season, I try to provide a generalized forecast for them, relating it to their specific activities.

In presenting the weather to an audience composed largely of non-meteorologists, I oversimplify explanations at times. I use diagrams whenever possible, sketching them while "on camera." I stay away from technical terms, preferring to be not quite accurate in language rather than bury the audience with words that are meaningless to them. I draw fronts and storms and place temperatures freehand on the map, giving approximations rather than pinpoints, in an effort to keep the show moving.

Of course, the basic ingredient needed for a weather program on radio and television is the aid, information, forecasts, and comfort furnished by the United States Weather Bureau. The bureau office in Chicago has been the main prop and provider for me. Its members, from Gordon Dunn and his regional and airway forecasters right on to the newest map plotter, have gone out of their way to be helpful. They've discussed and explained and watched for features I'd never have seen.

Mail from the TV and radio programs presents quite a task. Roughly speaking, 75 per cent of it is complimentary; 20 per cent is seeking climatological information or impossible advance forecasts; four per cent is miscellaneous, from people wanting to know how to ward off thunderstorms or whether TV aerials are causing excess rainfall. One letter out of a hundred is harshly critical — and almost invariably anonymous.

As long as the ratio stays like that, I won't be concerned; so long as people watch, the program is performing its function. In any case, it's fun, and I'm enjoying doing it.