

THE FIRST OPERATIONAL TORNADO FORECAST

EVENTS LEADING TO THE FIRST OPERATIONAL TORNADO FORECAST

Selected excerpts from an unpublished manuscript THE UNFRIENDLY SKY, by Robert C. Miller, Colonel, USAF-Ret.

On March 20, 1948, a tornado struck Tinker AFB, Oklahoma causing \$10.2 million in damages and injuring eight people. Captain Robert C. Miller, under the command of Major Ernest J. Fawbush, was on duty and had forecasted wind gusts up to 35 knots and no thunderstorms. "...This forecast gravely underestimated the gravity of the situation. ..."

As the weather situation deteriorated, "...The Sergeant began typing up a warning for thunderstorms accompanied by stronger gusts even though we were too late to alert the Base and secure the aircraft. At 9:52 p.m. the squall line moved across Will Rogers Airport 7 miles to our west southwest. To our horror they reported a heavy thunderstorm with winds gusting to 92 miles per hour and worst of all at the end of the message, 'TORNADO SOUTH ON GROUND MOVING NE!' ... at 10 p.m. the large tornado, visible in a vivid background of continuous lightning, and accompanied by crashing thunder began moving from the southwest to northeast across the base. ... Suddenly the glass in the control tower to our right succumbed to the pressure differential caused by the vortex, and all the glass shattered. The control tower personnel were badly cut. They had not abandoned the tower despite the 78 mile an hour winds around the outer fringe of the tornado. Seconds later the Operation Building's large window blasted outward into the parking area. Debris filled the air. Then, suddenly, the churning funnel lifted and dissipated over the northeast edge of the Base. ..."



Two Air Force officers at Tinker Field study their maps. Then when weather gets rough, they warn the military



Fawbush (right) and Miller (left), 1951; from TAKE-OFF, Tinker AFB newspaper

Take-Off
Tornado Forecasting Discovery Reaches Air Force Secretary

Weather Officers Commended

Awards Well Deserved!



FOR DILIGENT RESEARCH...in the severe storms areas of the Great Plains states, Lt. Col. Ernest J. Fawbush and Maj. Robert C. Miller, Tinker Weather officers, were presented commendation medals and citations by Col. A. L. Haig, Base Executive, during a special review. [January 1953]



A PLEA FOR UNDERSTANDING

"The close knit world of the tornado and severe thunderstorm forecaster often seems somewhat demented to those not knowledgeable in this discipline. This apparent derangement is based on our seemingly ghoulish expressions of joy and satisfaction displayed whenever we verify a tornado forecast. This aberration is not vicious; tornadoes in open fields make us happier than damaging storms and count just as much for or against us. We beg your indulgence, but point out the sad truism that we rise and fall by the blessed verification numbers. There is a fantastic feeling of accomplishment when a tornado forecast is successful. We are really nice people but odd."

--Robert C. Miller

The following day a board of inquiry found that the storm was not forecastable, but they recommended the meteorological community consider efforts to alert the public to these storms. They also urged Base Commanders to develop safety plans designed to minimize personnel and property losses in violent storms. Major General Borum, Commander of the Oklahoma City Air Material Area, directed the Air Weather Service to have Tinker Base Weather Station investigate the feasibility of forecasting tornadoes. For the next three days, Miller and Fawbush analyzed the upper-air and surface weather charts preceding the Tinker tornado. They also studied previous tornado outbreaks, looking for similarities in weather patterns that might serve as criteria for determining tornadic potential.

"On the morning weather charts of the 25th of March 1948, just five days after the Tinker storm, we noted a great similarity between the charts of the 20th and the 25th. ... This chart resulted in the somewhat unsettling conclusion that central Oklahoma would be in the primary tornado threat area by late afternoon and early evening."

In mid-afternoon, notified of swiftly changing weather conditions, General Borum assessed the rapid development of the squall line and for the second time that day asked ... "Are you going to issue a tornado forecast?" I knew E. J. would come up with a sensible, honest answer and he did. "Well, Sir, it sure does look like the last one, doesn't it Bob?" I tried to think of a brilliant answer and found myself saying, "yes E. J., it is very similar to last week." The General was not particularly impressed with this intelligence: "You two sound like a broken record. If you really believe this situation is very similar to the one last week, it seems logical to issue a tornado forecast."

"We both made abortive efforts at crawling out of such a horrendous decision. We pointed out the infinitesimal possibility of a second tornado striking the same area within twenty years or more, let alone in five days. 'Besides,' we said, 'no one has ever issued an operational tornado forecast.'"

"You are about to set a precedent," said General Fred S. Borum."

"With a sinking feeling in the pits of our stomachs, E. J. composed the historic message and I typed it up and passed it to Base Operations for dissemination. The time was 2:50 p.m. ... Base Personnel were carrying out his [Borum's] detailed Tornado Safety Plan, hanging aircraft, removing loose objects, diverting incoming air traffic and moving base personnel, including the control tower personnel, to places of relative safety. I could see it now, a sure 'bust' and plenty of flack thereafter."

By 5:00 p.m. the fully-developed squall line passed through Will Rogers Municipal Airport, producing only a light thunderstorm, pea-size hail, and no reports of tornadoes. Dejected, Miller headed home.

"... A little after six o'clock it began to thunder rather quietly and rain began. There was very little wind. It became quite dark and over the base, portions of the clouds seemed to be boiling while low cloud fragments darted hither and yon beneath the base of the thunderstorm. My view was quickly obscured by heavy rain and I stopped observing the storm. During the evening the radio broadcast we were listening to was interrupted for an urgent news bulletin. I was in another part of the house but caught the words destructive tornado and Tinker Field. 'Good grief', I thought, 'they're still talking about last week's tornado - but why break into the news.' I tried to call the weather station but the lines were dead. I felt a strange unbelieving excitement rising, told my wife I was going to the station and drove away."

"The base was a shambles. Poles and powerlines were down and debris was strewn everywhere. Emergency crews were busy trying to restore power, clear the streets and, in particular, to restore the main runway to operational status. I reached the station to find a jubilant Major Fawbush who described the course of events after I had given up hope. At six o'clock thunder began at the base as the squall line moved in from the southwest. E. J. and my friend, the Sergeant, were outside, observing the motion of the clouds. As the line approached the southwest corner of the field, two thunderstorms seemed to join and quickly took on a greenish black hue. They could observe a slow counterclockwise cloud rotation around the point at which the storms merged. Suddenly a large cone shaped cloud bulged down rotating counterclockwise at great speed. At the same time they saw a wing from one of the moth-balled World War II B-29's float lazily upward toward the visible part of the funnel. A second or two later the wing disintegrated, the funnel shot to the ground and the second large tornado in five days began its devastating journey across the base very close to the track of its predecessor."

"It was all over in 3 or 4 minutes. It seemed much longer. The swirling funnel left \$6 million dollars in damage, \$4 million less than the first storm and significantly, there were no personal injuries. General Borum's Tornado Disaster Plan had been just as successful as the first operational tornado forecast. We became instant heroes, and in my case, the rest of my life would be intimately associated with tornadoes and severe thunderstorms ... This first tornado forecast triggered a chain of events which led to the present day Severe Storms Forecast System and a vast national research program investigating these killer storms. Well, it did look a lot like March 20th. Even the General thought so."

"The Fawbush-Miller system will not cut into the big business of selling storm cellars, because no one has yet come up with a way to prevent a tornado. But the Oklahoma farmer who said he always depended upon flying cornstalks and bed quilts to warn him of an approaching twister will now have ample time to walk-not run- to his 'scarehole.'"

--from FLASH-TORNADO WARNING! by Pat McDermott, The Saturday Evening Post, July 1951

Colonel Miller's daughter Kristin Worcester and Grandson Ian at the ceremony commemorating the 50th Anniversary of the First Tornado Forecast at Tinker Air Force Base



FIRST TORNADO FORECAST MARCH 25, 1948

THIS MEMORIAL IS DEDICATED TO THE FIRST OPERATIONAL TORNADO FORECAST ISSUED ON MARCH 25, 1948 BY MAJOR ERNEST J. FAWBUSH AND CAPTAIN ROBERT C. MILLER AT TINKER AIR FORCE BASE, OKLAHOMA.

ISSUED SEVERAL HOURS BEFORE A TORNADO STRUCK TINKER AIR FORCE BASE, THIS FIRST FORECAST PROVED SEVERE WEATHER COULD BE ANTICIPATED WITH A REASONABLE DEGREE OF ACCURACY. THIS FOCUSED NATIONAL ATTENTION ON FORECASTING TORNADOES AND WARNING THE PUBLIC OF THEIR POTENTIAL DANGER.

SEVERE WEATHER PIONEERS, MAJOR FAWBUSH AND CAPTAIN MILLER DEVELOPED TORNADO FORECASTING TECHNIQUES STILL IN USE TODAY. THE 1948 TORNADO FORECAST WAS THE FORERUNNER OF TODAY'S NATIONAL SEVERE WEATHER FORECASTING AND RESEARCH PROGRAM THAT PROTECTS LIVES AND SERVES THE AMERICAN PEOPLE.

DEDICATED MARCH 25, 1998

RETROSPECTIVE:

Considering the quite limited severe thunderstorm reporting of the 1940s, compared say to that of the 1980s and 1990s, it appears that a very significant outbreak of severe and tornadic thunderstorms occurred on 25-26 March 1948. The severe events of five days earlier were far more isolated.

Given the above meteorological assessments, the question remains, "What exactly did stimulate Fawbush and Miller to issue their famous forecast?" The development of a base severe weather plan following the tornado disaster of 20 March and the presence and exhortations of General Borum at the weather station on 25 March probably provided as great, or greater, motivation for the first tornado forecast as did the "similarity" of the synoptic settings.

It is amazing that this first forecast was so fortuitously successful, that is, two significant tornadoes occurring at the same precise location within five days. Regardless, the fact that the second tornado did - with unbelievable luck, both good and bad - strike Tinker AFB undoubtedly accelerated the development of severe storms forecasting. It appears that the amazing coincidence of multiple tornadoes hitting a military installation where, in retrospect, just the right players happened to be stationed is perhaps the preeminent and quintessential event of operational severe storm forecasting.

--from "The Tinker AFB Tornadoes of March 1948," by Robert A. Maddox and Charlie A. Crisp, WEATHER AND FORECASTING, August 1999