

September 30, 1986
Tim Marshall, Editor
Phil Sherman, Assistant Editor
1336 Brazos Blvd.
Lewisville, Texas 75067

STORM TRACK
\$6.00/year



Vol. 9, No. 6
(Bi-monthly
address orders
and letters to
Tim Marshall)

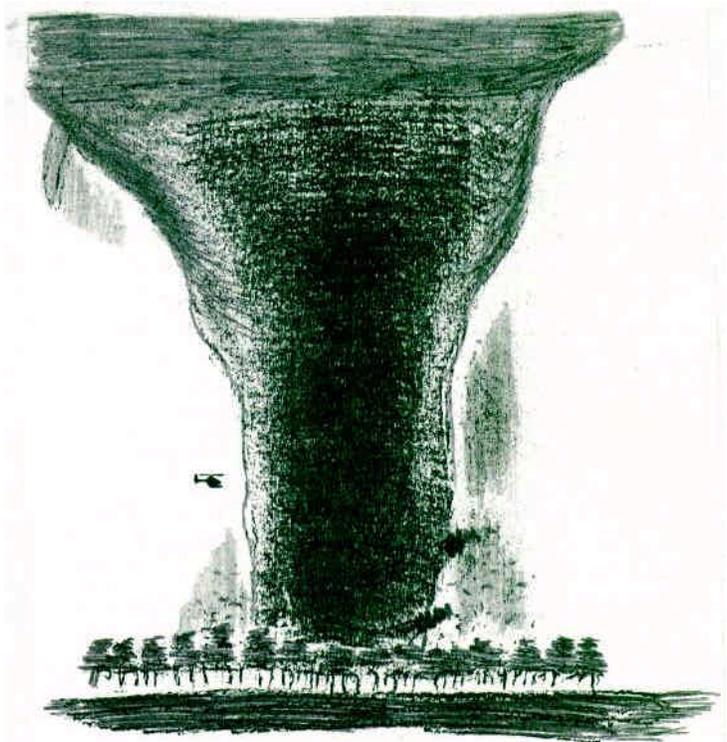
I. COMMENTARY

Now that the tornado season is over, the hurricane season begins. So far, both seasons have been relatively quiet. Hurricane Charley was a minimal hurricane and contributed more to increase public apathy rather than being a real threat. There have been several such "minimal" hurricanes over the last two years effecting a large portion of the Gulf Coast and Eastern Seaboard. Last years Hurricanes Bob, Danny, Juan, and Kate were low intensity storms. Earlier this year, Hurricane Bonnie just barely attained hurricane force (74 mph). I've heard many people say how they feel comfortable now staying on the coast since they've been through several "hurricanes". Little do they realize that it's the stronger hurricanes which make victims of such ignorance.

II. CHASER NEWS

FRONT SEAT AT A MINNESOTA TORNADO: I believe it's the most incredible video I've ever seen. What a view. Did you see that vertical motion on that vortex? It happened July 18, 1986 in Brooklyn Center, Minnesota. Two helicopter pilots were giving live traffic information when suddenly a thin funnel dropped to the ground on the horizon. They closed in on the tornado and filmed it from less than 3/4 of a mile away. They were lucky to survive as a small branch hit the rotor causing little damage. Awesome, and incredible! Both NBC and CNN television aired the video. Did you see it?

Bill Hoffmann sent in the details:
"As you must have heard, we were visited by a tornado last Friday that took its time, put on a great show, and did little damage. I didn't see it because I was attending a graduation ceremony indoors. We heard the sirens but the ceremony continued. It seemed like half the people in the metropolitan area saw the tornado. The other half could watch it live on the KARE-TV, the NBC outlet here. The helicopter was diverted to the tornado and circled it for maybe 10 to 15 minutes. The videotape is mind boggling showing close-ups of the funnel on the ground, whipping trees in a grove as if they were blades of grass. Trees were drawn in a circular pattern, like waves of grain, while occasionally single trees were sucked vertically into the funnel as if on a fast rising elevator."



HOW DANGEROUS IS HAIL? (The following is an excerpt from an article which appeared in the June, 1986 issue of NOAA's disaster preparedness report.) A violent hailstorm -- the worst to strike central China in a century--killed more than 100 people and injured 9,000 others the week of May 22, 1986, in Sichuan Province. Officials report more than 35,000 homes demolished and 7,700 acres of crops destroyed. The showers of ice hit cities of Yongchuan, Tongchang, and Dazu.

III. LETTERS TO THE EDITOR

Larry Mooney from NOAA in Oklahoma City writes: I wanted to share a brief observation about the Edmond, Oklahoma tornado last May. With all the sophisticated radar data available to us, many people apparently assumed that high technology was responsible for our excellent lead time on the warning (issued at 6:40 pm, tornado touchdown at 7:12 pm). Such WAS NOT the case. The tornado warning was in effect long before any radar indications occurred. Credit belongs to the forecaster who demonstrated a solid understanding of storm dynamics and structure, and to the timely and accurate reports from trained spotters. Moreover, credit belongs to the many storm chasers that have contributed to our understanding of the thunderstorm and its hazards. Chasers have made significant contributions to both the research and operational meteorological communities. The Edmond tornado was just another example of the payback from the chase efforts.

Rick Schwartz chased Hurricane Charley up the east coast and relays this message: "Just as in tornado chasing, pursuing hurricanes has its share of disappointments. Hurricane Charley was never as fearsome as its titled implied. I decided to intercept Charley when every morning news program on August 18, said that Charley was 50 miles south of Ocean City, Maryland, with 75 mph winds, heading N-NE at 15 mph. "

"I had been dutifully tracking this storm for two days and decided to drive to Rehoboth Beach, Delaware (about 30 miles north of Ocean City) for a possible intercept. Reckoning that by the time I reached Rehoboth Beach the storm would make its closest approach, I anticipated seeing the full hurricane sequence- the lush tropical clouds, the racing scud clouds, and the first rain. Finally, the rain band surrounded the eye of the storm which indicated the demise of the storm was imminent. "

"What I saw was sun and fair weather clouds the entire chase. I reached the beach at noon and so no damage. Although the storm eye was only 75 miles away, you wouldn't know it from walking on the Rehoboth Beach boardwalk. The walkway was packed with vacationers and all the shops were open. True enough, the beach was closed and stiff breezes whipped the waves into spilling white caps. Merchants had made little effort to tape and board up windows, and with the sun shining, the rain and wind of the morning was just so much small-talk.

"As has been happening in recent years with East Coast hurricanes (i. e. Gloria), most of the wind and rain remained to the east of the storm center. However, Charley perhaps was one of the most useful hurricanes in recent memory as the Mid-Atlantic region received much needed rain and had little storm damage. "

"Long time residents say that they've been lucky with the storms of recent years. They say one bad storm makes you a believer. However, vacationers on the boardwalk could be heard muttering something about the weatherman panicking as usual, overplaying the situation. "

Randy Zipser suddenly found himself amidst a squall while at work. "The heatwave in the southeast shattered with a vengeance on July 21st. I was at work on the fifth floor of a six story concrete building. The roof was covered with loose gravel and was elevated about 80 feet above the surrounding parking lot. About 4 pm, I glanced out of the window and noticed zero-visibility in driving rain and small hail. The precipitation appeared to be driven by straight winds estimated to be 70 to 80 knots from the southeast. I felt the building shake and then the power went off. A stand of tall pine trees snapped off about 15 to 20 feet above the ground and fell northwestward. Some trees had fallen on cars in the parking lot. "

"Nearly every car on the north side of the building had some glass breakage, with many having all four windows broken. About 160 cars were damaged. My car was on the outer fringe of the north parking lot and the windshield sustained two BB-like dings from flying gravel. Window glass was broken on the south and west sides of our building. "

Gary Livingston drove within two miles of an F-2 tornado without realizing it until a few minutes later. "I was living in Little Rock, AR, and was driving to work at 2:30 pm when I heard a severe thunderstorm warning on the radio. As I drove downtown, I watched leaves and street debris get picked up by the wind into a gigantic wall cloud about 4 to 5 miles wide with rapid rotation. Little did I know that about two miles to my southwest, obscured by a hill, a tornado touched down causing building damage and killing one person in A CAR! About six police cars with sirens on and four ambulances rushed by traveling westward. The tornado moved northward and passed right over my house. Although the house did not sustain damage, about a foot of leaves were cleaned from our yard. I figured the tornado saved me about ten hours of raking and burning leaves. I was thankful that our home was untouched and that our leaves were raked for us. "

Howie Bluestein and members of the Oklahoma University Intercept Team successfully launched a radiosonde into a wall cloud on May 7, 1986. Howie says: "We launched and optically tracked several radiosondes. One went up at Wheeler, Texas, about one hour prior to tornadogenesis; the other was launched from Canadian, Texas and ascended into a wall cloud after tornado #3, but before tornado #4. Its peak ascent rate was 53 m/s (119 mph) at 7 km (4.4 mi). The actual vertical velocity was therefore at least 48 m/s (107 mph), given the still air ascent rate of 5 m/s (11 mph). The balloon probably iced up above 7 km. Our measurement is probably a record for a radiosonde. The intercept crew consisted of Bill McCaul, Greg Byrd, and Gary Woodall (OU graduate students) and me. NSSL provided the financial support. "

IV. ROSTER

The ST Roster lists names, addresses, and brief bibliographies of those persons interested in or willing to correspond with others about storms. Normally, only recent entries since the last issue appear.

Name	Address	Chase country-range
Dan Chaffee	1510 Horland Ave. Norman, OK 73071	Oklahoma and West Texas

Bibliography: Age 31, single, moved to Norman to chase and attend O. U. as a painting graduate student. I'm a former pilot who has had dreams of tornadoes since childhood. My fascination seems to be growing exponentially.

Tommy Johnston	4313 Walnut Kansas City, MO 64111
----------------	--------------------------------------

Bibliography: Age 30, works as an RN in an intensive care unit at a local hospital. I am also a freelance photographer with a life long interest in tornadoes and other severe weather conditions. I am also a car mechanic with professional driving experience and looking to chase with someone. Equipment: 35 mm and 4 x 5 cameras.

Derek Dodson	Rt. 2 Metropolis, IL 62960
--------------	-------------------------------

(Bibliography: Age 16, raised in Metropolis, IL; am a student at Massac County High School. I am presently a junior and have never chased before but I do have a drivers license. I would like to exchange information with other kids my age. Would love to exchange weather data. I do not have very many pictures yet but would like some. I have written a booklet on severe weather in my local area & you can write me for more information. I would really like to hear from some of you since I'm a new member of STORM TRACK.)

Bob Slater	7419 Arlington Blvd. #304 Falls Church, VA 22042
------------	---

(Bibliography: Age 36, postal worker who has been interested in severe storms & all aspects of weather, ever since I was old enough to notice the difference. I have lived along the east coast most of my life, and have been lucky enough to have gone through most of the hurricanes along the mid-Atlantic coast from the 1950's on. But, tornadoes are my real fascination. I was fortunate to meet Dave Hoadley and he introduced me to STORM TRACK. Interested persons please write.)

Robert Welch III sent his designed bumper sticker:



V. FEATURE #1

MAY 14, 1986
SNYDER, OKLAHOMA TORNADO
By Jack "Thunderhead" Corso

On May 14th, my teammate Tim Dorr and myself caught several tornadoes in southwest Oklahoma. The morning dawned with a stiff south wind flooding northern Texas and Oklahoma with moist unstable air. Thunderstorms developed rapidly in clusters along a dryline from Childress, Texas through Clinton, Oklahoma.

Some storms became severe as early as 11 a.m. near Weatherford, Oklahoma. Upon hearing this, Tim and I turned to "code red", threw our camera gear in the car, and drove for Washita County. We turned north on Route 183 at Snyder, Oklahoma and caught up with a storm at Cordell -- watching it "wrap-up" about 2 p.m. Driving under the rain free base, it got as dark as dusk with heavy rain falling just to our west. Just when things began to look very good, with promising funnels, an anvil from a storm to the south streamed overhead. It was downhill from there as the storm we were watching began an early collapse and eventual outflow. While awaiting a possible second "wrap-up", the storm to the south looked better.

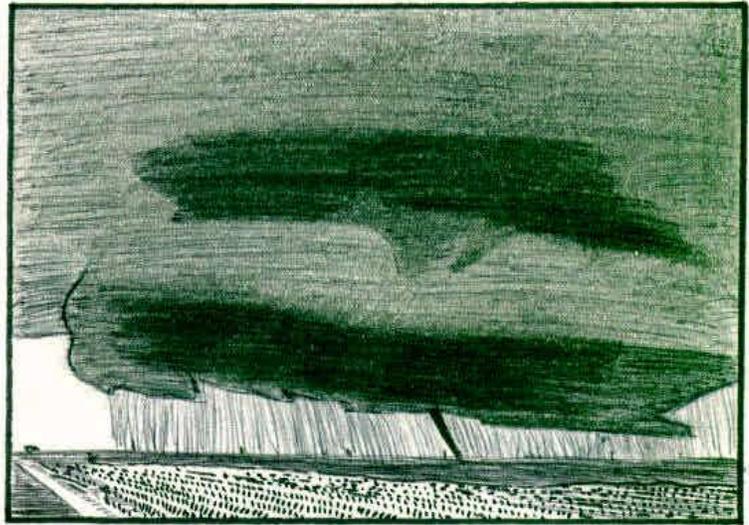
Leaving our position, Tim and I proceeded back southward on Rt. 183 toward Snyder. About this time, we heard over the radio the first report of good news: "Tornado sighted on the ground about 3 miles southwest of Altus". It was 3:30 p.m. We headed for the severe storm all the while pondering the possibility of everything being said and done by the time we arrived on the scene.

Despite being held up five minutes at Roosevelt, OK for a drivers license spot check (Murphy's Law), we resumed our advancement toward the storm, now heading on Route 62 toward Altus. Severe storm reports were now blaring over the radio. Softball-size hail was pummeling Altus. Numerous funnel clouds were being spotted south of town while torrential rains flooded streets and fields. Five miles past Headrick, OK we encountered rain and sporadic golfball-size hail. Most of the precipitation was still to our west and we proceeded down a narrow farm road about four miles east of Altus.

Coming out of the rain area, we could see a wrapping cloud base with a large, broad based wall cloud - gust front extended east over our location. Realizing we were on the inflow side of the storm, we parked and watched the storm. The terrain was flat and we had excellent visibility. Then we saw it! A narrow tornado stemmed from the wall cloud and traveled a few miles on the ground before dissipating.

Strong northeast winds started to blow as the storm appeared to move due east. We retreated back to Rt. 62 and

turned east to better our position. Constantly looking behind me, I saw another tornado imbedded in intense rain and hail - now about 1 to 2 miles south of Headrick. By the time we pulled off the road to film it, the funnel



was lifting back into the parent thunderstorm. With my quick action, I managed one photograph of it. (See Right)

We continued east moving ahead of the rain area leading the parade to Snyder. We parked on an overpass at Route 183 and awaited the oncoming storm. The storm approached quietly as if it were stalking us.

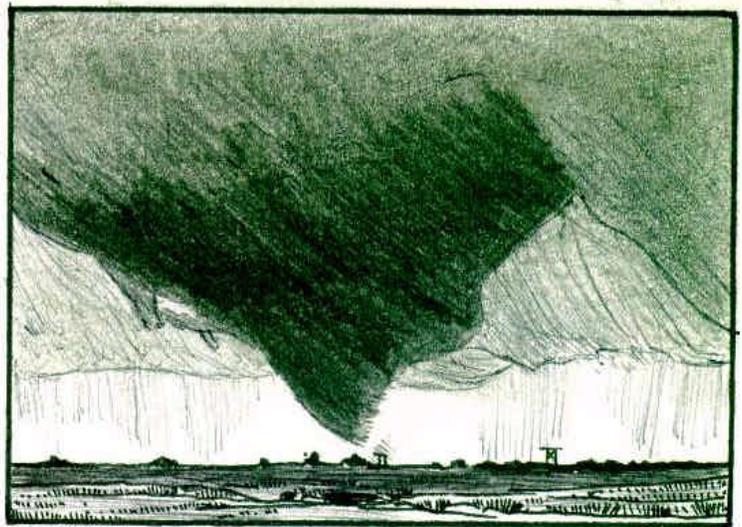
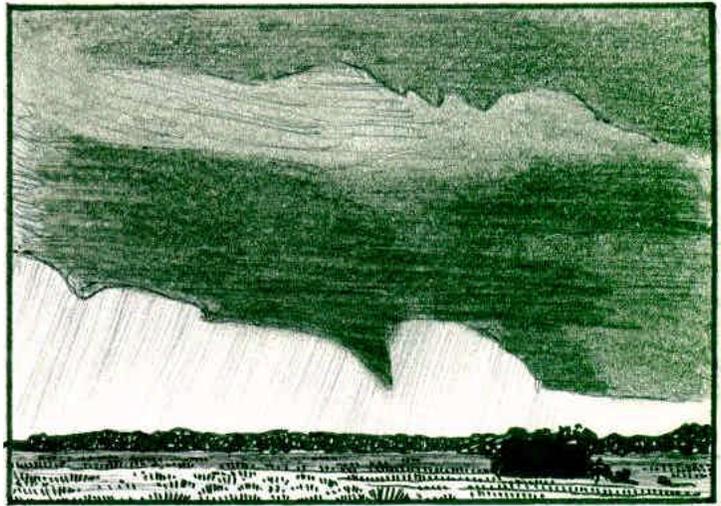
At 4:10 p.m., we saw a third tornado develop -- first as a dust tube just south of our position. The tornado grew fast and filled quickly with dirt and debris looking more like an inverted cone being widest at the top and pointed at the ground. The tornado was not on the ground long but appeared to have the second longest track of the day. (See Right)

We saw other storm chasers on the overpass with local news people on the scene as the funnel began its slow ascent back into the cloud base. Upon inspecting the damage path across Rt. 183, we found rocks and dirt over the roadway, a broken telephone pole, and a farmhouse minus some roofing. The distance between us and the damage path appeared to be 1 to 2 miles.

After the main show seemed over, we moved further eastward and met veteran storm chasers Dave Hoadley and Randy Zipser. While talking about who saw what, the radio blared out a tornado warning for the event we just saw.

We continued the chase and saw a fourth tornado (the fifth in a series) about five miles west of Cache, OK (not pictured). The tornado was cylindrical in shape and touched ground directly behind us. Tim could not maneuver the video camera to catch it in time. The funnel seemed to cross Rt. 62 and we watched it spin away to the northeast. The storm now was showing signs of becoming predominantly outflow and returned to its northeast track.

Chasers departed, each going their separate ways. We retreated to Altus to take lightning shots and photograph a shelf cloud filled with blowing dust dumping a barrage of hail. You always read the stories in *STORM TRACK* about chasers converging on the scene from different directions, but this was the first time in my 11 years of storm chasing where I truly witnessed the slogan: "meet you under the wall cloud".



By Alan Moller

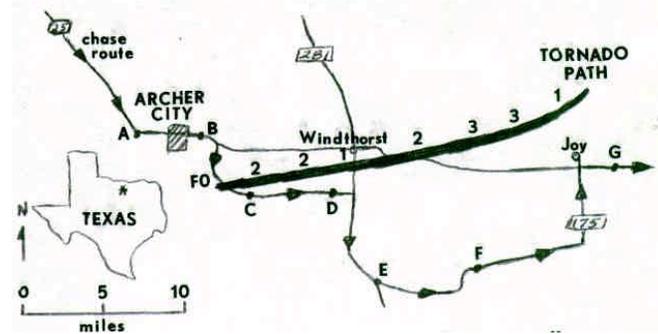
After having viewed two brief tornadoes which developed from a very "dirty" (precipitation obscured), modified (collapsed) supercell east of Altus, Oklahoma, Chuck Doswell and I drove south of the Red River, hoping to find a "cleaner" storm. A visually distinct and straight anvil edge at the south end of a thunderstorm cluster, southwest of Wichita Falls, lead us to believe that "tail-end Charlie" was a near steady-state supercell. We verified this when we reached Point "A" on the enclosed map.

We saw an intense, rotating chase updraft about ten miles west of "A", with a nearly transparent rain/hail curtain beneath the northeast-flank, and rotating rain curtains beneath the mesocyclonic updraft. As the storm approached "A", our east to west inflow increased from a sustained 25 knots to a steady 40 to 50 knots.

The inflow acceleration was probably due to inflow being "wedged" into a narrow channel ahead of the wrapping outflow associated with the rotating rain curtains. A constant, low-pitched roaring sound (hail?) was present, as was frequent in-cloud and occasional cloud-to-ground lightning. One inch diameter hail fell at "A" as the leading edge of the rotating updraft came overhead, and we fled eastward. (Reports of grapefruit size hail came from west of Archer City.) At "B", we observed a small but well developed funnel cloud near the north side of the updraft base where the inflow and rotation seemed to be concentrated. The precipitation core was gaining more of a solid appearance. Could this indicate a strengthening temperature gradient along the pseudo-warm front and a possible contribution from the solenoid term of the vorticity equation as tornadogenesis ensued?

Taking farm road 2581 south and east from Archer City (where tornado sirens were blaring at this time), we saw the tornado form very quickly from the wall cloud at point "C". Rotating rain curtains which previously hampered

our view parted almost as if we were privileged to see the tornado form! The funnel tapered sharply from cloud base and quickly grew into an impressive, large, cone shaped tornado about a mile from our position. After several minutes, the bottom of the cone dissipated, leaving a very blunt, truncated cone with a ground-based dust whirl. The tornado then became obscured by rain and we only had



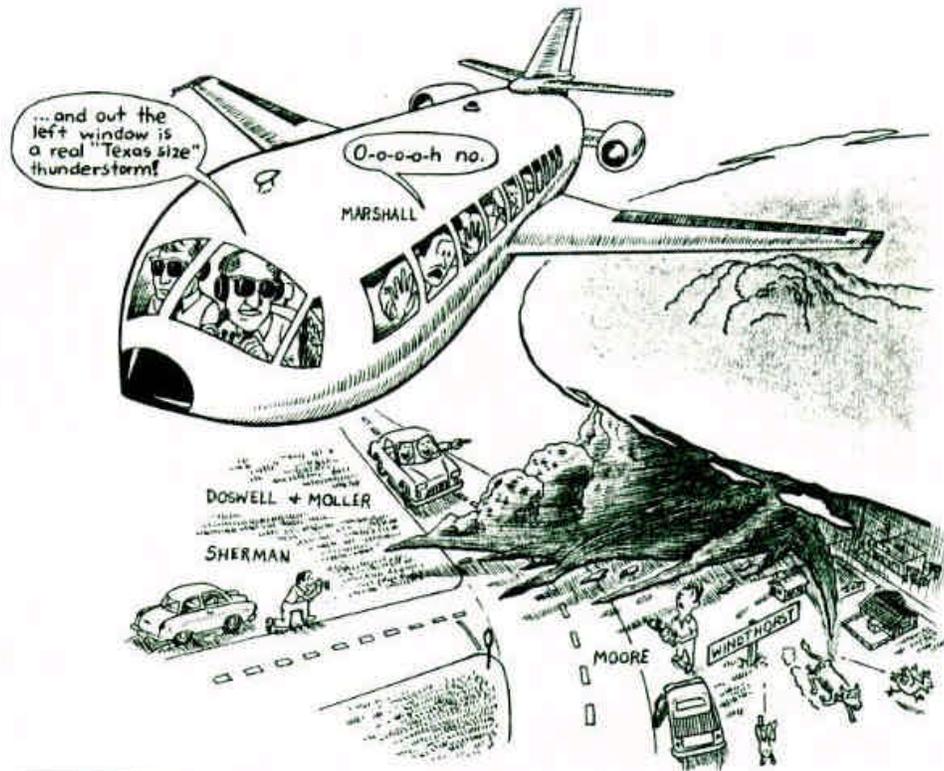
several brief glimpses as it continued on a path to within a mile south of Windthorst. We experienced estimated 50 to 60 knot rear flank downdraft winds from the southwest. We were lashed by brief periods of heavy rain from the rotating rain curtains. At the intersection of Rt. 2581 and Rt. 281, we talked to a motorist who had been battered by baseball-size hail in Windthorst. We never saw the tornado again, but did photograph the parent storm from "E" and "F". The structure was one of a huge corkscrew Cb with considerable overhang on the south flank. The cyclonically-wrapping flanking line had one or two vertical towers adjacent to the main storm tower, with a large laminar appearance (likely due to strong capping). East of location "G", we observed a severe downburst just north of farm road 174. The downburst leveled several trees, as we watched, and culminated in a fairly large dust whirl which rapidly broke up. This was the last severe weather we encountered.

F2 damage occurred to trees, mobile homes, and barns southwest of Windthorst. Several homes were unroofed and a car was lifted from the road and thrown against a barbed wire fence. Two occupants had sustained minor injuries. Several farms were destroyed north of Rt. 174. One farm house in particular had only one felled wall left on the foundation (F4). In talking to the farm owner, we found he narrowly escaped death. He saw the dark cloud approach, and although a tornado could not be seen, he grabbed his wife and kids and drove to a shelter at his brothers nearby farm. The farmer sensed that the storm was bad. (I promised to bring this farmer a print of the tornado so he can hang it on his fireplace when his home is rebuilt.)

Editors note: Talk about chase strategy. Sampling two tornadic thunderstorms at their peak on the same day in two different states is truly amazing.

VII. FUNNEL FUNNIES: Caught in Mid-Air (Fact)

The editor was literally caught up in the air watching a tornadic thunderstorm on May 14, 1986. His camera of course was in the luggage compartment. All he has to show for it is a large nose print on the aircraft window.



VII. FEATURE #3

WONDERFUL WEDNESDAY (not to be confused with Terrible Tuesday)

By Phil Sherman

On Wednesday, May 14th, while most of the other chasers on the plains were chasing a cluster of severe storms in southwest Oklahoma, I was stuck at a MANDATORY work meeting in Lewisville. With little time for rest breaks and late adjournment of the meeting, I couldn't perform a detailed analysis of the days meteorological conditions. The thought of knowing the day was ripe for severe weather (after watching A.M. Weather and talking to Bill Reed at the National Weather Service that morning) was frustrating. When I called Bill again at 4:15 pm, he asked "Where are you?". Unlike the situation on May 7th, where I was staring down the throat of the dryline, I replied, "I'm still in Lewisville", knowing full well that I was in the wrong location.

Bill answered, "Well, it might be too late for you. Oklahoma's been going up all day, and there's more storms about to go in Texas, but it's pretty far northwest of here". My adrenaline surged, albeit with slight disappointment at the lateness of the hour. Bill said that the dryline had passed Abilene by 4 pm. Abilene reported a 97 degree temperature and southwest winds. The arithmetic was easy. I had about 2-1/2 hours of driving and still over an hour of daylight left. Thus, reeling out of work like an emergency crew answering an alarm, I drove west on Rt. 380 out of Denton. My car was being buffeted by 25 to 30 knot winds from the southeast. I estimated that the stratocumulus overhead was streaming northward over 50 knots! I arrived in Jacksboro, Texas about 6:05 pm, and saw a wide-spreading anvil to my northwest with it clear to the south.

I proceeded on Rt 281 to confront the storm. Each mile drew me closer and closer, with each feature of the updraft becoming more defined through the haze. The anvil showed some remarkable protrusions, like "inverted TCU's", NOT the mammatus types! It was a quiet, eerie ride with almost no other cars on the road. Six miles south of the town of Windthorst, I stopped and observed the awesome storm to my northwest. This storm resembled the Borger Dryline storm that Alan Møller described (see ST Vol 6, No. 2). A solid, rotating updraft was strongly sheared and went all the way to the anvil level. The east side of the updraft was a dark, sharp edged vertical wall with cloud striations appearing like a barber shop pole. A smooth inflow band resembling a beavers tail extended from the rain area into the north side of the updraft. It was 6:40 pm. Strong rotation was visible in the cloud structure.

Meanwhile, at the same time Al Møller and Chuck Doswell were discovering a tornado under the "not at all" rain free base. I couldn't see it as it was hidden by a heavy shroud of precipitation. After a while, dust began blowing around the cloud base obscuring my view. I cautiously held my ground continuing to take some really nice slides of the updraft structure. I was in front of a picnic area at the intersection of Rt 26 and 281. A nearby road sign cautioned "Fasten Seat Belts".

Not wishing to confront gargantuan-size hail, or be caught on a DEAD end road with an obscured rain free base on top of me, I retreated south of Windthorst at 7:25 pm. I checked but declined a couple of small farm roads going east which would have put me in ideal position. Continuing back to Jacksboro, I discovered that a car had collided with some downed power lines. I stopped to help and was requested to photograph the damaged car for insurance purposes. I earned enough gas money that day to pay for my chase.

Tornado watches covered most of Oklahoma, the Texas Panhandle, North-Central Texas, and West Texas on May 14, 1986. That evening, watches were extended into Louisiana and Arkansas. A total of 42 severe thunderstorm warnings and 17 tornado warnings were issued for Texas and Oklahoma from 9 a.m. through midnight. Twenty-four counties in EACH state were affected. This was one of the few spring days where most chasers were on the road, including Dave Hoadley, Al Moller, Chuck Doswell, Marty Feely, Bruce Pettus, Randy Zipser, Howie Bluestein, Chuck Robertson, Jack Corso, Tim Dorr, Gene Moore, and Keith Brewster just to name a few.



Storm approaching Windthorst