STORMTRACK

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TIM MARSHALL, EDITOR

RICH HERZOG, ASST. EDITOR

EXPANDED ISSUE ON THE JUNE 8, 1995 TORNADO OUTBREAK IN THE TEXAS PANHANDLE
Storm Track is a non-profit publication intended for the scientist and amateur alike who share an avid interest in the acquisition and advancement of knowledge concerning severe or unusual weather phenomena. It is published bi-monthly in Lewisville, Texas. David Hoadley founded the publication in 1977 and STORMTRACK has continued to grow and improve ever since. Gene Rhoden designed the current cover. David Hoadley still contributes drawings and sketches. Current, we have about 650 subscribers!

Anyone can submit an article or letter to STORMTRACK. Articles should be single-spaced and contain proper English. Right justified margins are preferred or the editor can retype the text. High contrast photographs reproduce best. Diagrams should be clear and legible, subject to photo-reduction. All articles will be edited.

Subscription rates are: U.S. First Class mail $14/year, Canada $14/year, and England/Japan $20/year. Each November issue will have a color cover and one issue will contain additional pages of text. Individual issues are $2.35/copy. Back issues are available by year, or the complete 18 year set (1978-1995) can be purchased for $125. To subscribe or renew, send a check or money order PAYABLE ONLY to Tim Marshall, 1336 Brazos Blvd, Lewisville, Texas 75067.

STORM TRACK CLASSIFIEDS

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I. COMMENTARY

Hooray, the Federal Goverment speed limits have been repealed! Now each state can set their own speed limits. In Texas, several non-interstate roads will have speed limits increased from 55 to 70 mph. Some highways in rural Kansas and Colorado may go as high as 75 mph. The increase in the speed limits will have obvious benefits to storm chasers. But what will be the cost? It stands to reason that more accidents will occur especially those that involve fatalities. Fortunately, I have not been involved in a vehicular accident in over 100,000 miles of storm chasing, but I have had several close calls. One such close call occurred on a moonless night in rural Wheeler County, Texas when Gene Rhoden and I suddenly and unexpectedly did a pilon test around two black angus bulls that were on the highway. I can only imagine what that would have been like if we had been going 15 mph faster. I only know of one incident where a storm chaser lost his life while driving during a chase. The odds have now increased that another chaser will be in a serious accident.

This change will effect Highways 287 from Fort Worth to Dumas, Texas, highway 60 from Amarillo to Pampa, Highway 84 from Lubbock to Farwell and Rt. 277 from Seymour to Abilene to name a few.

II. CHASER NEWS

The 18th Conference on Severe Local Storms will be held on February 19-23, 1996 at the Cathedral Hills Hotel in San Francisco, California. The registration fee for AMS members is $225.00 before January 8th, and $240.00 after January 8th. To register, send your remittance together with your name, affiliation, and complete mailing address to the American Meteorological Society, 45 Beacon Street, Boston, MA 02108, Attn: SLS Meeting. Registration includes a conference luncheon, admission to the conference, and one preprint volume.

Storm chaser Don Burgess will start off the conference with the Keynote address at 9:15 am on February 19th entitled: Doppler Radar: Then and Now. Three of the four sessions that day will be on VORTEX results; the remaining session will he on the Palm Sunday Outbreak in 1994. On Tuesday February 20th, there will be two sessions on forecasting, one on modeling and one on storm dynamics. On Wednesday February 21st, three sessions are on tornadoes and one on straight-line winds. On Thursday February 22nd there will be one session on radar algorithms, one on tornado climatology, one on forecasting and one on supercell dynamics. On Friday, February 23rd, there will be one session on squall lines and one on satellite observations. The conference ends at noon on that day. The severe storm photography and video shows will be Tuesday and Wednesday evening beginning at 8 pm each night. Prof. Roscoe Braham will be the luncheon speaker on Wednesday. There will be a limited number of rooms at the hotel so book early. See you there -the editor.
III. LETTERS TO THE EDITOR

There have been numerous responses to the last commentary in STORMTRACK, second only to the chaser responsibility commentary. Some say ST should evolve, others say no.

Greg Stumpf writes: "My suggestion to you is to make STORMTRACK electronic! You can put it on the Web, but only subscribers can see the whole thing. Other magazines do this, and they put free "teasers" on the Web that everyone can link to, but the meat of the magazine would cost (you would have to enter a personal username and password). Consider it! It would make life easier for you, and might even drive the cost of the newsletter down. You should also be prepared to be "flamed" if your opinions don't jive with others who read them, and be prepared to defend yourself! But, all in all, I think you will find the Internet a new, challenging, and rewarding venture."

Arjen and Jerrine Verkaik respond: "The Internet has certainly become a technological obsession of late. People who barely know what a computer does are flocking to "surf the net" in hopes that they won't be left behind in the blinding pace of "progress". Of course, the Internet has tremendous potential as a diverse means of communications and as a limitless source of information. But the more information we all have access to, the more we need to ask the critical questions: Is it helping me? Am I using my time effectively? Can I trust what I read and discover? Although I've been a long-time PC user and I'm also on the net, I still insist that these new technologies serve my needs. They must advance the quality of my life, provide stimuli and entertainment, but also wisdom and satisfaction. I get those things each time a copy of ST arrives in the mail. A printed copy has a sense of permanence and that personal touch that you can't get from a bunch of bit 'n bytes. This makes for an item of value, that you can hold, look at again and again. There's something too temporary about electronic communications and they can harbour inherent weaknesses and errors caused by a lack of preparation time or reflective thought due to the competitive rush to post information immediately. ST presents us with a potpourri of thoughts, feelings, and ideas from a large family of chasers brought together in a pleasing and organized manner by the editors. Also, the Internet is like the cafeteria approach to dining. You have to pick out all the stuff you want. Give me a cozy family restaurant anytime, where the meal is presented to look and taste like someone cares."

Tim Vasquez says: "Taking Storm Track online is a great idea. I wouldn't want to have to deal with the extras, such as maintaining a subscriber list, addressing all the copies, postage, printing, etc. One option is to offer a zipped file that can be downloaded; the file can be unlocked with a password and viewed off line with a browser. With an operational Storm Track homepage, paper subscribers should dwindle."

Greg Gember writes: "An online service will be necessary in the future. However, you can count me as one of the subscribers that likes the real, physical magazine that I can hold, glance at, and keep on my bookshelf."

Paul Swearingen says: "I have learned to live with instant communication and to tame it to be just another tool. The hard-copy publication is not going to go away in the face of increasing easy information via electronic means. Although I spend a lot of time in an easy chair working on my Powerbook, I much prefer the information retrieval system based on cellulose. I don't think you have to worry about a mass exodus from ST as published in its present form. However, you may be forced to spiff it up a little (replace the Courier type with Times Roman or Palatino, add more graphics and photographs of tornadoes, cartoons, etc.)."

Cliff Nelson (cliff@vortex.pdial.interpath.net(hm.)) responds: "The Internet is populated by a lot of young, self-important little turkeys. They snipe, flame, and debate over who should be allowed to chase storms. Although, I wrote to you a few months ago asking whether you'd be showing up on the Net, I almost hate to see you weigh in now. You have nothing to prove to these people and only garner more respect for your aloofness."
June 8th, 1995 will be remembered as one of the most incredible tornado days of this chasers life. I was having a terrible chase year with several missed forecasts and bouts of bad luck. I missed the storms on April 17th at Corum, OK, May 12th at Colby, KS, and May 22nd at Woods, KS each by a few hours. In addition, the forecast model outputs kept shifting from run to run as if they incorporated some sort of earthquake algorithm. Mother nature and I were simply out-of-phase. June 8th was no exception.

A. THE CHASE BEGINS

The 48 hour forecast on the evening of June 6th (valid 00Z June 8th) placed a surface low near Goodland, Kansas along a stationary front; the front extended east-west across northern Colorado and northern Kansas. A dryline was to extend south from the surface low into west Texas. The large scale trough in the west was slow moving but short wave was progged to break away from the main trough helping ignite western Kansas on the evening of the 8th. This set up looked similar to that on May 12, 1995 when a lone supercell developed in northwest Kansas and tracked eastward to just north of Salina; the dryline never fired.

I talked to several chasers and we all agreed that northwest Kansas was the place to be on June 8th. Gene Rhoden and I decided to make the 13 hour drive to Goodland on June 7th so that we would be in position and ready to chase on the 8th. Upon our arrival at the Goodland Weather Service on the evening of the 7th, we were greeted warmly by the forecaster in charge. He kindly informed us that we were in the wrong place. He said the progs were too slow and that there was too much cold air across western Nebraska. He expected the cold air to sink southward during the night and be out of the western part of the state by morning. "Wonderful", I said grudgingly.

Gene and I were too tired to drive south all night, so we decided to get an early start the morning of 8th. I told Gene that if the cold air roared south, I'd wake him up promptly at 7 am, and we'd drive south until we encountered the front. As expected, I awoke to cold air and low overcast with a howling northeast wind. I quickly plotted a 7 am surface map (the only one I plotted that day) and we drove five hours to the south encountering the front north of Perryton, Texas at noon. The front was stationary so we stopped for lunch and waited for the show. It appeared we'd overcome the first obstacle that mother nature gave us on this day.

Around 3 pm, thunderstorms began firing along the front northeast of town. I didn't like the linear cloud bases nor the fact that cold air seem to undercut the storms. So, we explored the possibility of heading south looking for a storm later in the day along the dryline. Gene parked the car at the side of the road and set up the RCA mini-dish so we could watch The Weather Channel. The radar and satellite loops showed no other storm activity except for the storm we were on. Around 3:30pm, we heard the VORTEX armada was in the area and they began talking about a mesocyclone on the storm to the northeast. We forgot about a south storm option and decided to pursue the storm to our northeast which was now entering the Oklahoma panhandle. The storm wrapped a few times and produced large hail but could not produce any tornadoes. Although strong mesocyclones were reported, the storm continued to be undercut by cold air and cloud bases remained linear. We came to our second chase decision of the day. Do we stick with a known storm with a mesocyclone, or go to clear skies to our south and hope another storm would form later?

Shortly after 4 pm, we decided to head south into clear skies. About ten miles out, one of the VORTEX vehicles reported a funnel cloud and passible tornado on the storm we just left. So, we turned around and headed back north. When we arrived back at the storm, we heard of a tornadic storm about 80 miles to our southwest near Pampa. We immediately turned around again and headed south. This south-north-south maneuver is what I called a "Texas three-step" and it cost us about a half hour. While driving south, we kept hearing of tornadoes near Pampa and a knifing anvil came into view.
Just south of the town of Canadian, Tx, we turned southwest on Highway 60 and caught up with the rain free base near Miami around 6pm. The storm had already produced several tornadoes and had the potential of producing more. However, the storm was moving northeast into an area with no roads and it was so hazy out that we could barely make out the wall cloud. Looking south, we could see another knifing anvil from a tornadic storm near Clarendon. So, we made our third chase decision of the day to forget the Pampa storm and head south for a better vector on tail-end charlie. We soon found ourselves pursued by the VORTEX armada; they decided to head south also.

B. THE MCLEAN/KELLERVILLE TORNADO

We passed through the forward flank downdraft rain and emerged at the town of Wheeler at 6:45 pm. Two long beaver tails were oriented east-west over the town which told me to head west on FM 2473. We stopped about seven miles west of town at a bend in the road, now FM 3104. At 7:00 pm, a large wall cloud was visible to our southwest occasionally wrapped in rain. Cloud fragments along the tail cloud moved rapidly to the south. At 7:04 pm, a tornado emerged from the rain and headed right for us. We monitored the transmissions of the VORTEX field commander, our tape narrative follows:

TIM: Stovepipe tornado southwest.
FC: All teams, FC. The tornado is about 1 to 1.5 miles southeast of Kellerville.
TIM: We are ok. We have an escape route (tornado is 7 miles away and closing).

At 7:08 pm, the tornado widened to wedge status and appeared to stall briefly. Being northeast of the tornado, we had good contrast for photography and less haze. Our surface winds were northeasterly feeding right into the circulation.

TIM: Big tornado.
FC: All teams, the tornado now is approximately 3 miles northeast of Kellerville or 3.5 miles southeast of where 3104 bends north.
TIM: Oh, that's good. Big, wedge tornado.
NOAA: FC, NOAA 43, Doughnut with asp on hook precisely at your tornado location.
GENE: I think it's coming right at us!

At 7:10 pm, the tornado continued northeastward. The perimeter of the wedge lifted and took on more of a cone-shaped appearance. A thin veil of rain curtains wrapped around the tornado. We remained right in the path of the tornado.

FC: The tornado is 2.5 miles southwest of where 3104 turns east-west to north-south.
TIM: Oh, look at this. RFD has wrapped around it. Gene take some stills.

Our winds shifted from northeast to southeast. Gene stepped out of the car and took a photograph (see cover). The motion of the tornado becomes 3-D. Rapid movement of the cloud tags raced overhead and we became disoriented. At 7:12pm, we decided to drive east a half mile to flee the approaching tornado. However, the tornado must have seen us and turned east to follow us down the road.

FC: All teams, FC. The tornado is now about 1.5 miles southwest of the 3104 bend.
GENE: Wow. This is incredible.

We let the tornado close in to within a mile. The pulsing rush of inflow wind increased and we began to hear the roar of the tornado. A white frothing inflow jet headed southwest into the tornado. The fear of power poles falling on us, plus the apparent eastward turn of the tornado eventually forced us to retreat eastward. The tornado eventually crossed the road behind us and continued north. We headed east to Wheeler then turned north hoping to catch the tornado again as it crossed Highway 83. However, the tornado roped out before the highway and the mesocyclone disappeared in rain over the tiny town of Briscoe.
C. THE ALLISON TEXAS TORNADO

Knowing that there was a good chance for another tornado to form to our east, we turned east on FM 1046 towards Allison at 7:37 pm. Some of the VORTEX crew passed us as the rain and winds increased out of the northwest. The low visibility slowed our advance eastward. We were blind and the information provided by VORTEX was most crucial. Between 7:45 and 7:50 pm, the VORTEX transmissions changed dramatically.

FC: All teams, FC. There's a very large lowered base forming six miles southeast of Briscoe without a tornado at this time.
FC: All teams, FC. A rear flank downdraft is coming around the southeast of the circulation which is southwest of Allison.
FC: All teams, FC. There's a very low hanging wall cloud southwest of Allison about five miles.
FC: All teams, FC. There's a large tornado on the ground four miles southwest of Allison moving northeast.

Gene and I pressed eastward through the heavy rain (no hail) and emerged from the west side of the hook echo at 7:53 pm. We were in the bear’s cage with a VERY BIG BEAR!

GENE: There's motion.
TIM: Good. Continue. The tornado will pass north of us.
FC: All teams, FC. The tornado is going to cross about one mile west of Allison.
GENE: There it is.
TIM: Very large. A mile wide tornado!

The giant tornado lumbered across the road in front of us and headed north into an field churning up a tremendous amount of dirt. Around 7:58 pm, smaller funnels whirled around the perimeter of the wedge. One such satellite vortex landed on the road right in front of us. The bottom of the vortex broke off and was sucked horizontally into the southeast side of the wedge tornado. What a sight!

FC: All teams, FC. It looks like the tornado is a mile across.
TIM: It's a mile wide -a mile wide tornado!
TIM: Funnel across the road. Tornado coming down! Tornado right in front of us!
GENE: Oh. Look at that!
TIM: There we go. Horizontal tube right in front of us.
PROBE3: We have other tornadoes revolving around it now!

As daylight faded, the dusty wedge wrapped in rain northwest of Allison. We headed east again to catch perhaps another tornado. We stopped briefly in Reydon, Oklahoma to fill up the vehicle with gasoline. All the electric power in the eastern panhandle of Texas was out which left many chasers stranded. Just as Gene finished topping off the tank, the power went out. Another tornado was reported just up the road from us. We bolted north on Highway 30 and encountered tornado damage about nine miles north of town. The chase ended with power lines arcing to our northeast. What a day!

D. POST MORTEM STUDY

The June 8th event will go down in record as a classic Texas panhandle tornado outbreak day that will be studied by scientists for years. As typical with many severe weather situations, the models did not do well, especially those valid 48 hours or longer in advance. Unfortunately, when planning a chase two days in advance, one does have to rely somewhat on the models. The forecaster in Goodland taught me once again to rely on my instincts and experience rather than the models.

The surface synoptic situation was a textbook case for a June tornado outbreak. The surface features (ie, low, front, dryline) all remained fairly stationary throughout the afternoon.
Winds behind the dryline were south-southwest (not west) and were only moderate in velocities. The dryline retreated west during the late afternoon as storms began to fire. The air east of the dryline was quite warm and unstable with a temperature reaching 90 F and dewpoint of 75 F at Childress. Eventually, the winds increased in the inflow sector; we encountered over 40 knot winds in Reydon, Ok.

It was interesting to see the cap break first along the stationary front, then break further south along the dryline down to the tail-end charlie storm near Silverton. The cap apparently was too strong south of there, although there was a storm near San Angelo for some reason. Initially, the surface moisture convergence was greatest along the front, then shifted southward as each storm developed further south.

As typical with late season situations, the upper air was slow to evolve. The morning 12Z (7am) sounding at Amarillo showed a stout temperature inversion (22 C at 850mb) and shallow moisture. A steep lapse rate resulted in an lifted index of -8 C, an unstable air mass. The hodograph looked like a jumble of spaghetti with little directional shear. There was no significant storm relative inflow with a forecasted storm movement of 217 degrees at 20 knots.

By 20Z (3pm), only eight hours later, there was a dramatic change in the upper air parameters. Directional and speed shears increased. The storm relative features had significant low level turning and inflow. The depth of the low-level moist layer increased. Cap strength was about one degree (C) from breaking.

The 00Z (7pm) sounding was awesome. Low level turning of the winds increased even further. Storm relative winds were quite sufficient for supercell storms. The positive buoyant energy exceeded 2600 joules/kg, fuel for explosive development. However, the instability didn't change much all day, due to warming aloft (a 3 degree C rise at 500mb); the lifted index remained at -9 C.

Analysis of the WSR-88D Amarillo radar data revealed there was a second supercell just west of the Clarendon- McLean-Kellerville- Allison storm. The configuration of the radar echoes of both storms was "horseshoe shaped", although the western storm was slightly smaller in size. I have not heard of any tornado reports from the western storm, which is another mystery.

You can see this chase along with others this year on the 1995 WEDGEFEST video. To order, send a $30 check or money order payable to Tim Marshall 1336 Brazos Blvd. Lewisville, TX 75067. Order now and get the 11 page transcript of this chase free by request.
12Z Sounding and Hodograph

20Z Sounding and Hodograph
June 9, 1995

500 mb and 850 mb isotachs valid 00Z

00Z sounding and hodograph modified to McLean, TX position

Forecasted CAPE valid 00Z
Visible satellite imagery at 4 pm on June 8, 1995

Doppler reflectivity of Alanreed and McLean, TX supercells at 7:12 pm on June 8, 1995
I was stuck at work until 3:40pm due to meetings, and was not able to go out on VORTEX's last field mission.

However, storms were already firing as I left work. One tornadic storm was up in Beaver County, and VORTEX was with that one at that time. Other new storms were developing in Gray and Roberts County, so I opted for the quickest way west...on I-40. I figured I'd get on different storms than VORTEX, but Erik R, proved me wrong. These storms were all firing on the dryline, and the surface winds were nicely backed (as evidenced by the OK Mesonet plot). Dewpoints feeding into the storms were in the upper 70s, almost unheard of, and a contributor to the very hazy conditions.

Anyway, as I was heading out west, I was hearing the reports of the tornadoes doing damage in Pampa. I decided to take Route 6 west out of Elk City to intercept that storm. In Sweetwater, OK, I topped off my gas tank, even though I was only 4 gallons down. I learned a lesson 5 years ago in the Eastern Panhandle that gas stations close early and power can be knocked out for many miles by one storm. At that time, I now had two options, the Roberts County storm (previously in Pampa, now a F2 mile wide tornado reported), and a new tornadic storm near McLean. I chose the southern storm, for obvious "southern storm" reasons (easier to move in that direction, edge of cap/lid so no seeding by other storms, etc.), and because the Roberts county storm was moving over open country with little roads.

I got to a county road 3 miles east of McClain, and saw through the haze (thick haze too, visibility of lower cloud features was about 4 miles), a nicely rotating wall cloud. A small funnel appeared on the right side of the wall cloud, which made a debris cloud up to it. That lasted about one minute and was my first hose of the day, and this was about 3 NE McClain. Next, I went east 2 miles to the F.M. road to Kellerville and drove up 5 miles to about 1 mile south of the edge of the circulation. A stovepipe tornado developed to my NNE and I watched it for about 3-4 minutes as it moved away from me into bad contrast as the hook of precip began to wrap around the SW side. Therefore, I had two options. Go north then east through the core and possibly drive out into the tornado, or head back south to I-40, east to Shamrock, and north to Wheeler on U.S. 83 to get ahead of it again. I chose f2, and during that 20 minutes, I missed the rest of the tornado (but some VORTEX teams got it great).

So I drove to Wheeler, headed east on TX152, and then took the F.M. road up to Allison. I could start seeing through the haze, the circulation of interest. I heard VORTEX saying they had a huge wall cloud SW of Allison. As I approached the wall cloud, I happened to notice that this wasn't a large wall cloud, but a large wedge on the ground! 10 seconds later, I heard a VORTEX transmission of the same thing. It must have just condensed at that time. I ended up getting about 1 mile SSE of this behemoth, and watched as the edge of the condensation was scraping through trees about 1 mile away. The tornado was about 3 times wide as it was high (a "triple-wide wedge") and was moving very slowly (about 5 mph). It lasted about 15-20 minutes until becoming invisible due to rain wrapping around the south side. While watching this, I was in gusty (55-60 knots? must check the VORTEX mesonets near me for confirmation) S-SW winds with the classic atomized rain I've witnessed before within the Bear's Cage. The contrast was pretty poor, and the light low, so I only shot a few photographs with my fast film camera (Fuji Provia 400).

I tried to survey the area, but power lines over the road were too low and dangerous for my little CRX. What I did find was 0.4 -- 0.5 miles of FO-F2 damage, but I never found the confluence line of the tornado path. It was estimated by others as 1 1/4 miles wide and an F4 or F5. More on this later.

Also, the Kellerville tornado was at least F4, and another "pavement peeler" as was Pampa, and Dimmitt from 6/2/94.

That made 8 tubes for me this year, and it's now time to hang up my chase gear, as the summer ridge has arrived. Oh, but I am heading to Colorado for a few days in a few weeks. Maybe a spout or two to top 1995!
All one needed to do was look at the morning sounding in Amarillo. Modifying it, I got a forecast CAPE (convective available potential energy) of greater than 7000 j/kg and an LI (lifted index) of around -15°C. That was all I needed to see. With the dryline/boundary intersection to the north, my target area was anywhere in the eastern Texas panhandle. I left Lubbock around 2 pm, and proceeded northeast toward Turkey. Nearing Floydada, I began to see tops of a developing storm northeast of my position. Jogging east then north toward Clarendon, I finally got to a point where I could see the rain free base. I was located south of Clarendon, about ten miles, and the action area was located about ten miles further to my west. I watched this storm for several minutes while listening to radio reports of tornadoes near Pampa. I was tempted many times to head north towards that storm. Thankfully, sound reasoning prevailed and I stayed with my storm.

About 5 pm, things started to happen. A small lowering developed in the rain free base and was rotating from the get-go. The wall cloud got better developed during the next 15 minutes with numerous funnels spinning up and dissipating all most as fast. As the storm moved northeast, I continued to go north to Clarendon and then southeast to Hedley. Hail the size of baseballs had fallen in Clarendon before my arrival. The storm continued its trek into the canyons and valleys of the Salt Fork of the Red River. North of Hedley on Highway 273, I crested a hill top and a large tornado emerged out of the haze to my northwest, approximately ten miles away. The tornado was a fat cone with a horizontal tube extending to the northeast. I stopped and shot some video of what was to become the first of four tornadoes for me. Tornado #1 moved northeast and rain began to wrap around it -it also became cloaked in dirt. At the same time, a new wall cloud developed to the northeast. Tornado #1 lasted about 10-15 minutes before I headed north towards McLean.

At 6:10 pm, Tornado #2 developers. At first it was a condensed cone to the ground, then the funnel lifted to about half-way off the ground with multiple vortices writhing on the ground beneath it. A minute or so later, the condensation returned to the ground having an elephant's trunk appearance which evolved into a stovepipe shape and then into a wedge. A power line flashed well to the northeast of the tornado in the inflow region which was followed by another power flash about one minute later very near the tornado. I watched the tornado for 15-20 minutes as it remained nearly stationary. Once again, rain and dirt degraded contrast and I continued north to just south of McLean where a ropy Tornado #3 developed about two miles west of my position. I stopped to take more video. Tornado #3 was short lived -less than two minutes. However, the funnel remained visible for several more minutes as it was drawn into a much larger circulation to its immediate northeast. The funnel finally dissipated into a rapidly rotating wall cloud. It was only a matter of time before the next tornado developed.

Tornado #4 developed at 6:28 pm, less than one mile northwest of McLean. I headed north to capture the tornado crossing Highway 273. I passed through the wrapping rain curtains and knocked on the doorstep of the tornado. "Wow, look at that motion", I proclaimed as the large multiple vortex tornado crossed the road in front of me. Power poles snapped like match sticks. I moved east on I-40 as the tornado moved northeast toward Kellerville. I turned north again on FM 1443 to make my second intercept of Tornado 04 before it reached Kellerville. About four miles north of I- 40, I stopped to take video and stills of the second wedge about 1-2 miles northwest of my location. Tornado 04 moved northeast passing Fm 1443 ripping down power lines and peeling up about 25 yards of the asphalt road. After this tornado passed the highway, I continued north to see if my route was blocked with debris. The tornado evolved into a cylinder/cone and moved out into a field of red dirt as it continued northeast. Unfortunately, my east route was blocked by power poles. So, I back- tracked to I-40 and tried to make the Allison event -but I was too far behind at that point. I decided not to press my luck any further. I returned home with a smile on my face. If only it was this easy every time.
Tornado #2 SW of McLean around 6:20 pm (Bruce Haynie)

Tornado #4 -- wedge northeast of McLean, TX (Bruce Haynie)

Multivortex tornado, 3 S of Pampa, TX at 4:38 pm (Todd Lindley)
Thursday, June 8th, Rich Thompson, Jim Leonard, and I slept in. At noon, we found ourselves at the Goodland, KS NWS shivering behind the cold front. We realized we were way out of position - the eastern Texas panhandle was screaming at me! We busted south and arrived at the storm in the eastern Oklahoma panhandle that VORTEX was chasing. At the Slapout, OK gas station, a local pulled four inch diameter hailstones out of freezer. However, the storm was gusting out on the wrong side of the cold front so we headed south into the eastern Texas panhandle. We heard of a report of a half-mile wide tornado approaching Canadian. The supercell approaching from the southwest had poor contrast and was moving into a bad road network. So we decided to head further south to "tail-end charlie" upon hearing a report of a half-mile wide tornado near Clarendon and McLean.

We finally caught up with the storm and saw a large truncated cone getting wrapped in rain south and east of Kellerville. We stopped for pictures. I took stills while Jim and Rich shot video. We were close enough to hear the roar. After five minutes or so, the tornado was getting away from us. So we went east through sheller and north towards Allison. We had intermittent views of the Kellerville tornado through the rain curtains.

South of Allison we saw the biggest wall cloud ever. The inflow was strong and due easterly. A wedge was inevitable. We parked on the only west facing gravel road south of Allison and took pictures through the rainy inflow. As the wedge formed, we could see it through tough contrast to our west-northwest. We headed north and took video of the "rotating fog hank". The video we took was full of unforgettable comments mainly about taking good contrast video and observing the tornado without unduly risking our lives. We can even hear the roar over all of our stupid comments even with the windows periodically rolled up. I was concerned about getting too close so I only drove up to the southern lip of the condensation. Jim expressed concern of satellite vortices and Rich commented the car could get rolled by rear flank downdraft winds. We were all correct. Other chasers observed satellite vortices to the west and south of the tornado while a VORTEX vehicle recorded 84 mph winds to hills to our SOUTH! A home just west of us had F-0 shingle damage to the roof. The wedge almost went stationary just southwest of Allison and the town was just missed. The tornado eventually wrapped in rain and we never saw it again. As we drove through Allison, it was black as night and very windy.

We crossed the border into Oklahoma and I quickly filled up the car with gas at Reydon. As I paid the attendant, the power flickered. I thought, "Oh no, no gas for VORTEX" (they were right behind us). We drove north on Highway 30 about nine miles and encountered the damage path. We observed three to four power flashes to the north-northeast. That is the best way to end a great chase day - stopped by damage at sunset. Later that evening, we met Erik Rasmussen and Lou Wicker and crew at the Elk City, OK Pizza Hut and swapped stories.

Jim Leonard, Bobby Prentice, and I began the day in Goodland after following LP storms last evening. We suspected the dense, cold surface air would surge somewhere to our south, but figured we'd be able to get there in time. We drove south that morning with temperatures in the 50's and lots of stratus clouds, with our first breaks occurring as we entered the Oklahoma panhandle. We followed a storm in Beaver County, OK for about an hour until it gusted out. A guy showed us four inch hailstones with the storm, but low level inflow was fairly weak. We then dropped south into the Texas panhandle to Canadian, but bad roads/visibility precluded us from intercepting the Pampa supercell. Therefore, we went for the southern "anchor" storm near I-40, playing tag with much of the VORTEX armada. We eventually got a view of the updraft from the east and south, then turned toward it to get a better view of the base.
Driving north from I-40, a large cone tornado (near Kellerville) emerged from the "muck" to our north-northwest. It was probably 1/4 to 1/2 mile wide with a big debris fan. We got to about one mile south of it and could hear the roar. The tornado moved off to the northeast into poor visibility, so we busted east and north to get the next cyclic meso/tornado. This took us to south of Allison where a very large menacing wall cloud developed 2-3 miles to our west. A large tornado quickly developed with this meso, and we dinked north towards Allison to stay with it. The tornado widened to somewhere in the 3/4 to one mile wide range, and strong winds of 70-90 mph extended east and southeast of the tornado. We moved to within 1/2 to 1/3 mile of the "wedge" and decided that was close enough. We again heard the roar of the tornado for about a 15-20 minute period before wrapping rain obscured the tornado. We played cat and mouse with the rain wrapped tornado near Allison, then went east into Oklahoma. Our chase ended with a probable rain wrapped tornado 10-11 miles north-northeast of Reydon, OK. All told, a very exciting chase.

VORTEX OPERATIONS: JUNE 8, 1995 by Erik Rasmussen and Jerry Straka

The first storm targeted by VORTEX occurred in the Oklahoma Panhandle in the middle of the afternoon. The storm was located on a surface front and an elongated mesocyclone formed near Elmwood in Beaver County, and moved toward Laverne and Rosston. This storm produced softball-size hail, severe surface winds, and a brief funnel cloud, but no tornadoes. After the Elmwood storm transitioned into a weaker HP supercell, the VORTEX armada moved south toward the eastern Texas Panhandle. We bypassed a storm near Spearman because we felt it would also be an HP storm. Another tornadic storm had developed to near Pampa and was moving north-northeast, but we realized it was over open country in the Canadian River bottomland west of Canadian, Texas and would not approach any major roads, therefore, we targeted the new tornadic storm near McLean, Texas. Unfortunately, the Pampa and McLean storms sufficiently destroyed the power distribution network such that there was no electricity in any of the communities in the eastern Texas panhandle. This meant NO GASOLINE PUMPS! Three of our teams ran out of gas near Shamrock; three other teams ran out later.

Most of the armada intercepted the southernmost cell near McLean. The NOAA P-3 and NCAR Electra aircrafts had already been gathering data on this storm for over an hour. A large violent tornado formed north of McLean and traveled south and east of Kellerville, and moved to a point northwest of Wheeler, Texas. (This tornado was the fourth in a series -- see Bruce Haynies account) Asphalt pavement was completely removed from a section of farm-to-market road 1443. Meanwhile, a twin supercell was also moving north-northeast just west of the target storm. This storm also produced several tornadoes between Alanreed and Mobeetie.

The target storm underwent another phase of cyclic tornadogenesis. Another large, violent tornado (#5) developed about six miles southwest of Allison, Texas. It moved directly toward the town, but veered to the left just at the edge of the community and passed 1.5 miles west of town. As the Allison wedge passed northwest of town, a small satellite tornado formed on the south side of the wedge and struck the VORTEX PROBE2 vehicle, causing a 12 mb pressure fall in 18 seconds and a peak (six second) wind of 44 meters/second (98 mph). Although not apparent at the time, the small funnel continued to travel around the south side of the wedge as the overall circulation moved northeastward. The wedge tornado traveled to a position about three miles northwest of Allison and remained nearly stationary for about 20 minutes. This tornado was well-sampled with the mobile mesonet, and perhaps with the mobile scanning Doppler, as well as the NOAA P-3. Teams were positioned southeast and northeast of the tornado, as well as west of the tornado where is crossed FM (farm-to-market road) 1046. The mobile scanning Doppler as well as the WSR-88D depicted as many as four tornadoes or mesocyclones occurring simultaneously within an area roughly 12 miles north of FM 1046. A number of turtles were deployed in the track of the Allison tornado. The best deployments were by the New Mexico Tech investigators, Bill Winn and Steve Hunyady. One of their turtles experienced a pressure deficit of nearly 60 mb!
Our chase on June 8, 1995 started out north of Darrouzett, Texas where we watched a large but struggling supercell. Cold air became entrenched in the Oklahoma panhandle and as a result, the storm's outflow undercut the updraft. A large arcus cloud hand soon appeared signaling the end of the storm, so we headed back south into the Texas panhandle. Little did we know that this chase would become one of our most eventful! Supercells quickly developed along the dryline and outflow boundary from Perryton southward to the Clarendon area. By the time we reached the town of Lipscomb, the day's first tornado was reported five miles south of Pampa near Texas Highway 70. Also at the same time, a severe thunderstorm warning was upgraded to a tornado warning for south Ochiltree County which was just 20 miles to our west. Now it was time for a critical decision. We opted for the Pampa storm for two reasons: 1) it was removed from the cold air and outflow boundary, and 2) the storm had produced a confirmed tornado. Fortunately, we made the right choice. We plotted an intercept point near Miami which was 30 miles to our southwest. The race was on to get into position.

As we passed Canadian, a large tornado was being reported between Pampa and Hoover by K101-FM radio moving northeast at 25-30 miles per hour. We could see two sharp anvils to our south. The closest one was with the Pampa supercell while the other anvil was with the rapidly developing tornadic supercell near Clarendon. By the time we reached the U.S. 60/83 junction, more tornado reports and an updated tornado warning were broadcast on K101-FM. The new tornado warning was issued for northern Gray and Roberts counties with a large tornado being reported between Pampa and Hoover moving northeast. The city of Miami was warned to take cover in this bulletin. Our optimism at this point was on the increase as we were just 18 miles from Miami and closing in. We encountered moderate anvil rain showers and a few lightning strikes around three miles south of Mendota near the county line. We could see the tough looking updraft tower and associated feeder bands to our southwest. This sight brought a grin to our faces, but we could not see under the base yet. Electric power was out in Miami (for some strange reason) as we rolled into town. Police and Fire Department officials were cruising through town warning residents to take cover as the warning sirens were inoperative due to the power outage. Many residents were looking southwest pointing to an area near Hoover.

About two miles southwest of Miami, we caught our first distant views of a large wall cloud and hazy outline of a tornado. Unfortunately, we were still in the Red Deer Creek valley and out view to the southwest was obscured by higher terrain. Finally, at 5:09 pm, we reached a clearer vantage point where we could see a classic quarter-mile wide tornado. We plotted its location just southwest of Hoover and eight miles to our southwest. It was fairly hazy between the tornado and our location and rain curtains were wrapping around the tornado. We stopped for a while and watched the tornado track to the northeast at around 25 miles per hour. By 5:15 pm, the tornado started to weaken visually but was still strong enough to remove a section of pavement from farm road FM 2371. The width of the tornado decreased steadily from a quarter-mile to about 100 yards while the structure evolved into dust whirls and occasional multiple vortices. At 5:17 pm, the Pampa tornado dissipated three miles northeast of Hoover. A few miles further northeast, a new wall cloud formed and a brief dusty tornado occurred under it to our northwest. We scrambled back into the vehicle and headed back to Miami where we could get a better road option. The show was just beginning!

We headed northwest out of Miami on FM 282. The road was a chasers dream as it was flat and open as we were on the caprock. The road took us directly to the scene. Rain curtains swirled around the perimeter of the updraft while a pronounced funnel was pendant from the wall cloud. Also, an impressive rear flank downdraft started to work into the storm from the southwest. At 5:24 pm, a tornado developed to our southwest. The condensation cone (200 yards wide) touched down solidly and moved northeast at around 30 mph. It was only three miles away and heading for us. As we approached the tornado, the condensation cone lifted hut debris and dust swirls...
remained on the ground. By 5:32 pm, the tornado dissipated and we moved up the road about one half mile. We were forced to stop as just a half mile to our west, the mesocyclone reorganized in a big way. Suddenly, winds gustied to around 70 mph from the southwest and our ears popped. Tornadogenesis occurred right in front of us on Fm 282. Much to our surprise, a pick-up truck was directly underneath the mesocyclone. Two vortices were within feet of his pick-up, however, the pick-up was not flipped. The driver had a look of fear, shock, and surprised as we passed him.

At 5:33 pm, a condensation cone crossed the highway a half mile to our west and slowly widened aloft. Subvortices intensified under the truncated cone and increased in number as the overall tornado moved northwest at around 25 mph. The tornado widened to one-half mile just west of a gas plant. Southeast winds gustied over 70 mph and a roar could be heard to our northwest. As many as eight subvortices swirled beneath the truncated cone. Between 5:35 and 5:37 pm, the tornado transformed into a large condensed cone. Mike and I watched in awe as the large tornado moved northwest towards FM 2699. At 5:39 pm, the tornado narrowed to 1/4 mile wide and rain started to wrap around it. We moved closer to the tornado and could hear a rushing sound similar to the wind blowing through pine trees. Rain finally obscured our view of the tornado, so we headed back to the east. We headed north on a service road west of the gas plant and reached a position where we could watch the tornado without the rain curtains being in the way. At 5:44 pm, the tornado began to rope out about four miles to our west. A pronounced gassy odor was in the air possibly caused by gas line damage. At 5:50 pm, the tornado dissipated about ten miles northwest of Miami.

We quickly headed northeast and intercepted an impressive wall cloud near Canadian. Another tornado developed about 6:40 pm. A very pronounced rear flank downdraft cut into the wall cloud from the west causing an occlusion. At the same time, a second mesocyclone formed to the southeast. While watching the tornado to our northwest, we almost got hit by the suction spots which started to appear in the field just east of our location. We avoided the "squeeze play" and safely made it back to US Highway 83. The storm moved north into the outflow boundary and weakened.

We headed back to Canadian for gas and found out about a tornadic supercell near Kellerville moving northeast. We plotted an intercept near the town of Briscoe and soon we were enroute. Just north of Briscoe, we found the core of golfball-size hail. Meanwhile, we heard of the megawedge churning up the ground near Allison. We headed northeast on FM 1046 to Allison. Unfortunately, we were five to ten minutes late to see the tornado. We quickly came up on the incredible damage path. We finally caught a glimpse of the tornado from FM 277 about two miles north of Allison. There were several vortices within the overall circulation while rain, dust, and debris swirled around the outer edge of the tornado. We wanted to get ahead of the tornado so we proceeded into Oklahoma via FM 2124. We encountered east-southeast inflow winds on the east side of the rain wrapped circulation. About four miles south of Durham, OK, we found the leading edge of the monstrous, now HP, supercell. In a matter of minutes, violent cloud motions and a distinct roar approached from the southwest. Winds rapidly increased. Moments after abandoning our location, power line flashes were seen to our west. We later learned that power poles were downed along Highway 30. At times, we could see the outline of a large tornado which lightning helped illuminate. Darkness was soon upon us, so we decided to end our chase.

The next day we were surprised to find out that the tornadoes we saw west of Miami were not on the preliminary storm report issued by Amarillo, so we have forwarded our documentation to them. This was truly an outbreak of major proportions which was confined to a fairly small area. Also impressive was the number of strong to violent tornadoes in relation to the total number of tornadoes on this day. June 8th will ALWAYS be a day to remember.
PAMPA, TEXAS TORNADO SKETCHES

Tornado sequence northeast of Pampa, Texas

Photographed by Brian Stertz and Mike Morgan
We left Colorado Springs about 7:30 am MDT with the Texas panhandle as our general target. Erik and I were driving in separate vehicles. About 10:30 am MDT, we stopped in Clayton, NM and Eric called his friend for a weather update. The 17Z observations showed a strong surface cold front across the Oklahoma panhandle. The moisture convergence maximum was over the NE Texas panhandle. With this information, we narrowed our target area to the NE Texas panhandle. The prognosis looked quite good. We proceeded east on US Highway 87 and about 3:15 pm CDT, we spotted towers building to our east-southeast. About fifteen minutes later, a storm developed from this area about 60 miles to our east. At 3:35 pm CDT, we felt a significant rise in humidity as we crossed the dryline about seven miles west of Dumas, TX. We arrived in Pampa, TX about 4:10 pm CDT and stopped at the Allsups on Wilks Street and U.S. Highway 60. We were within the western edge of what appeared to be a broken line of towering cumulus and developing thunderstorms. The storm we saw earlier had already moved well to the northeast.

It was hazy and difficult to see very far. Intermittent moderate rain and sporadic hail up to around 5/8 inches in diameter were encountered in Pampa. Winds were south- southeast at 10 to 20 mph. We were uncertain as to what to do next. After about 15 minutes, we decided to go south to see if some distance would clarify the situation. We headed south of town of Rt. 70. Only 1/2 mile south of U.S. Highway 60, I looked up and noticed some faint hanging in the clouds and immediately pulled over and stopped. A wall cloud had formed overhead and was definitely rotating. By the time I got the video camera out, dust rose about 200 yards to our south on the west side of the road. I told Eric a tornado was forming and we had to get out of the way. We drove back to US-60 and turned west anticipating the tornado would go to the northeast. After going about one-half mile, I noticed the tornado was following us. I turned north and traveled one-half block before stopping to take about 20 seconds of video, then headed east. Eric and I were terrified and we began looking for houses with basements. I then turned south onto Rt. 70 again and watched the tornado pass to my west then travel north. Eric and I were shaken but managed to do our best to document my first tornado.

After the tornado had gone through Pampa, we followed it along U.S. Highway 60 until it dissipated. According to our observations, the tornado started about 4:30 pm CDT about 1/2 mile south of U.S. Highway 60 just a few hundred feet west of Rt. 70 and traveled northwest before curving north then northeast tracking through the western part of Pampa before reaching open country. The tornado dissipated about 5:18 pm CDT.
PAMPA, TEXAS TORNADOES by Alan Moller

[ unabridged for CD-ROM ]

Chasing Northwest Texas 1995: Echoes of Sunray

Mention the word "Sunray" (see Storm Data June 1971) to an old storm chaser and you will invoke a response similar to that received by whispering "Rosebud" to an expiring newspaper tycoon or screaming out "Roswell" at a UFO convention. For years, Chuck Doswell and I have chased, chased some more, and wondered when our Sunray would come. I think 1995 gave us our answer. Furthermore, I am convinced that the storm gods blessed Chuck in 1995. He chased tornadoes down on five dates (5/22, 5/31, 6/5, 6/8, 6/9). If you were with him this year (luckily for me, I was for the last four dates), you were going to cash in some serious blue chips!

For the uninitiated, storm chasing amounts to making a series of crucial decisions about forecasts, routes, what to eat, what storm to chase, when to gas-up, when to give-up, etc. You can make the perfect forecast then blow it with a bad road selection. You can make all of the right decisions, then have no serendipity (e.g., no photographic contrast of an F5 tornado); make the wrong decisions then have nothing but serendipity; or make no decisions yourself, call Harold Brooks 250 miles away and have him tell you what to do - then waltz into the sensory event of your life. The latter occurred on our June 8th chase. Our June 5th chase amounted to a combination of right decisions and a dose of serendipity. I won't discuss our failing grade day (June 2nd) - except to say that if it were not for me, Chuck probably would have claimed his 6th tornado day of 1995.

June 5th - The forecast (thanks to help from WSFO LBB) was straight forward. Strong vertical veering of the winds and high instabilities were present along an old east-west outflow boundary that extended from the Caprock to north of Plainview. The problem: weak mid-level flow. In LBB I mentioned to Chuck, Sam Barricklow, and Martin and Lori Lisius that an approaching upper low in northwest flow aloft had a water vapor satellite feature (a curling, dark subsidence slot) similar to one that accompanied the upper low that moved across Fritch, Texas on 6/27/92 - another day with woefully lacking mid-level flow at 1200 UTC. I suggested (hopefully) that 20 kts might increase to 40-45 kts by afternoon near the subsidence slot, as happened on 6/27/92. Did the wind acceleration occur? Remember, Chuck Doswell was with us.

We drove north to Plainview, noting a sky full of hard CB tops, but with very small, high bases. The storms were benefiting from some mid-level moisture and high lapse rates, but they were not tapping into the boundary layer. However, a lower-based (boundary layer-rooted) storm soon exploded to our northeast along the outflow boundary. The storm quickly produced a substantial wall cloud and the chase (fig. 1) was on! Rotation was soon evident at cloud base and, at location 1, we observed two features on the east end of this lowering that led us to believe a second mesocyclone was developing; a new beaver's tail, fraught with high-speed east-to-west motion and a short N-S line of TCU that quickly moved into the area being fed by the beaver's tail. It helped that we had observed a similar HP cyclic, tornadic supercell evolution on 5/31/95 near Ballinger, TX.

From location 2, the South Plains mesocyclone was visibly weakening to our north, where it anchored the west end of a spectacular, elongated east-west cloud lowering on the storm's front flank. We observed two features on the east end of this lowering that led us to believe a second mesocyclone was developing; a new beaver's tail, fraught with high-speed east-to-west motion and a short N-S line of TCU that quickly moved into the area being fed by the beaver's tail. It helped that we had observed a similar HP cyclic, tornadic supercell evolution on 5/31/95 near Ballinger, TX.

We decided to zigzag south and east to get into position before the target area became a rain-wrapped bear's cage. Within about 15 frenetic minutes we arrived on highway 70, just in time to see a wedge tornado form to our north (location 3) and move southward across highway 70 (position 4).
Frequent CG lightning and scattered golf ball hail threatened us as we photographed the tornado. I was nervous about these elements, in addition to a ferocious dark green precip shaft that was approaching Hwy 70 from the north. I tore a mesmerized Chuck loose from his videotaping and we hurried east, then south, and watched the large tornado become rain-wrapped west of Dougherty (location 5). We later photographed a second very impressive HP supercell near Jayton. According to local spotters, this storm also produced a large tornado, away from paved roads and our eyes. Giddy with success, we decided that June 5th was our best vacation chase day since we started in 1977. That distinction held for three days.

June 8th - The deluge of northwest Texas tornadoes continued, similar to 3-11 June 1971, or the fabled "seven days in May", 1977. We received extremely helpful information from phone calls to Mike Branick, and as mentioned, Harold Brooks in Norman. The first conversation brought us south from Lamar Colorado (where Chuck, Sam Barricklow, and I witnessed several beautiful supercells the evening before) towards a triple point low Mike said was forecast to be in the extreme northeast panhandle at 0000 UTC. The progs turned out to be fast with the low's position.

We decided to drive south (towards Dumas), instead of southeast (into the Oklahoma Panhandle), to approach storms from the clear air mass behind the dry line, rather than from the low visibility, stratus-laden air mass across the OK Panhandle. That was a fortunate decision, since we never would have made it in time for Pampa if we had taken the southeast route.

A line of scattered, rapidly developing CB's, already with visual right-flank overhang, was to our east as we arrived in Dumas. Unfortunately, Sam had to drop out temporarily, owing to a driver's side window that "dropped out" of his van on the trip out of Colorado (no serendipity here). Weak, rear-flank convection began to mask the CB tops as we drove into Stinnett, making it difficult to pick a target storm. So we called Harold. He said that three storms to our east had mesocyclones and suggested that we drive down Hwy 152 to pursue tail-end Charlie.

We saw a dense precipitation curtain to the east and a large, rounded rain-free base to the south as we entered the outskirts of Pampa. A funnel cloud was dangling beneath the CB base! The funnel cloud dissipated, but a wall cloud formed quickly to our SSE as we turned south on FM road 282 in west Pampa. Dust whirls and frequent, short-lived ground-based condensation tubes were visible beneath the roiling wall cloud. We pointed out the developing tornado to a Pampa policeman and he zoomed toward it as debris became more apparent. Unknown to us, sirens had already been activated in Pampa.

The developing tornado initially moved northwest and then west (!), passing within a mile south of our position, which was about midway between Hwys 152 and 60. We drove to the Hwy 60/282 intersection, then watched in awe as the circulation intensified into a full-blown tornado and turned north across Hwy 60 and the railroad tracks. From our location the photographic contrast was excellent - the core of the tornado was dark with light-fringed edges and a bright background. I have only dreamed of such a photogenic view! Chuck zoomed in with the video camera at the right moment, as if he knew he was about to capture the very sudden and dramatic example of tornado intensification - from about 1/3 of a mile.

We made a U-turn and moved north on 282, paralleling the tornado as it began to pick up considerable debris. The spin of it's compacted debris cloud intensified to about one revolution per second. The tornado entered an industrial district in west Pampa, with high speed motions continuing in its central, wedge-shaped debris cloud. Considerable lightweight roof and building material floated skyward into a less dense, outer debris cloud. I shot with a normal lens at 1/250th of a second (wide open at F1.4), freezing debris in the photos. Some debris is identifiable (sheet metal, etc.). Chuck's video at this time ranks with the best "whirling debris" videos and films I have seen.

The tornado sounded like a loud waterfall as it moved about 1/2 mile northwest and north of us. What had been a dark funnel began to reflect skylight, turning milky white as it moved to our northeast. At this time we captured tornado #2 (the Hoover tornado, forming several miles
ENE of the Pampa twister) in the same frame as #1. After the Pampa tornado dissipated, we spent eight minutes steering clear of emergency vehicles (more than I have ever seen at one time) and exiting Pampa, so that we could chase the Hoover tornado. We captured several good shots of this second tornado, but Martin Lisius did much better. The Hoover tornado was two or three times larger than 01, and probably an F4 or F5 storm. It stripped asphalt off of a farm road near Hoover and inflicted various mayhem onto area livestock and flora.

Apparently we were so stunned by the Pampa event that we lost our poise, for the rest of the day turned out to be a futile game of catch-up. We did not take the right roads in pursuit of the Pampa supercell. Instead, we watched several low-contrast tornadoes to the distant N of Hwy 60, then got to the McLean/Allison storm too late. Bruce Haynie, Tim Marshall, and Gene Rhoden captured great footage of the McLean/Allison storm. We could have done the same, but stayed with the Pampa storm too long (all the way to east of Canadian, possibly thinking about yet another tornado day in the distant past, some 48 years ago). Nevertheless, what a fabulous chase day!

We were relieved to learn that no one was killed by any of the June 8 tornadoes... ditto for June 5th and June 2nd. I am not surprised, since local emergency preparedness, the NWS offices at LBB and AMA, and the local news media have done a terrific job of developing spotter networks and warning systems in northwest Texas. A tip of the hat to these people! Finally, VORTEX had tremendous success with the June 2nd and June 8th tornadoes - a great way to end what turned out to be a highly successful field project.

**FUNNEL FUNNY:** June 2-9, 1995: Wedgeface

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**ANNOUNCEMENT:**
Birth to Roger and Tanja Edwards

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**Hurricane season aint over yet!!**

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**Donna Camille**

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**Date:** 11 DEC 95  
**Time:** 8 PM  
**Height:** 19  
**Weight:** 7/14
Wall cloud looking SSE from FM 282

Condensation tube on ground

Tornado SW of FM 282 & Hwy 60

Tornado with flying debris in west Pampa
Looking west through northwest