

1

00:00:00,000 --> 00:00:16,865

This series presents information based in part on theory and conjecture.

2

00:00:16,865 --> 00:00:21,388

The producer's purpose is to suggest some possible explanations but not necessarily

3

00:00:21,388 --> 00:00:25,551

the only ones to the mysteries we will examine.

4

00:00:25,551 --> 00:00:32,877

The last cool air of winter collides with the warm moist air of spring,

5

00:00:32,877 --> 00:00:35,239

high above the Central United States.

6

00:00:35,239 --> 00:00:41,204

Then suddenly terror.

7

00:00:41,204 --> 00:00:51,252

Smashing and twisting its way across the land with winds in excess of 200 miles per hour,

8

00:00:51,252 --> 00:01:00,059

a tornado strikes.

9

00:01:00,059 --> 00:01:17,473

In all of nature's fury, there is no windstorm as great or as deadly as the killer tornado.

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00:01:17,473 --> 00:01:24,999

Although the spring clouds of the Midwest, there's a richness of life.

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00:01:24,999 --> 00:01:30,763

Cities and farms bask in the warming sun.

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00:01:30,763 --> 00:01:37,889

People enjoy their traditions and diversions.

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00:01:37,889 --> 00:01:41,251

But always present is a particular fear.

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00:01:42,212 --> 00:01:45,975

At any moment, tranquility can change to chaos.

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00:01:45,975 --> 00:01:48,777

Contentment to misery.

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00:01:48,777 --> 00:01:53,421

This is the tornado season.

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00:01:53,421 --> 00:01:57,424

And these people live in tornado alley.

18

00:02:11,275 --> 00:02:29,410

Statistics say that a city within a tornado area will be hit only once in every 250 years.

19

00:02:29,410 --> 00:02:36,815

Yet Oklahoma City has been struck 32 times since 1892 and Kodell, Kansas, three years

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00:02:36,815 --> 00:03:01,395

in a row on the exact same date.

21

00:03:01,395 --> 00:03:11,283

In 1974, 148 tornadoes killed 300 people and injured 6,000 more across 13 states all in

22

00:03:11,283 --> 00:03:13,404

the same day.

23

00:03:13,404 --> 00:03:21,371

Damage totalled 600 million.

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00:03:21,371 --> 00:03:26,215

Tornadoes attack the land with circular winds that topple structures and send bits of metal

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00:03:26,215 --> 00:03:28,977

and wood through the air with lethal velocity.

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00:03:29,977 --> 00:03:36,463

It is not unusual for steel to be pierced by a fragment of wood or victims to vanish

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00:03:36,463 --> 00:03:42,227

forever.

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00:03:42,227 --> 00:03:47,391

The force within a tornado is equal to all the energy in the United States running full

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00:03:47,391 --> 00:03:54,317

power for five minutes.

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00:03:54,317 --> 00:04:00,842

Stories of a recent tornado in Holton, Kansas comment on their experience with the twister.

31

00:04:00,842 --> 00:04:02,723

Everybody respects them, I believe.

32

00:04:02,723 --> 00:04:03,724

I know I sure do.

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00:04:03,724 --> 00:04:07,767

You just never can tell what they will do and where they will hit.

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00:04:07,767 --> 00:04:12,731

I know these tornadoes here, they hit and they bounce up and they come back down just

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00:04:12,731 --> 00:04:13,732

like river balls.

36

00:04:13,732 --> 00:04:15,854

You just know where they're going to hit next.

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00:04:15,854 --> 00:04:20,257

Pretty much that they really clear them, but yet they keep an eye on them.

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00:04:20,257 --> 00:04:25,381

The tornadoes come and you can see it four or five miles away and they will keep an eye

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00:04:25,381 --> 00:04:27,583

on it instead of going to the basement where they should go.

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00:04:27,583 --> 00:04:34,429

The worst disaster we had here was in the trailer, mobile home, and there was four people in

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00:04:34,429 --> 00:04:35,429

it.

42

00:04:35,429 --> 00:04:39,513

When the tornado hit it, apparently they were not warned.

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00:04:39,513 --> 00:04:44,877

The trailer is set right up yonder and as you can see it was carried down here and the

44

00:04:44,877 --> 00:04:48,199

frame sets over here and it just looked like it picked it up and blew it up.

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00:04:48,199 --> 00:04:52,403

They found a woman, a little girl approximately around a quarter of a mile from the scene.

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00:04:52,403 --> 00:05:00,129

The father of the little girl, he died long in the night that same evening.

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00:05:00,129 --> 00:05:06,214

To millions of people, tornadoes are a frighteningly real part of everyday life.

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00:05:06,214 --> 00:05:10,017

Each year the United States suffers damage in the millions.

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00:05:10,017 --> 00:05:15,861

The value of the lives lost is of course incalculable.

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00:05:15,861 --> 00:05:19,304

The tornado is the fiercest of all storms.

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00:05:19,304 --> 00:05:24,268

Unlike the hurricane, it can unleash its fury with virtually no warning, bursting forth

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00:05:24,268 --> 00:05:30,633

from the storm in an instant to ravage the earth for seconds or as long as three hours.

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00:05:30,633 --> 00:05:36,197

Hoping to increase the crucial warning time the public needs to avoid tragedy, a counter-offensive

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00:05:36,197 --> 00:05:41,522

is being waged by a dedicated group of men and women who are probing this mysterious and

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00:05:41,522 --> 00:05:42,522

lethal phenomenon.

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00:05:42,522 --> 00:05:46,726

Well, what I've prepared here is a sketch of an actual thunderstorm.

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00:05:46,726 --> 00:05:51,169

It's a vertical cross-section and the red arrows here indicate the major updraft within

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00:05:51,169 --> 00:05:53,211

the storm and the blue indicates the down...

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00:05:53,211 --> 00:05:58,655

Men such as Dr. Ernest Agee and his associates at Purdue University hope to answer the most

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00:05:58,655 --> 00:06:05,220

basic question of all, what makes a tornado behave the way it does?

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00:06:05,220 --> 00:06:10,184

Utilizing a tornado simulator, they seek clues to the cause of the devastating winds that

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00:06:10,184 --> 00:06:17,190

form the tornado funnel.

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00:06:17,190 --> 00:06:22,434

Although there is no one answer, most scientists acknowledge that it is the interaction of

64

00:06:22,434 --> 00:06:26,757

warm and cold fronts that produce the thunderstorm.

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00:06:26,757 --> 00:06:32,322

Just what starts the clouds violently rotating is still not fully known.

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00:06:32,322 --> 00:06:37,606

It could be a function of the earth's rotation or some internal phenomenon within the storm

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00:06:37,606 --> 00:06:48,855

itself.

68

00:06:48,855 --> 00:06:54,459

Observing the effects of a simulated tornado on this model city provides graphic evidence

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00:06:54,459 --> 00:07:05,468

of the power of the wind and its vacuum effect on buildings.

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00:07:05,468 --> 00:07:26,725

The National Severe Storms Laboratory in Norman, Oklahoma lies in the heart of the nation's

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00:07:26,725 --> 00:07:29,327

most active tornado area.

72

00:07:30,168 --> 00:07:36,733

Here meteorologists, technicians and students work toward eliminating the element of surprise

73

00:07:36,733 --> 00:07:53,026

in the tornado's attack.

74

00:07:53,026 --> 00:07:59,311

Locked in a race against death and destruction, they utilize radar, satellites, computers,

75

00:07:59,551 --> 00:08:05,636

and eye-witness observations to scan the skies throughout the year in order to anticipate

76

00:08:05,636 --> 00:08:08,398

disaster.

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00:08:08,398 --> 00:08:14,243

By analyzing and interpreting data, they attempt to provide the crucial lead time that spells

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00:08:14,243 --> 00:08:18,606

the difference between early warning and tragedy.

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00:08:18,606 --> 00:08:23,850

During the tornado season, the day begins with interpretation of the satellite photo

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00:08:23,850 --> 00:08:26,652

by meteorologist John Weaver.

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00:08:26,652 --> 00:08:32,177

He must decide on the day's tornado outlook and advise the staff.

82

00:08:32,177 --> 00:08:38,182

The prognosis of today's photograph is not good and the storm track down begins.

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00:08:38,182 --> 00:08:44,346

Upper vertical wind structure is conducive to tornado generation, winds increasing and

84

00:08:44,346 --> 00:08:45,347

varying with height.

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00:08:45,347 --> 00:08:50,031

The maximum wind in this sounding, although it's not showing here, is 70 knots a lot.

86

00:08:50,031 --> 00:08:55,876

I do expect, as I say, there's a very high probability of tornado formation in any storms

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00:08:55,916 --> 00:09:02,921

which fire up along this warm front north of the low.

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00:09:02,921 --> 00:09:08,686

Twenty-two thousand miles in space, a satellite confirms the telltale signs of a towering

89

00:09:08,686 --> 00:09:15,691

thunderstorm, apparent to the tornado.

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00:09:15,691 --> 00:09:24,538

Okay, we're going to watch the circulation up here.

91

00:09:24,538 --> 00:09:25,539

It's updating now.

92

00:09:25,899 --> 00:09:31,464

In a darkened room, a handful of men track and predict the storm, hoping to out-guess

93

00:09:31,464 --> 00:09:33,265

its deadly intention.

94

00:09:33,265 --> 00:09:39,510

Okay, I'd ought to call the weather service back and update them and call John.

95

00:09:39,510 --> 00:09:41,992

We got a forecast position on there.

96

00:09:41,992 --> 00:09:43,673

Nerve center for the chase.

97

00:09:43,673 --> 00:09:51,039

They watch with mounting interest.

98

00:09:51,039 --> 00:09:55,122

In minutes, the storm center issues an advisor.

99

00:09:55,122 --> 00:09:56,123

This just in.

100

00:09:56,123 --> 00:10:00,447

The National Weather Service has just issued a storm watch for the following areas of

101

00:10:00,447 --> 00:10:03,689

Kansas, Jackson, Cook County, Lernerville County.

102

00:10:03,689 --> 00:10:10,695

Miles away, the skies only hint at what is to follow.

103

00:10:10,695 --> 00:10:17,700

Attention, the violent storm has incited 15 miles to the south west.

104

00:10:23,985 --> 00:10:30,991

With the storm's approach, citizens are warned to take cover, possibly for their lives.

105

00:10:30,991 --> 00:10:33,993

Okay, that's going.

106

00:10:33,993 --> 00:10:39,398

It's already going up.

107

00:10:39,398 --> 00:10:45,322

Moving against time, an intercept chase team heads out to find the storm system and document

108

00:10:45,322 --> 00:10:52,328

the tornado's formation without becoming victims themselves.

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00:11:00,734 --> 00:11:07,380

Led by meteorologist Bob Davies-Jones, students Kelvin Drogemeier and Ken Carson spend their

110

00:11:07,380 --> 00:11:11,223

summer vacation heading straight toward danger.

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00:11:11,223 --> 00:11:14,265

But adventure is not what spurs them on.

112

00:11:14,265 --> 00:11:19,669

It is knowing that they are part of a coordinated effort to save lives.

113

00:11:19,669 --> 00:11:21,591

We got two main missions.

114

00:11:21,591 --> 00:11:28,596

One is to get within close range of tornadoes and get a close range debris movie.

115

00:11:30,038 --> 00:11:37,043

We hope to be able to analyze the movie for trackable debris and get tornado wind speeds.

116

00:11:37,403 --> 00:11:44,409

Our other mission is to verify tornado signatures which are seen on the docks of radar.

117

00:11:45,410 --> 00:11:48,412

Okay, John, we'll take the algae action headwind.

118

00:11:48,412 --> 00:11:55,418

We'll scramble the jet to cover it.

119

00:11:56,419 --> 00:12:02,423

Aerial observation and recording of the storm's activity is initiated using a specially equipped

120

00:12:02,423 --> 00:12:06,426

F-4 Phantom jet.

121

00:12:06,426 --> 00:12:11,430

Okay, John, we're just turning on the I-35 just outside the lab.

122

00:12:11,430 --> 00:12:15,434

We're going ahead south on Highway 76.

123

00:12:15,434 --> 00:12:22,439

Flying near the speed of sound, the pursuit plane penetrates the storm system.

124

00:12:25,442 --> 00:12:28,444

Timelapse started at 1200 CFT.

125

00:12:28,444 --> 00:12:35,449

Setting up near the storm's edge, the chase team focuses on the most promising area for tornado formation.

126

00:12:35,449 --> 00:12:40,453

We'll be time-lapse-ing in one frame per second.

127

00:12:40,453 --> 00:12:45,457

Bob's camera records nuances of cloud activity hidden to the naked eye.

128

00:12:49,461 --> 00:12:51,462

You want this one frame per second?

129

00:12:51,462 --> 00:12:52,463

Yeah.

130

00:12:54,464 --> 00:12:57,467

I have a little trouble with the contrast.

131

00:12:58,468 --> 00:13:00,469

I'll test with John at the lab two pretty soon.

132

00:13:00,469 --> 00:13:01,470

Okay.

133

00:13:01,470 --> 00:13:03,472

Nestle-suitor control, do you copy, John?

134

00:13:03,472 --> 00:13:06,474

Okay, John, I copy. What kind of sky cover do you have?

135

00:13:06,474 --> 00:13:10,477

Okay, presently we've got a serious overcast.

136

00:13:10,477 --> 00:13:16,482

We are time-lapse, the final location in the cloud base appears to be a spinal cord north, the heading towards the north-east.

137

00:13:16,482 --> 00:13:17,483

Roger.

138

00:13:21,486 --> 00:13:27,491

I've just been up on the observation deck and there's a big new set of towers building into the southwest side of that old Renault.

139

00:13:27,491 --> 00:13:29,492

Okay, thank you. Thank you, Brad.

140

00:13:29,492 --> 00:13:31,494

Oh, you want to copy?

141

00:13:31,494 --> 00:13:33,495

Control, this is all you want to go ahead.

142

00:13:33,495 --> 00:13:37,499

John, we've got some towers that are growing pretty explosively to the northwest here.

143

00:13:37,499 --> 00:13:43,503

We're beginning to paint an echo on the scope and I wondered if you could go up and take a look at those storms.

144

00:13:43,503 --> 00:13:49,508

We're looking to the northwest. We have a extensive rain-free base. Towers are rapidly building.

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00:13:49,508 --> 00:13:53,511

It's a little bit easy. We're having difficulty trying to de-examine the features,

146

00:13:53,511 --> 00:13:58,515

but we are approaching it. Shouldn't you give a better indication later on?

147

00:13:58,515 --> 00:14:01,518

Okay, Roger. Stand by, John. I'm going to see what Doppler has on that.

148

00:14:01,518 --> 00:14:05,521

Okay, Don, we've got some good cyclonic shear at mid-levels, five kilometers high.

149

00:14:05,521 --> 00:14:08,523

The coordinates are 297 at 58 kilometers.

150

00:14:08,523 --> 00:14:11,526

Okay, thanks, Larry. You see that, Mike?

151

00:14:11,526 --> 00:14:12,526

Yeah, Don.

152

00:14:12,526 --> 00:14:17,530

John, we've got some cyclonic shear, 297 degrees, 58 kilometers.

153

00:14:17,530 --> 00:14:20,533

And if you have a new satellite picture, we'd like to see that, too.

154

00:14:20,533 --> 00:14:22,534

All right, thank you.

155

00:14:24,536 --> 00:14:30,541

Interpreting local cloud patterns, the chase team narrows in on the storm.

156

00:14:30,541 --> 00:14:36,545

For the experts, there's no doubt now a tornado is forming.

157

00:14:36,545 --> 00:14:40,548

As information comes in, the worst seems imminent.

158

00:14:40,548 --> 00:14:42,550

Okay, John, what do you see?

159

00:14:42,550 --> 00:14:46,553

Okay, presently, John, the towers are growing very rapidly.

160

00:14:46,553 --> 00:14:49,556

It appears to be rotating quite dramatically.

161

00:14:50,556 --> 00:14:54,560

The appearance from here, John, looks like a rotating atomic bomb.

162

00:15:01,565 --> 00:15:03,567

Yeah, that's only about 300 meters off the ground.

163

00:15:03,567 --> 00:15:04,568

So we're looking at it.

164

00:15:04,568 --> 00:15:07,570

200 miles per hour. Don is basically wrapping up.

165

00:15:07,570 --> 00:15:08,571

You've got to go to the tornado.

166

00:15:08,571 --> 00:15:09,571

Okay, Larry.

167

00:15:09,571 --> 00:15:10,572

Call Tinker.

168

00:15:10,572 --> 00:15:13,575

This is Don Hurgis in SSL, Norman.

169

00:15:13,575 --> 00:15:18,579

I'd like to issue you a tornado advisory for a storm that's 300 degrees at 20 nautical miles.

170

00:15:18,579 --> 00:15:21,581

I would put it right over the city.

171

00:15:25,584 --> 00:15:29,587

Only moments separate the tornado from a town never struck before.

172

00:15:33,591 --> 00:15:34,591

There it is again.

173

00:15:34,591 --> 00:15:36,593

Oh, that's a great one. We've got to lock it.

174

00:15:36,593 --> 00:15:37,594

Okay.

175

00:15:39,595 --> 00:15:41,597

Then why don't you update it again, Larry?

176

00:15:42,598 --> 00:15:43,598

Oh, wow.

177

00:15:43,598 --> 00:15:44,599

There it is.

178

00:15:44,599 --> 00:15:45,600

Oh, wow.

179

00:15:45,600 --> 00:15:46,601

Good building.

180

00:15:48,602 --> 00:15:50,604

How high off the ground is that, Larry?

181

00:15:50,604 --> 00:15:51,605

Oh, this is right down the deck.

182

00:15:51,605 --> 00:15:53,606

I hope those two will take cover.

183

00:16:01,613 --> 00:16:03,614

Hey, James, control. This is OU1.

184

00:16:03,614 --> 00:16:04,615

Go ahead, OU1.

185

00:16:04,615 --> 00:16:10,620

Hi, Roger, John. We have debris, tornado on the ground just to our southwest.

186

00:16:10,620 --> 00:16:17,625

We are moving eastward very rapidly, and we'll have to get photographs and moving over.

187

00:16:17,625 --> 00:16:20,628

Don, 1715, chase the tornado.

188

00:16:20,628 --> 00:16:24,631

Chase the tornado. 330 degrees, 48 kilometers.

189

00:16:24,631 --> 00:16:26,633

We have enough data on the ground.

190

00:16:26,633 --> 00:16:27,633

Yeah, just about where we got it.

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00:16:27,633 --> 00:16:32,637

They say County Line Road, Northwest Highway, has been a lot of damage, houses destroyed.

192

00:16:47,649 --> 00:17:16,672

For some, being lucky means the storm missed them.

193

00:17:16,672 --> 00:17:22,677

For former Dean Stouse, it means being alive and able to rebuild.

194

00:17:24,678 --> 00:17:31,684

Yeah, we lost cows and calves and sows and pigs, and we've still got some sows missing.

195

00:17:31,684 --> 00:17:33,686

They haven't come back.

196

00:17:35,687 --> 00:17:43,694

But there could have been a lot more kills than what it actually was for all the debris and tin.

197

00:17:43,694 --> 00:17:50,699

There's a lot of tin flying around, and just like here, there was 41 fat cattle ready to be shipped Thursday.

198

00:17:50,699 --> 00:17:57,705

And this was Friday, the next afternoon, and we found every one of them and no broken legs or anything like that.

199

00:17:57,705 --> 00:17:59,706

And I don't know how they got out of it.

200

00:17:59,706 --> 00:18:04,710

You can just see that stuff's just pounded right in the ground and they got away.

201

00:18:05,711 --> 00:18:11,716

Dean's wife, Karen, was alone in the cellar with her infant when the tornado struck.

202

00:18:11,716 --> 00:18:19,722

I could hear things breaking, but I had no conception of the wind or anything because I was singing lullabies as I was feeding my son his food.

203

00:18:19,722 --> 00:18:25,727

And I didn't know the roof was off or the windows were out until I opened the door to the basement and see the sky.

204

00:18:25,727 --> 00:18:31,732

And usually there's two flight of stairs going up to the attic, and they weren't there.

205

00:18:31,732 --> 00:18:35,735

Until now, you know, he hadn't been actually in contact.

206

00:18:35,735 --> 00:18:45,743

We helped back when there was tornadoes south of here in the Pica and Meriden area, Silver Lake, when I was these boys' size.

207

00:18:45,743 --> 00:18:53,749

And, you know, I just never was personally involved before, but I am now.

208

00:18:56,751 --> 00:19:03,757

I guess it frustrates me so much that people are primarily concerned with the house, and the house can be rebuilt with income.

209

00:19:03,757 --> 00:19:07,760

But if we don't get the farm going, we don't have any income.

210

00:19:07,760 --> 00:19:14,766

But had it not been for Advanced Warning, Karen Staus and her baby might have been added to this year's list of fatalities.

211

00:19:14,766 --> 00:19:22,772

A list that is diminishing because of the dedication and skill of the men and women of the National Severe Storms Laboratory.

212

00:19:34,781 --> 00:19:47,792

It has been estimated that at any given moment there are 1,800 thunderstorms in the atmosphere above us, each of which could produce a devastating tornado.

213

00:19:47,792 --> 00:19:55,798

Despite all the advances in the science of meteorology, the tornado remains perhaps the most challenging weather event of all.

214

00:19:55,798 --> 00:20:01,803

To date, we have no way to stop the tornado. We can only try to cope with it.

215

00:20:01,803 --> 00:20:06,807

Can we expect someday to be able to modify or control this unique force of nature?

216

00:20:06,807 --> 00:20:12,812

Dr. Edwin Kessler, Director of the National Severe Storms Laboratory.

217

00:20:12,812 --> 00:20:19,817

We might turn heavy rains into moderate rains over a wide area. That would be very nice for agriculture.

218

00:20:19,817 --> 00:20:26,823

We would reduce erosion, and we would have a better supply of water power, for example, a more regular supply.

219

00:20:26,823 --> 00:20:44,837

But I'd like to emphasize that this is really very speculative at this time, and I would offer a comment that because of the really astonishing advances of the recent decades in areas of science and technology,

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00:20:44,837 --> 00:20:57,847

particularly in America, we've tended to look to a science and technology for the answer to many problems for which science and technology are not well suited.

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00:20:57,847 --> 00:21:02,851

The best thing that we can do about the tornado is to be intelligent about it.

222

00:21:02,851 --> 00:21:13,860

Heed the warnings, observe the clouds, so that you guide yourself intelligently in this marvelous atmosphere that God has provided for us.

223

00:21:13,860 --> 00:21:37,879

Coming up next, in search of continues with a probe into the causes and consequences of tidal waves, then agents take on a white supremacist hate group on FBI The Untold Stories.

224

00:21:37,879 --> 00:21:46,886

And later tonight, History's Greatest Blunders continues with the failures of the gigantic airliner Spruce Goose and the overhyped DeLorean car.

225

00:21:46,886 --> 00:21:50,889

Nine Eastern, ten Pacific, here on the History Channel.