Danny Dunn, Tornado Chaser

Synopsis

It is springtime in the United States. With spring comes the season of severe weather. Professors Bullfinch and Grimes watch the television news intently from Bullfinch's laboratory on the east coast near the University of Midston. Thunderstorms are breaking out from Texas to Illinois.

Many of the storms are supercell thunderstorms. Only a few of these monster storms generate tornadoes. The two professors are quite interested in studying the tornado: how it forms, its destructive costs and especially its predictability. Bullfinch and Grimes feel that an early warning system needs to be invented. A system that would be potentially more reliable and earlier than say, radar, a weather spotter or teams of weather observers on the ground. Their goal is to save even more lives from this facet of nature's fury.

Professors Bullfinch and Grimes are consummate professionals; they are inquisitive explorers of their natural world. They are also opposites in many ways. Bullfinch is a short, stout and friendly-to-all intelligent scientist with two doctoral degrees in mathematics and meteorology. Grimes is the stereotypical scientist. He is gruff, intelligent, tall and lanky and with a

perpetual scowl on his face. He is also brilliant. He possesses a doctorate degree in climate studies. Both professors are avid Extra Class amateur radio operators.

They make an excellent duo of explorers.

For the past fifteen years, they have built, tested and refined a "storm" detector. While it is true that a very efficient Doppler radar system exists nationwide, and while the ever-progressive National Weather Service has its National Severe Storms Laboratories in the Plains, there is no instrument that can tell when a thunderstorm is about to unleash a tornado. That is, until Professor Bullfinch's invention came to life. He uses the earth itself to listen for these signals. He calls his invention STORM (Sensing Tornadoes On Remote Monitors).

In his lab, the professor is able to view and measure the static generated by the movement of the molecules of wind, and electrical charges generated by snow and rain by using a special loop antenna (his very own design) hooked to a low frequency receiver and sensitive spectrum analyzer. They monitor the images generated by storms throughout the seasons. And, over a period

of nearly a decade, both professors have recorded thousands of images and established profiles, "fingerprints" of each event. A small, yet powerful and portable computer stores and analyzes these images. New ones coming in via the special noise-free antenna to the analyzer are stored in the computer and compared to the ones in its memory. A match will confirm what the scientists are feeling quite confident about: they have built a precursor to their idea of a tornado detector. Hence, they are excited by the prospect of making very accurate weather forecasts of these events.

Quite accurately, Bullfinch is able to tell when a particularly heavy rain or snowfall is approaching Midston. Winds similar to the Santa Anas in California are also predictable. They are all made with pinpoint accuracy. STORM is called a success for now. His device has worked well in the lab. But bigger frontiers await it. Dr. Grimes now asks: is it possible to detect the formation of a tornado buried deep in a supercell thunderstorm?

They both needs real-time data. Lots of it. He needs to record images (picked up by the antenna and the spectrum analyzer) of these thunderstorms for the computer to analyze. In the Great Plains region, Professor Bullfinch

will attempt to view and record the unique "fingerprints" of winds that are twisting and twirling massive amounts of charges in a thunderstorm.

As Professor Bullfinch puts it, "The winds are blowing particles, rain, hail, dust and lots of electrons. They form a 'pre-tornado' as I call it. It fits a certain shape from the supercell thunderstorm and it triggers another alarm in STORM."

Professor Bullfinch theorizes that the "noise" generated by a tornado is actually a well-defined pattern of electrical charges. Before the tornado even becomes visible to the researchers, before it even shows up on Doppler radar, the professor believes that the device he's invented will "see" into the severe thunderstorm. A tornado (just before it becomes visible) has swirling winds that generate images that are common to all tornadoes just forming. The professor plans to chase tornadoes in Tornado Alley that week in middle spring. He, and Drs. Grimes and Richards will use several monitors with observers around the thunderstorm to record these images. They have seven days to try out this new invention. Three young adults will accompany them.

Danny is the most headstrong of the three. But he is a quite-intelligent young man. Irene Miller possesses her father's brilliance and down-to-earth common sense. Joe is a poet and a voracious eater of many kinds of food. He tags along, not because of the science involved (he simply does not care one whit about it), but he figures (rightfully so) that his friends have to eat eventually. And he'll be fed then as well.

All three go along with the three professors on this trip. The adventures they have bring them face-to-face with many exciting, unusual, (and dangerous) facets of severe weather.

The second night of their tornado hunt, Danny is tasked with properly storing STORM in one of the rooms at the motel all five are staying at. Danny forgets to do so. STORM and its antenna are on, pointing outside the front door. A tornado outbreak occurs a little after midnight. STORM's noisy and reliable alarms wake up the tornado chasers minutes earlier than spotters or warnings from the National Weather Service. At least eight major twisters (ranging from EF4, EF5 to EF6) touch down and devastate the town. All five adventurers were able to warn the town's citizens because of the early warnings from STORM. The device worked! Professor

Bullfinch's invention is a success. But as he says later, "Think of the lives saved. This receiver could be made small enough, be battery operated, and portable enough to carry."

"We have a lot of work to do."

Indeed.

Even today, a tornado's formation cannot be explained fully.

Why are these intrepid scientists risking life and limb? Perhaps Dr. Bullfinch said it best, "Given enough time, enough inquiry and enough experimentation through observations made carefully by equally careful researchers, any 'thing' can be explained. And understood by non-science people. This just might be the early warning system we are looking for."

And that can possibly save lives.