

# HANGAR FLYING

## Bats and crops benefit by balloon breakthrough

by George Denniston

Caves filled with bats are a well-known phenomenon in Central Texas. Curious residents can stand near holes in the ground, the mouths of caves, and watch the bats depart during the evening hours. The exodus starts slowly, then picks up in speed. The bats leave the cave, fly in a continuous stream and quickly disappear out of sight over the nearby pine forest. Where do they go?

Curiosity led research scientists to employ balloonist David Smuck of Austin Aeronauts to take them above the trees on a tether flight. A free flight was considered dangerous and counter-productive because it was getting dark, and the wind was not blowing in the direction that the bats were going. From their vantage point above the trees, David and the scientists watched the stream of bats swirl upwards and away. But where were they headed, and why?

Previously, the scientists had tried using a huge kite, so large that they had to use the wheel hub of a Chevy Suburban to control it. They also investigated the use of stationary surveillance blimps that were in place along the Mexican border. These were able to lift sensitive equipment into the air, but they could not go anywhere. Next the scientists developed a small helium balloon with a radio package beneath it. The radio transmitted a signal that enabled the scientists to locate the balloon in the air at night. It also had a microphone that picked up bat sounds, and transmitted them to the excited scientists, racing along in a truck below. As the small balloon rose through the swarm, its radio picked up numerous signals that often increased in speed and frequency. These indicated that the bats were feeding. But what were they eating? Dr Gary McCracken, a biologist at the University of Tennessee, Knoxville, decided to devote his professional career to finding out. He teamed up with another scientist, Dr John Westbrook, a meteorologist - biologist with the U S Department of Agriculture at College Station, Texas.

They are Mexican free tail bats, and they winter, like some fortunate Americans, near Mexico City. In the spring they migrate to several large caves in Texas. Their total numbers are estimated at 150 million. The Mexican free tail bat is a mammal. It is highly specialized and highly efficient. Its Latin name, Chiroptera means "hand wing" because its wing structure is basically made up of the same bones as the mammalian hand, our hand.

Soon after Dr McCracken began his research, he had a lucky break. The National Weather Service installed a Doppler Radar station just 20 miles away from one of the caves. Doppler Radar is capable of detecting various forms of weather phenomena,

including heavy rain, and the wind shears that are so lethal to pilots if they happen to be on final approach. No sooner was this new system set up than the weathermen began to see what looked like heavy storm clouds - but the sky was clear. It was the bats emerging from their caves. With further observation they discovered another large cloud that resembled a light drizzle, yet there was no visible cloud in the sky. This large cloud was moving north toward the area where the caves were. Finally they saw the two clouds merge. Could this cloud be food for the bats?

To find out, they once again asked David to take them up in his hot air balloon. This time it was to be a free flight. Leaving several hours before dawn they flew up and into the swarm. There they could listen to the bats' echolocations all around them. They could also collect specimens in nets. It turned out that the cloud coming north was made up of corn earworm moths, and the bats were feasting!

David landed at dawn and the scientists returned to their laboratory. To further confirm their findings, the scientists collected droppings from the bats in the caves. They analyzed these droppings for their DNA content, and discovered that 90% of the bat diet is corn earworm moths.

The implications of this exciting research are that, thanks to the huge amount of corn being grown to feed six billion humans and cattle all over the world, the specialized corn earworm moth has a field day, laying its eggs in vast numbers. When they hatch, the larvae eat the corn, then become moths, and fly north to do more crop damage. Thanks to the 40 million bats in one cave alone who eat 200 tons of insects every night, the crops to the north are largely spared. Billions of dollars are saved. So it becomes vital to understand the bats, and to make sure that nothing is done to harm them.

As it is, the bats have plenty of predators. As infants, if they fall off their perch on the cave wall or ceiling, they are quickly devoured by Dermestid beetles on the cave floor. After they learn to fly, they become prey to red tail hawks, and to peregrine falcons, who scoop them out of the air. As they return to the cave, if they falter, the Texas rat snake is there to devour them whole. Only 50% of infant bats make it through year one.

Scientists have now learned much about the feeding habits of this bat, and about the hazards of its existence. Now the public is getting to hear about them, too. The project was interesting enough to attract the attention of National Geographic Magazine, the Kratt brothers "Be the Creature" on the National Geographic Channel, the Discovery Channel, the BBC and Sir David Attenborough's, "The Life of Mammals". Were this remarkable bat to disappear from the caves, it could be disastrous for many farms in the Central United States.

