Seeing with sound

Bats have been finding their way in the dark and hunting prey at night for over 55 million years. But nobody understood how they did it until less than 70 years ago.

When we go out at night, although we have eyes we cannot see unless we use a torch. The beam of light from the torch shows us what is ahead. Bats, like us, have eyes that can see when it is light. But when they fly at night they use pulses of sound to give them a picture of what is in front of them. We call this system echolocation – locating, or finding things, by their echoes.

How do bats produce and hear these calls?
Bats make and hear sounds just as we do. They produce their echolocation calls by passing air over the vocal cords in their larynx, or voice box, so making them vibrate. Hold your fingers gently on your throat and hum. Can you feel the vibrations?

Most bat echolocation calls are so high-pitched we can only hear them by using a bat detector.

What do bats need to know when they are hunting their prey?
Bats use their arms and hands in other ways too.

- How far away is the insect?
- How big is it?
- Where is it?
- In which direction is it flying?
- How fast is it flying?
- What is it?

To gain all this information quickly, most of their calls are very short and close together. When nearing their prey, the time between the sound pulse and the echo is even shorter. These very fast calls just before the bat snaps up its prey are known as a ‘feeding buzz’.

Bats send out their calls either through their mouths or their nostrils. Those using their nostrils, like the horseshoe bat above, have strange folds of skin over their faces which help to focus the sound.

Most bats in the Vesper family call through their mouth, which is why most bat photographs of flying bats show them with their mouths open. They have a small piece of cartilage at the base of the ear, called a tragus, thought to help receive the echoes.