

# Listening

## Section 4

### Answers

- 31 adult females
- 32 bond groups
- 33 co-ordination (between families)
- 34 hearing
- 35 broadcast it
- 36 a female (elephant)
- 37 hear it
- 38 C
- 39 F
- 40 B

### Tapescript

**Lecturer:** In today's lecture I'm going to continue the theme of animal communication, and I'm going to describe some of the latest research into the largest of all land animals. And that is the elephant, of course.

Let me begin by briefly outlining the structure of elephant society. Elephants live in layered societies. The basic family unit is formed of small groups of adult females, who are related to each other, and their young of both sexes. Now the females remain in their families for life, they're highly social, but male elephants leave their families at about fourteen years of age. They travel alone or congregate in small, loose groups with other males, occasionally joining a family on a temporary basis. When males are ready to mate they wander widely, searching for receptive females.

The family unit, on the other hand, often contains three generations, and it can remain stable for decades, or even centuries. Then ... each family associates with between one and five other families, probably consisting of their more distant relatives. Scientists call these groups of families 'bond groups', and bond groups belong, in turn, to even larger groups, called clans.

So elephants have a complex social structure. And like other social animals they have to be able to communicate. But what baffled early naturalists was their ability to communicate over long distances. So they set about researching this question.

In one experiment, scientists fitted groups of elephants with radio-tracking collars. And what they observed about their behaviour really intrigued them. Because they found that there was some sort of co-ordination between families. For example, two separate family groups might move in parallel to each other, miles apart, and then change direction simultaneously, either turning or moving towards each other. Now elephants have a keen sense of smell which they use whenever they can. But smell alone couldn't account for these synchronized movements, because the wind often carries odours in the wrong direction. So, the scientists concluded that the elephants were using their hearing instead, and attention then turned to the nature of elephant calls.

In another experiment, scientists from Cornell University in America went to Etosha

National Park in Namibia, and they produced a recording of calls made by a female elephant to potential mates. Then they broadcast it. And they did this from a van which was parked more than half a mile from a water hole where several bull elephants were drinking. And two of these looked up, spread their ears wide, and then crunched through the bush towards the loudspeakers. As you can imagine, the scientists may have been alarmed at this point, but the elephants marched straight on, past them and their van, in search of a female elephant. But the striking aspect of this experiment was that, when they replayed their recording, neither the two scientists nor the rest of their team, who were filming from a nearby tower, could hear it. And that's because the sounds that they had replayed were below the lower threshold of human hearing. In scientific terminology, the sounds are infrasonic.

Elephants can make these extremely low-pitched sounds because although they have a larynx, or voice box, that is similar to those of all other mammals, it's much larger. But what do the sounds 'mean'? Scientists from Pittsburgh Zoo in the USA have classified certain infrasonic calls, based on when these occur and how other elephants react to them. They found, for example, that when individual family members re-unite after separation, they greet each other very enthusiastically, and the excitement increases with the length of time that they've been separated. They trumpet and scream and touch each other. They also use a greeting rumble. This starts at a low 18 Hertz – Hertz is a measurement of sound pitch – crests at 25 Hertz, which is a level just high enough to be audible to humans, and then falls back to 18 Hertz again. In another example, an elephant attempting to locate its family uses the contact call. This call has a relatively quiet, low tone, with a strong overtone which is clearly audible to humans. Immediately after contact calling, the elephant will lift and spread its ears, and rotate its head, as if listening for the response. The contact answer is louder and more abrupt than the greeting call, and it trails off at the end. Contact calls and answers can last for hours, until the elephant successfully rejoins her family. A third type of call seems to represent a summons to move on. At the end of a meal, one member of a family moves to the edge of the group, typically lifts one leg and flaps her ears. At the same time she emits a 'let's go' rumble, which arouses the family, and they start to move on. Finally, mating activity is associated with yet another group of calls.

So, our understanding of elephant communication has increased considerably in recent years. However, even with the use of radio tracking collars it's technically difficult to document the functions of long-range communication. So although scientists are aware that elephants may know the whereabouts, and possibly the activities of other elephants that are several miles away, there may be a lot of subtle, long-range interactions which are still not evident.