Bats share a problem that politicians often complain of — they get a lot of bad press. The bats, however, are not only oblivious of it, they are far less deserving. For the past four years, Ottawa's National Capital Commission has used a "Bat Walk" programme to inform people about bats. Here Brock Fenton holds a microphone so that a passing echolocating bat can show his talents.

G.P. Bell

for orientation, but zero in on their prey in silence, again relying on their eyesight (California leaf-nosed bat, fig. 2) or on sounds coming from their target (Pallid bat, fig. 3; Indian false vampire bat, fig. 4; Egyptian slit-faced bat, fig. 5).

Why should bats turn off their echolocation if it is such a refined orientation system? The simple answer is in the amount of information the bat betrays about itself. There are, after all, a number of tropical bats that eat other bats. Any street-wise bat is certainly not going to constantly broadcast its whereabouts to possible predators. The information leak works in the other direction too. Many insects use high-frequency sounds to communicate, either to avoid each other or to locate mates, and a large variety of moths and some lacewings have ears tuned to the same frequencies the bats are broadcasting on. One of these moths, hearing a faint echolocating call, will turn and fly in another direction. If the call is loud, indicating a nearby bat, the moth will fold its wings and plummet to the ground. A moth already sitting on the ground reacts to an approaching bat by gripping the ground and pulling its body closer to it. A large number of bats, then, use echolocation only when necessary and rarely for hunting.

The moth on the ground presents the bat with an interesting problem, different from that of tracking flying prey. An insect in the air is a "hard" target on a "soft" background; the bats' cries bounce off the insect, or continue through the surrounding air, and the bat can hear the clear difference. A moth on the ground or a tree trunk, however, represents a hard target on a hard background, a much more difficult distinction to make. There are only marginal differences between the reflected sound from the target and from the background. Bats that hunt stationary prey are called gleaners. The Pallid bat (fig. 3), a gleaner, prefers to use sounds generated by the insect itself to home in on. The California leaf-nosed bat (fig. 2), even though it can use echolocation to find a hard target on a hard background, uses vision if light levels are sufficient.

Bats also use echolocation to communicate with each other. Whether going out to dinner, going home to roost, looking for a mate or a hibernation site, Little brown bats (fig. 6) fly towards speakers that are playing recorded Little brown bat echolocation calls. In other words they use echolocation signals to seek one another out, to communicate. Spotted bats (see photo p. 28) use echolocation calls to locate each other, but not for the purpose of meeting. They use the signals to space their numbers out, particularly in hunting areas where prey density is low. Their response to recorded calls is to leave the area, logical when echolocation is seen as a spacing device.

The dusky world of the bat is filled with interesting examples of how this echolocation technique has been refined for specific uses. There are the Bushveld bats of South Africa (fig. 7) that use the Doppler-shifted echoes from their prey's fluttering wings, a strategy that evolved about 60 million years ago. There are the Large slit-faced bats of Africa (fig. 8) that home in on the

Indian false vampire bat.

M.B. Fenton