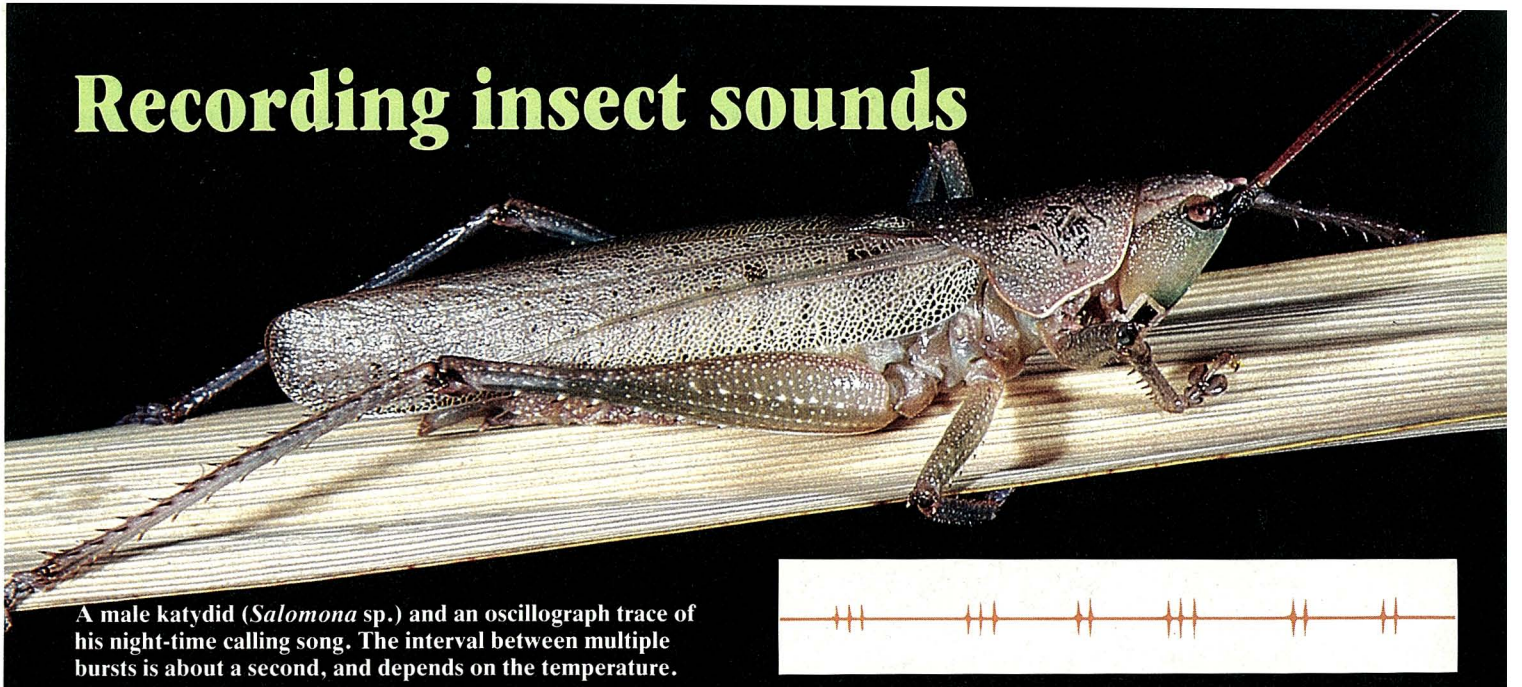
Recording insect sounds



A male katydid (*Salomona* sp.) and an oscillograph trace of his night-time calling song. The interval between multiple bursts is about a second, and depends on the temperature.

Chirp...click...zzzst...hum ...buzz. Many kinds of insects make sounds. Warm summer days wouldn't be the same without the throb of cicadas and, as the light fades, crickets tentatively adding their vibrations to the evening air.

Aristotle noted that grasshoppers produce sounds, and in modern times the list of known insect soundsmiths continues to grow.

Like us, insects use sound to communicate. Mosquitoes buzz at a frequency that will attract the opposite sex. Beetles alarm potential predators by rubbing together parts of their body. Termites knock their heads against the wall of their galleries to warn others of approaching danger.

Scientists who study insect taxonomy have begun to make use of the characteristic sounds insects make. Especially when dealing with the order Orthoptera (the grasshoppers and their relatives), characteristic mating calls can simplify the identification of a specimen.

Indeed, some species, although so closely related they cannot be outwardly distinguished, have very different songs. Certain taxonomically 'difficult' groups — such as the field crickets, tree crickets, and katydids (bush crickets or long-horned grasshoppers) — have been unravelled by comparing the songs of the males.

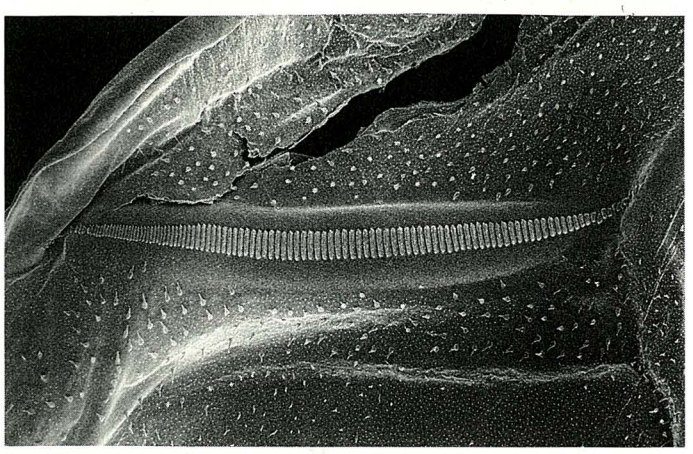
Museum curators, and others who take on the task of preserving objects of natural history, are now accumulating tape recordings of insects. The British Museum (Natural History) has been documenting Orthoptera sounds since 1955. In Australia, the Australian National Insect Collection (in the care of the CSIRO Division of Entomology in Canberra) has begun assembling the calling songs of Orthoptera from all over the continent. Since 1980, Dr David Rentz has recorded more than 300 species.

In Perth, the University of Western Australia is collecting the songs of that State's Orthoptera.

Grasshoppers and their allies are Dr Rentz's specialty, and he records their sounds both by day (at the CSIRO laboratory) and night (at his home study). Newly acquired specimens from a field trip are kept alive in large jars until they feel moved to sing, whereupon Dr Rentz rolls the recorder.

In this way, the recorded sound is matched to the individual that made it. The drawback with field recording is that the performer may prove elusive, and its signal may be affected by the noise of others. Only about 20% of the recordings originate in the field, and these are of species that refuse to sing in captivity.

Dr Rentz has studied the way in which katydids use their wings to make sound. One wing of the male carries a series of small ridges, akin to a file, which he draws across a hard ridge on the other wing — like a washboard player in a jazz band. The rasping sound that results is amplified by resonators on his wing.



The 'file' at the base of one of its wings, seen under the scanning electron microscope. The creature scrapes the file, about 2 mm long, with its other wing to make a burst of sound.

Often the sound is very high-pitched, and some species' sounds are beyond the range of human hearing (and common recording equipment). Fortunately, most of the key rhythmic patterns are in the audible range.

Male katydids sing longest and loudest. Females sometimes softly answer, using a less-developed mechanism.

Some species of katydid communicate in an extraordinary manner: the males stamp their feet, which produces vibrations that are picked up by females.

Dr Rentz is making a particular effort to record species that may soon become extinct. For quite a few, it's probably already too late — expanding civilization has overtaken them.

But for number of vanishing species, their swan song, preserved on tape, will prove as valuable to science as the mute specimens themselves. In one sense, the recordings will bring these specimens back to life for future generations of entomologists.

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Insect sound. D.C.F. Rentz *Phonographic Bulletin* No. 34, 1982, 42–9.