

Detecting Wood-Boring Insects

electronic device developed as aid in locating insects destructive to timber and wood products

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The footsteps of a single drywood termite can be heard with a listening device designed as a tool for use in research.

The listening device consists primarily of a small, lightweight instrument which, in essence, is a high-gain, low-noise, frequency selective amplifier. A highly sensitive pickup with a slender, needle-like probe protruding from the head is attached to a lead which plugs into the body of the amplifier. The probe may be pushed into any hardwood surface and leaves only the smallest of holes when removed. A light pair of earphones completes the instrument, which has a gross weight of about three pounds. A small, thumb-controlled, on-off volume control is situated near the handle, enabling the switching to be accomplished with one hand. The current model includes a small meter which indicates power drain on the *A* and *B* batteries.

Many wood-boring insects—attacking timber, stored lumber, buildings, and furniture—are of economic importance. Among those insects—and of great economic importance—are the termites, which alone are responsible for an annual outlay of millions of dollars spent on their control.

Detection of wood-boring insects has been difficult because of their hidden life. In many cases the presence of freshly extruded frass indicates the possibility of some infestation, but often the visible signs are wanting. Hitherto, the one sure method of detecting an infestation was to cut into and open the wood to expose the insects within. This method could prove to be as costly as the damage caused by the insects themselves.

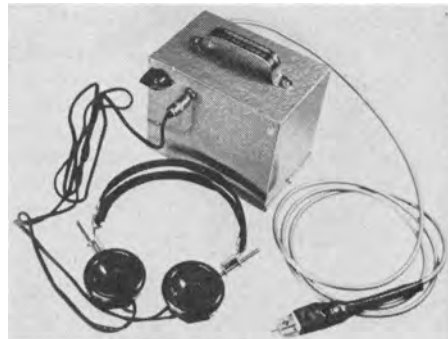
The existence of the problems of detecting and identifying wood-boring insects prompted investigation of the possibility of designing a small portable electronic listening device.

An instrument was designed as a DC unit with a band pass and receptivity sympathetic to the footsteps of a drywood termite. The selection of drywood termites was made because of their comparative quietness in relation to the feeding and movement sounds of the soldiers and workers of subterranean and dampwood termites. By narrowing the receptivity of the device to the range of the sound of the footfalls of a single termite, the selectivity is such that extraneous

and undesirable noises are minimized. It is difficult to exclude all sounds other than those desired, but high receptivity to a limited band in the over-all sound spectrum enables the operator to receive peak frequencies in the narrow range he is seeking.

Once the operator becomes familiar with the characteristic sound pattern created by different insects, he can quickly isolate and analyze these signals. When surveying for termites—for example—it is necessary to first disturb the area where termites are thought to be present. This may be accomplished by a series of raps with some suitable tool. This rapping sets up an alarm system which is relayed throughout the colony by sharp signal raps of the soldier and worker termites. It is these return signals that are detected by the operator.

When used as a laboratory tool where controlled conditions can be effected, the listening device is of great value in studying the movements of insects. The study of the rhythmic cadence of sound created by undisturbed drywood termites opens up a new field of investigation. The interval of sounds of feeding and motion of many other unseen insects affords the



Insect-detecting device.

investigator opportunities to better study their behavior.

The electronic listening device cannot be considered as an answer to the many problems in the commercial field, but it is being field-tested as an aid in specific research problems.

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Portion of a colony of drywood termites.

