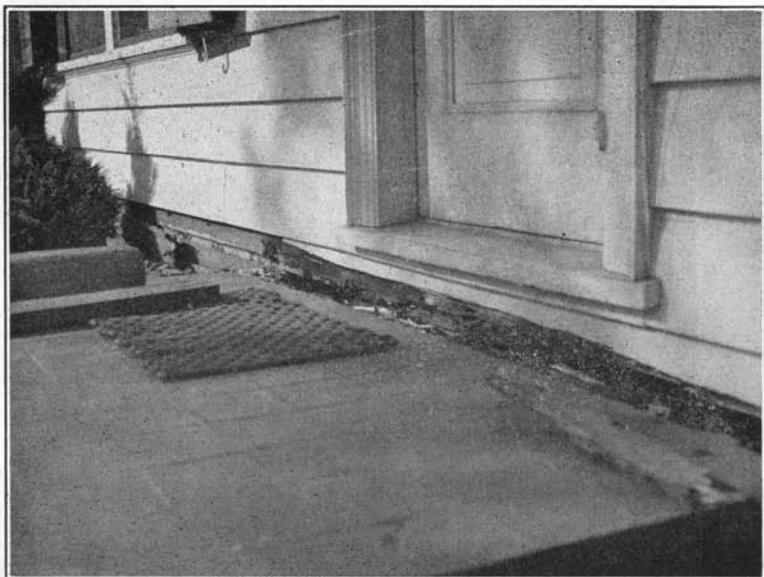


# Control of Termites in Buildings

by Neely Turner



Termite damage to sill and sheathing adjoining masonry porch. Part of porch floor removed to make repairs.

CONNECTICUT AGRICULTURAL EXPERIMENT  
STATION, NEW HAVEN, CONNECTICUT

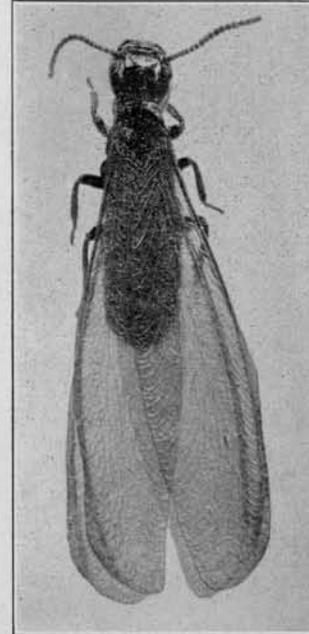
# CONTROL OF TERMITES IN BUILDINGS

Neely Turner<sup>1</sup>

Eastern subterranean termites are native to Connecticut and have infested some buildings for many years. These termites live in the soil and may enter buildings at places where the wood of the structure touches the soil. The large increase in termite damage since 1930 seems to be associated with changes in the type of architecture used. The two changes which have made houses more susceptible to termite attacks are the use of soil filled masonry porches and building close to the ground.

## HOW TERMITES ENTER BUILDINGS

Termites may enter buildings (1) through direct contact between wood and the soil, (2) through cracks or hollows in masonry or concrete foundations or (3) by covered shelter tubes which they build for short distances over the face of masonry foundations.



Winged adult termite, about seven times natural size.

Direct contact between wood and soil is by far the most common means of entry in Connecticut buildings. Such construction as sills in contact with fill under masonry porches; wooden supporting posts, partitions and steps projecting underneath concrete basement floors; and wooden hatchways, steps and porches fit into this category. *More than half of the infested modern dwellings in Connecticut have been attacked through filled masonry porches and terraces.*

Termites occasionally infest a building by reaching the wood through cracks or voids in the foundation. Poorly laid cinder block foundations are especially susceptible to termite entry.

Few cases of entry through shelter tubes built up over foundations have been seen in this area.

## FINDING TERMITES IN BUILDINGS

In many cases the first indication that a building is infested by termites is the occurrence of a swarm of winged adults. These come from infested wood through one or more small openings. The swarming season lasts from late winter to early spring, and the males and females mate and attempt to start new colonies in moist soil. The winged termites themselves are considered harmless except as an indication that

the building is infested. They may be killed by any household insecticide spray.

Winged ants may appear in houses in late spring or summer. These ants are "wasp-waisted" and easily distinguished from termites.

The presence of brown, earth-like shelter tubes on the foundation or even on infested wood may be the first external indication of a termite



Termites constructed this shelter tube from wood to the ground in a partly excavated area (formerly exterior).

infestation. The white worker termites build these tubes over obstructions or over unpalatable wood. These workers live entirely under cover. They eat the cellulose of dead wood which they digest with the aid of bacteria and protozoa occurring in the digestive tract. They require a constant source of moisture, usually moist soil.

It is difficult to determine whether or not termites are present without these external indications. The first step is the examination of wood in contact with the ground. This may be done by punching the wood

near the ground with a sharp instrument such as a screwdriver. If much damage has been done, the screwdriver will open up some of the burrows. Termites usually eat out the soft portions of the wood and leave the hard section of the annual ring. Termite burrows usually contain wood paste which resembles commercial wood putty.

## CONTROL OF TERMITES

It is obvious that the most efficient control of termites is to construct buildings so that the insects have no hidden access to wood. Specifications for termite-resistant construction of new buildings are given on page 8. These are of little use, however, in the case of existing buildings already infested except as a guide for repairs.

In general, insects are controlled by insecticides. In the case of termites, insecticides are not very useful because it is difficult to reach the workers. It is generally agreed that the best method of control is to create a barrier between the soil and the wooden portions of the building. This should prevent the termites in the ground from continuing to damage the wood. It also kills any termites left in the wood by cutting them off from moisture.

Various types of barriers have been used. The most complete is a termite shield, usually built of copper. It is installed at least six inches above the grade level and below all first floor woodwork. There is usually a projection of at least an inch both inside and outside the foundation or partition wall. The shield must be a complete sheet of metal without holes or cracks. Such a termite shield has been used only in heavily infested buildings of considerable value because of the relatively high cost of installation.

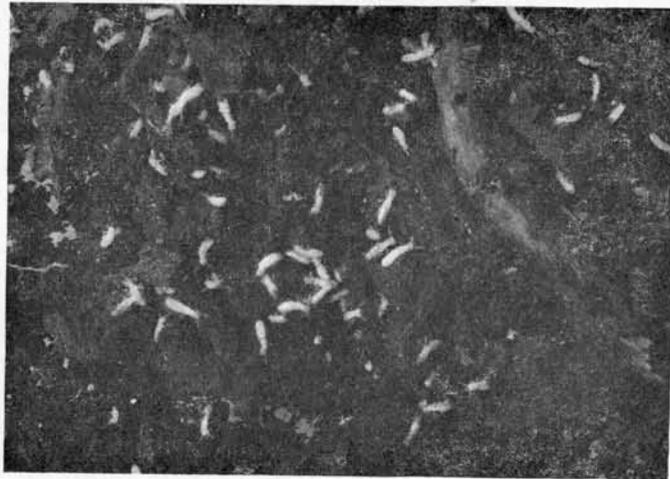
## Chemical Barriers

At the other extreme, chemical treatment of the soil has been used to create a barrier. It is difficult, however, to make a chemical treatment thorough enough to stop termites unless the soil is removed and treated.

In a large majority of infested buildings a combination of structural and chemical barriers has been the most acceptable control measure. The type of structural changes required is indicated in the following list.

1. Cut off any wood in contact with the soil and place on a concrete base extending at least 6 inches above the ground.
2. Provide at least 18 inches clearance and adequate ventilation between the soil in unexcavated areas and any pipes, air ducts, etc., attached to the floor above.
3. Replace wooden basement window frames with metal frames.
4. Replace wooden bearing posts in the basement with lally columns or place the posts on a concrete curb extending at least 6 inches above the floor.
5. Place all permanent wooden basement partitions on 6-inch concrete curbs.
6. Replace any wooden basement floors with materials not susceptible to termite damage.
7. Protect the wood adjoining masonry porches by tunnelling to remove the soil or fill adjoining the wood, treat the soil remaining with chemicals and leave open for inspection; or install a metal termite shield.
8. Use lumber treated under pressure with creosote, zinc chloride or equivalent wood preservative for sill and stud replacements when such lumber is available.

Chemical treatments of the soil may be made during the course of these repairs. For instance, if wooden posts in the basement are to be set on concrete bases, the soil underneath should be treated after the



Termite workers, soldiers and supplementary queens. Natural size.

posts are cut off and before the concrete is poured.

Chemical treatment of the soil may also be used around the foundations of the building. The usual method of application is to dig a narrow trench from one to three feet deep adjoining the foundation. The chemical treating material is placed in this trench and is expected to penetrate down the foundation. The trench is then filled and treated as the job proceeds.

#### Materials

Many different chemicals have been used for control of termites in the soil. None has lasted indefinitely, but tests have shown that when applied properly they may last five years or more. The materials discussed here are those which have the best records of effectiveness and the least hazards of use.

Sodium arsenite is a water-soluble poison which should not be used near wells or springs. It is generally applied at the rate of one gallon of 10 per cent solution to 5 cubic feet of soil.

Pentachlorophenol is usually used in a 5 per cent solution in fuel oil. The suggested rate of application is 1 gallon of the solution to 5 cubic feet of soil.

Most termite control operators use their own preparations which usually contain either one of these materials or some other effective chemical.

All soil treating materials may injure the roots of shrubs when used in quantities large enough to kill termites. Valuable plants should be moved to another location to avoid damage. Lining the outside of the trench with roofing paper may help to protect shrubbery from damage.

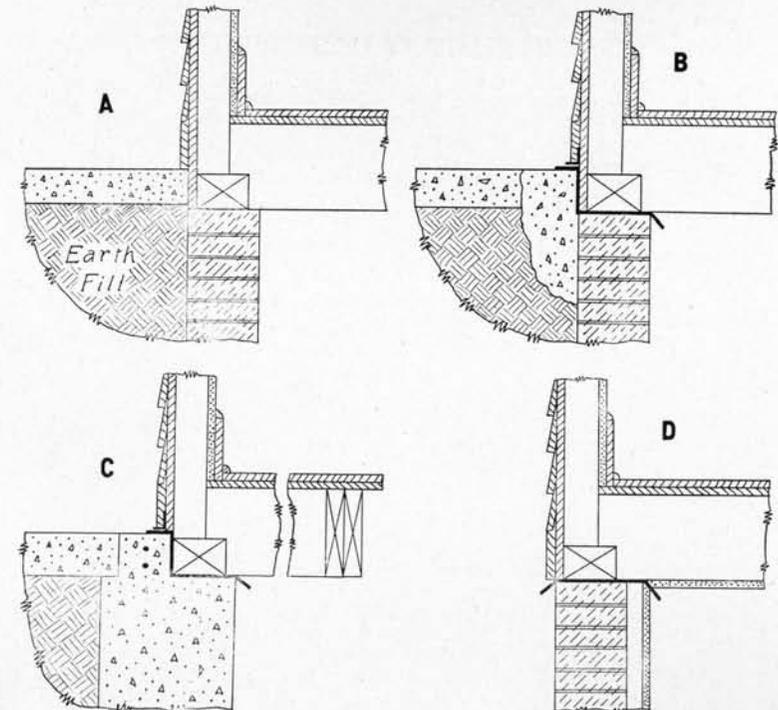
#### Reinspection of Infested Buildings

After any termite control work has been done it is always advisable to reinspect the building periodically. Particular attention should be paid to the spots where reconstruction has been necessary. If termites are found, further chemical treatment or even more reconstruction may be necessary.

#### OTHER INSECTS DAMAGING WOOD OR RESEMBLING TERMITES

Winged adults of the European pavement ant are about the same size and color as winged termites. They come from ant nests located under basement floors or alongside of foundations. They are definitely "wasp-waisted", which serves to distinguish them from winged termites.

The carpenter ant may excavate wood in buildings for a nest. Entry is usually made at some point where the wood is wet, such as a cornice or porch post. These ants cannot digest wood, and they cast away "saw-



A. Cross-section of usual type of filled masonry porch which allows termites to enter the sheathing and sill. B. Reconstruction of usual type of porch, showing in cross-section the metal shield protected by a layer of concrete.

C. Cross-section showing foundation with extra thickness adjoining masonry porch. May be used without shield. Also illustrates use of short joists at right angles to the sill to facilitate inspection. D. Metal shield used to protect woodwork above furred-out basement walls. Drawings by J. F. Townsend.

dust" from their burrows. Ant burrows are cleaner than termite burrows, and no wood paste is present. Carpenter ant damage is usually not very serious and the ants can be killed by poison baits or by chlordan sprays.

Powder post beetles of several types have damaged wood in buildings. The grubs feed on the wood, leaving burrows filled with very fine dust. The emerging beetles leave small round exit holes in the surface of the wood. Most of the severe infestations have been in native lumber cured rapidly out-of-doors where the adult beetles could reach it. In some cases they may cause serious damage. Surface treatment of wood using penetrating chemicals is usually sufficient for control. Pentachlorophenol is a suggested remedy. The wood preservative paint "Cuprinol" has also been effective.

Wood attacked by fungi, called "dry-rot", is much different in appearance from wood attacked by termites. Rotten wood may be checked on the surface but contains no burrows. Such rot is caused by moisture and can be prevented by proper drainage or ventilation to keep the wood dry.

### TERMITE-RESISTANT CONSTRUCTION

The following specifications are suggested for Connecticut buildings:

1. Foundations shall be of monolithic concrete construction or of solid unit masonry laid solid in cement mortar and capped below woodwork with at least 1 inch of cement mortar.
2. The top of the foundation shall be at least 12 inches above the final grade level.
3. Foundations adjoining masonry porches or terraces shall be of monolithic concrete with an extra thickness to avoid a crack between the fill and wooden portions of the building. (See Illustration C, page 7.)
4. There shall be at least 18 inches clearance between the ground and any pipes, air ducts, etc., attached to the floor above in any partially excavated areas.
5. Partially excavated areas shall be provided with ventilation either from the basement or from the outside.
6. No wooden construction shall be used below the first floor framework with the following exceptions:
  - a. Basement stairs may be wooden and shall be set on and not in the concrete floor.
  - b. Basement partitions may be wooden provided they are set on a concrete curb extending at least 6 inches above the basement floor and are separated from basement walls by a 3-inch concrete plinth.
7. If specifications of items 1, 2, 3 or 6 are altered, a metal termite shield (described on page 5) shall be installed. No alterations allowable in items 4 and 5.

In the average six-room house, the extra cost of the changes from usual construction methods should not exceed \$500. Architects or prospective home builders, encountering problems not covered in these general specifications, may obtain suggestions for meeting them by writing to the Experiment Station.