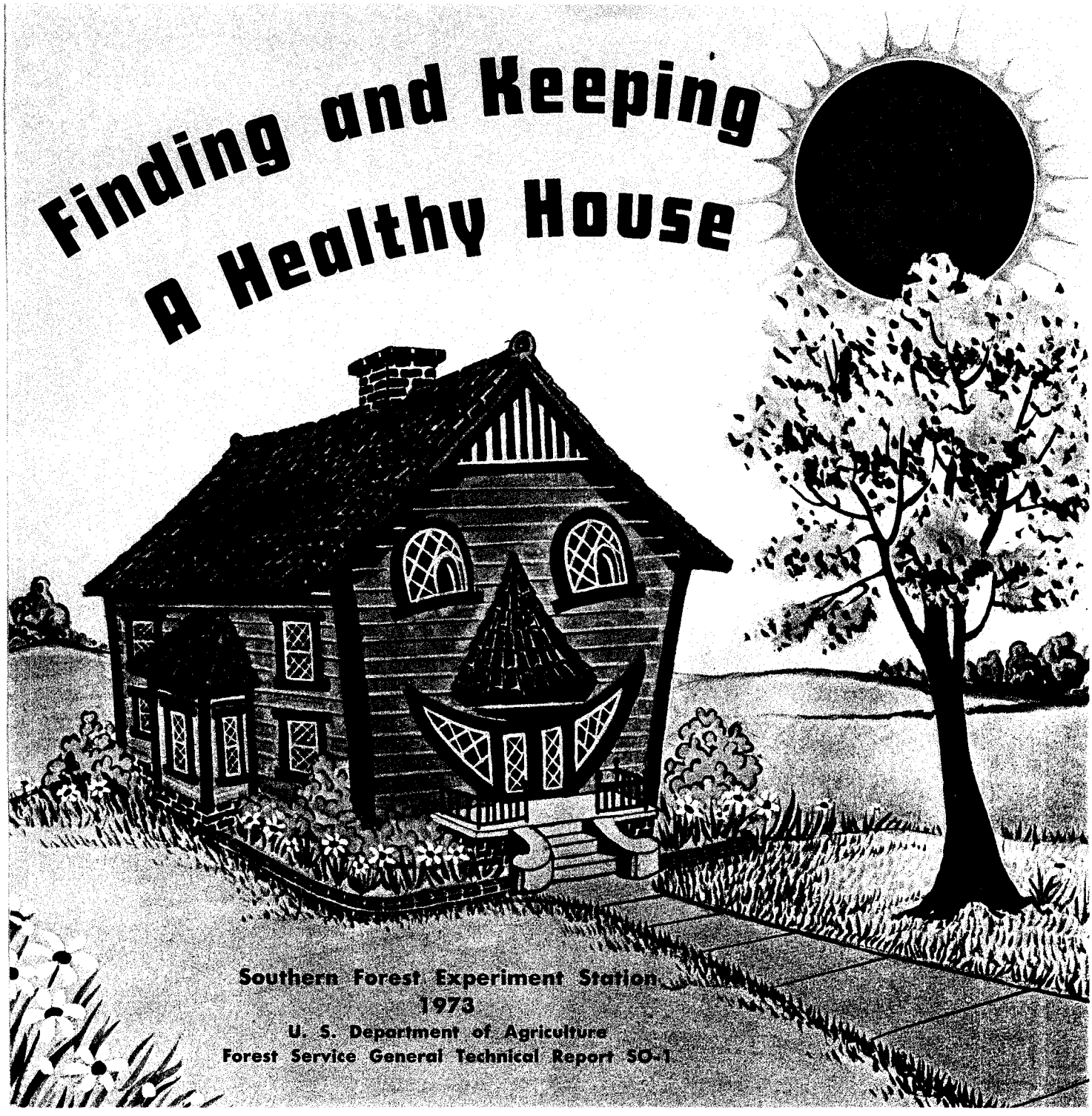
# Finding and Keeping A Healthy House



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# Finding and Keeping a Healthy House

*R. C. Biesterfeldt, T. L. Amburgey, and L. H. Williams*

A house is the average family's most expensive and important possession. It stands between the family and the world, and it will continue to do so as long as it stays healthy. Curing a sick house, one that has a serious case of decay or insect damage, can be a big job. But preventive medicine is no great chore in a well-constructed house. This booklet provides tips for selecting a healthy house and for keeping it that way.

At Gulfport, Mississippi, years of research by the Southern Forest Experiment Station have demonstrated that good construction is essential for excluding decay, termites, or other structural pests. Unfortunately, construction practices are not always the best, and many people do not know how to maintain their houses. As a result, houses often fail to outlive their mortgages without costly repairs. The annual costs of termite damage and control exceed $500 million in the United States. Estimates of losses to wood decay are not available, but the costs, including outlays for repairs, probably are as high as those for termites.

No buyer is looking for a house that is infested with termites or weakened by rot, but many a buyer gets just that. A termite inspection is required before certain types of home mortgages can be obtained, but for the most part the buyer must depend upon himself or his agent to find a healthy house. In a poorly constructed house, damage may not be visible. The buyer, therefore, should give careful attention to design features as well as signs of insects or decay.

Many buyers who would carefully inspect an old house for evidence of decay and structural pests fail to consider these wood destroyers when choosing a new house. Their confidence is often misplaced. If it is not properly protected, the sapwood lumber used in new homes is highly susceptible to decay and insects. If poor construction makes the wood vulnerable, damage almost certainly will occur in just a few years. In one sense, an old house is less of a risk. It has stood the test of time. If it is healthy now it will probably remain so with proper maintenance.

In this booklet, the destroyers of wood in houses are discussed in order of probable occurrence. Decay comes first because it is the most likely form of damage in most houses. Termites and other wood-destroying insects are covered next, and wood-nesting insects last.

# DECAY

Wood decay is caused by small plants called fungi. These organisms cannot colonize or decay wood that has a moisture content of less than about 30 percent. The wood in a properly constructed and maintained home is safe because its moisture content is seldom above 15 percent. The prescription for preventing decay is simple: KEEP WOOD DRY.

That prescription is not always easy to follow, however. The siding of a house is exposed to rain that blows against it. When there is a large temperature difference between the inside and outside of a house, condensation can occur within the walls. Soil conducts water and can easily moisten wood in contact with it or directly above it to a point where decay is possible. Plumbing leaks can make wood inside the home vulnerable.

One must strive to keep wood dry at all times, because wood soaks up water and retains it for long periods. An occasional soaking during heavy rains will supply ample water for decay during the period between rains.

Wood that will become wet can be protected by treating it with preservatives. To assure long-term protection of wood, the preservative must be applied under pressure. If the wood is in contact with the ground, only pressure treatment is satisfactory. Decay resistance of pieces that will occasionally become moist can be increased slightly by brushing on a preservative, and soaking gives some additional protection. The appropriate chemical for treatment depends upon the wood's purpose. Some chemicals give off harmful odors, precluding their use indoors. Others cause paint to peel. The use for the treated wood should be specified when it or the preservative is purchased.

Even the fungi that cause what is called "dry-rot" cannot feed upon wood that has a moisture content below 30 percent, but they can conduct water from wet to dry portions of wood through structures called rhizomorphs. The primary water-conducting decay fungus in the United States is *Poria incrassata*. Since it brings moisture from one portion of a house to another, it can destroy all the wood in a building very rapidly—possibly within 2 years. Although this much destruction does not occur often, it is well to remember that it is possible, and that this fungus can grow wherever ordinary decay fungi can grow.

Mold and stain fungi also attack wood. Molds grow mainly on the surface but may penetrate the outer sapwood; the discoloration they cause can be removed by light sanding. Stain fungi penetrate the outer layers of sapwood and cause discoloration that cannot be removed. Both molds and stains feed upon wood. By themselves, they do not decay or weaken the wood, but by penetrating its tissues they increase its capacity to absorb and hold moisture. Thus, they increase the likelihood of decay, and their presence indicates a moisture problem. In addition, some people are allergic to the spores of mold fungi.

Wood decays very slowly at temperatures below 40°F. Building deterioration, therefore, is more rapid in the South than the North. Decay is also more rapid in humid than in dry regions. The organisms causing decay, however, are present throughout the United States.

## Designing for Dryness

When buying a house or planning alterations, remember that designs which permit wood to become wet invite decay. Moisture comes from soil as well as from rain.

**Foundation sill plates**, the lowest wood members of your house, should be well above the soil level around the entire perimeter of your house. Wood siding should be at least 8 inches above grade. With concrete slab construction, a portion of the slab should be visible on all sides of the house. Homeowners often invite decay by raising the level of the soil at the side of the house in order to plant flowers.

Embedding wood in concrete that is near the soil is also dangerous. If wood is laid on a concrete slab, there should be a moisture barrier under or on the slab. Where no barrier is present, the wood should be pressure-treated with preservatives. Posts resting on concrete floors can be protected by placing them on raised bases.

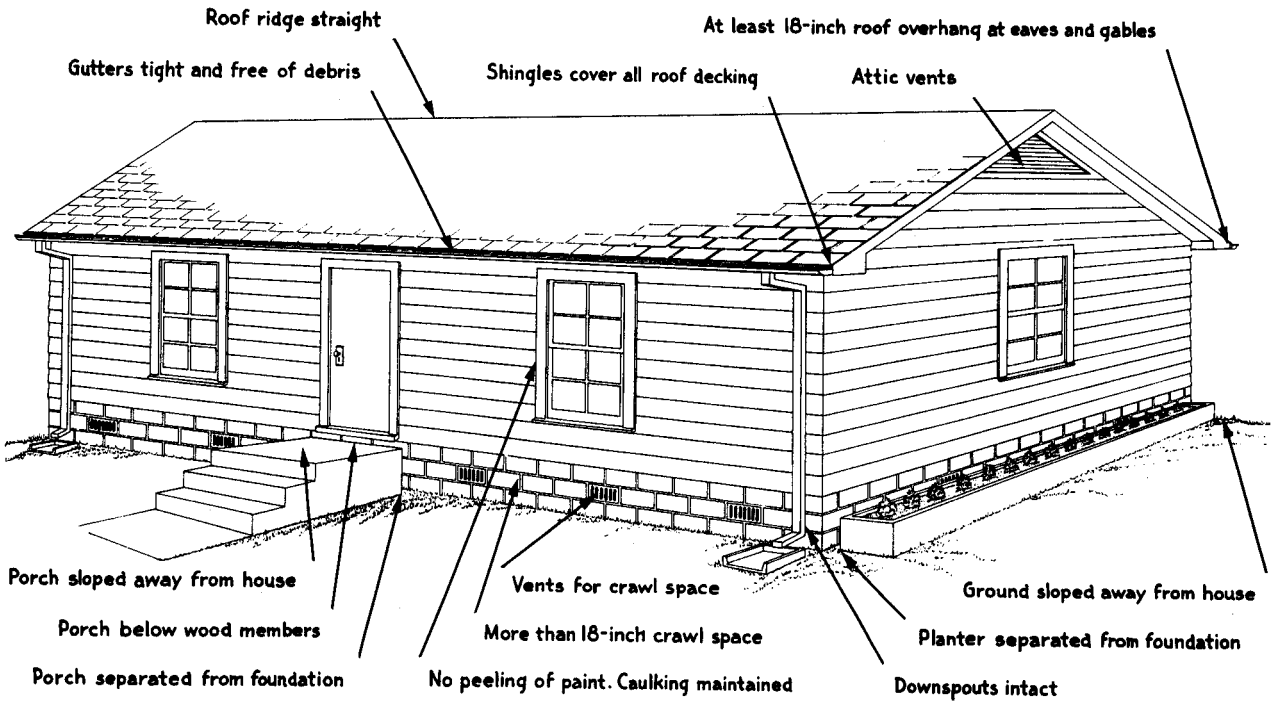
**Water drainage** away from the house is very important. Check for drainage by looking for puddles after a heavy rain. If the site is not level, subsurface tile drains may have to be installed on the upslope side to direct water around rather than under the house.

**Crawl spaces** under houses should be elevated at least 18 inches (preferably 2 feet), and they should be ventilated and protected from soil water. Even though the water table is many feet down, soil can transmit large quantities of water to the surface. In the shade beneath a house, uncovered soil will cause high humidities, and condensation may moisten wood foundation members and subflooring. To prevent this, it is recommended that the soil be covered with an impervious substance (moisture barrier) such as polyethylene or roll roofing. In addition, the level of the soil beneath the house should always be higher than that of the surrounding area. If it is not, puddles will develop beneath the house and the impervious layer will be more a hazard than a help if water is permitted to accumulate on top of it. The crawl space should have at least 4 wall ventilators located near the corners. The combined ventilating area of the openings should be at least 1/150 of the area underneath the house if the ground surface is bare, and 1/1,500 of the area under the house if the ground surface is covered with a moisture barrier.

In houses with basements, all below-grade portions of the foundation walls should be waterproofed on the outside. One method is to apply asphalt and cover it with polyethylene while it is still tacky.

**The price of rain seepage.**

# YES!

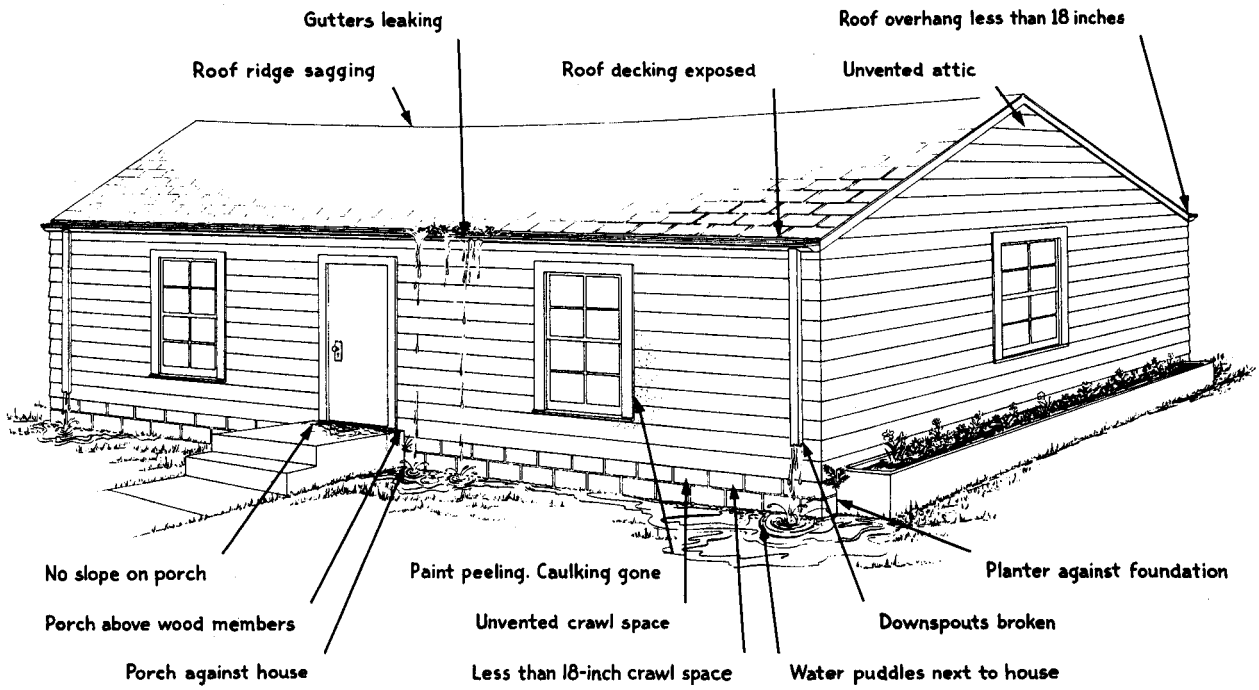



**Earthfilled structures,** such as porches, patios, and flower planters, present a very high decay hazard if they are in contact with the foundation and if the level of fill is above the foundation sill plates. Such structures should be separated from the foundation by 1 to 2 inches. In existing filled porches in contact with the foundation, the fill should be removed from the area adjacent to the house. The surface of patios and porches should be sloped away from the house.

**Sufficient roof overhang** is particularly important for protecting siding, windows, and doors from rainwater. In most parts of the United States 18 inches are sufficient, but 30 inches may be needed in areas of high rainfall such as the Gulf Coast and much of the Pacific Coast. This overhang is necessary at both gables and eaves. It prevents water from running down the siding except when high winds accompanies a rain.

**Caulking** is needed around doors and windows. When the culking dries and cracks, it must be replaced.

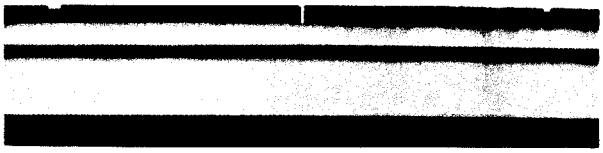
# NO!



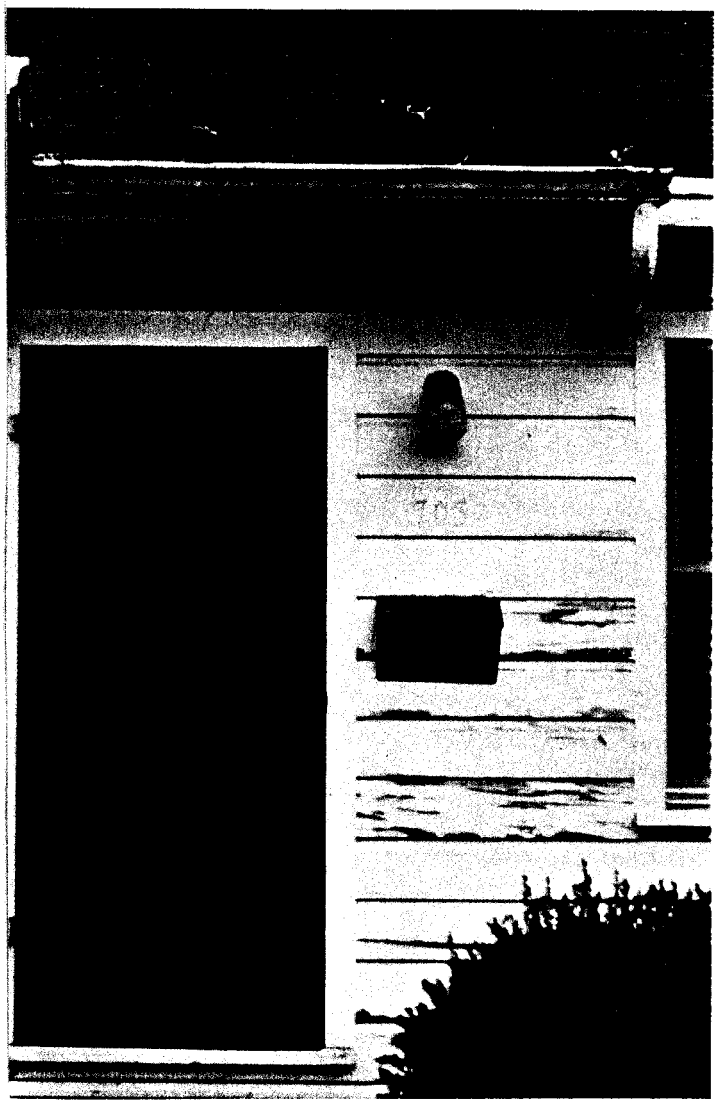

**Gutters and downspouts** prevent water from running down or splashing against siding. If they are not kept clear and free of leaks, however, gutters can be more of a hazard than a help. Water can back up in them and soak fascia boards and siding. Downspouts should direct water away from the house.

**Attic vents** at eaves and gables prevent moist air from accumulating. Roofs without gables (hip roofs) should have ventilators near their peaks. In warm, humid climates it is also advisable to install attic ventilating fans.

**Roof leaks** can cause very extensive decay in a short time. Leaks near the center of the roof are usually spotted and repaired promptly because they lead to ceiling damage inside the house. Those near the edge of the roof often go unnoticed for long periods, causing decay of decking and fascia boards. Asphalt shingles are often installed so that roof decking is exposed between shingle tabs at the eaves. A complete layer of shingles should extend beyond all edges of the roof. Metal flashing at the lower edge of the roof is also helpful.



**Gaps between shingles near the roof edge can lead to decay.**



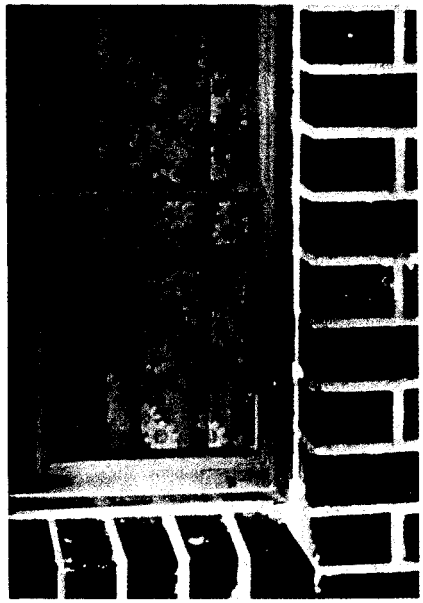
**Condensation** is a troublesome source of moisture that can be avoided through placement of vapor barriers and through proper ventilation. It is caused by warm, moist air passing over a cooler surface. In cold climates, moisture barriers should be placed on the warm side (inside) of insulated walls and ceilings. Polyethylene directly behind the wall board is very effective. In existing homes, an impermeable paint applied to inside walls will greatly reduce the amount of water moving into them. In warm, humid regions condensation is sometimes associated with air conditioning. Insulated walls that permit free passage of water vapor are relatively safe.

**Complete paint films** or stains containing a wood preservative and water repellent should be maintained on all exposed wood surfaces. Paint is not a preservative, but it protects wood from intermittent wetting. Peeling paint and nail pulling indicate that wood is getting wet, that decay is likely to occur.

In warm, moist climates molds may develop on the paint. On the Gulf Coast, where mildew is very common, fungicides can be mixed with paint to protect it. Many of the fungicides are highly poisonous, however, and they should be used with great caution.

In general, architectural frills or novel forms of construction should be studied carefully before they are adopted. They may provide entrance points or pockets in which moisture can remain long enough for decay to get started. Lumber takes in water most readily through exposed ends, as in joints.

**Paint peels from wood that is getting wet. If decay is not present, it soon will be.**



**Caulking around windows prevents rain seepage.**

**Ample roof overhang protects siding. Attic vents prevent condensation.**

### Indoor Water Sources

**Plumbing leaks,** even very small ones, eventually lead to decay of the wood that becomes wet. Often the cost of repair is quite high before any damage is apparent.

Leaks in caulking around **bathtubs, shower stalls,** and **sinks** may permit large quantities of water to enter walls and flooring. In some cases the flooring beneath a bathtub has given way before the owner knew that any major damage was occurring. When buying a home investigate carefully around showers, sinks, and tubs. Flooring that is no longer level, does not fit tightly against baseboards, or feels spongy when walked on is a sign of advanced decay.

**Cold water pipes** that accumulate condensation or "sweat" for long periods should be insulated. The same is true for **air conditioning ducts.**

**Improperly vented appliances** can release considerable moisture inside the house. Clothes driers, for example, should be vented to the outside of the house and not into a crawl space, garage, or attic.

# DESTRUCTIVE INSECTS

The average homeowner is probably more fearful of subterranean termites than of decay. Even though he is not familiar with termite control techniques, he is aware of the termite threat. He may not know that other insects also can severely damage the wood in his home. Drywood termites and certain beetles as well as subterranean termites feed upon the wood in houses. And carpenter ants and carpenter bees may nest in wood, causing some damage and a major nuisance. The homeowner or buyer should learn to recognize the damage of these insects, and he should know a little about the insects and the proper methods for controlling them.

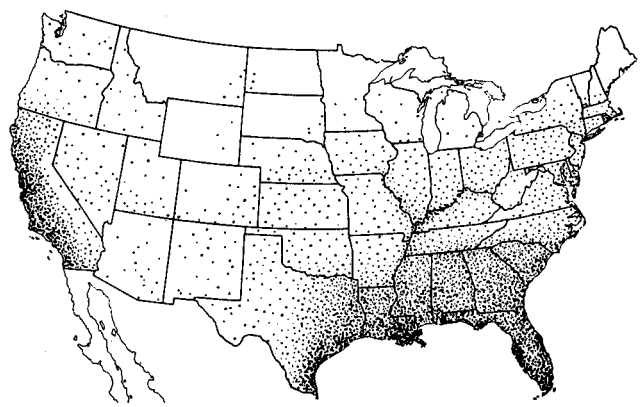
## SUBTERRANEAN TERMITES

These insects have earned their notoriety by causing costly damage in much of the United States. But, as will be shown, infestations can be prevented through proper building design, construction, and maintenance. If a colony is discovered in the home, there is no cause for panic. Effective control methods are known.

Subterranean termites live in large social groups called colonies. They got their name because workers and soldiers, the most common forms in colonies, spend their entire lives either underground or in completely enclosed galleries in wood that is under attack.

These insects require high humidity, which they maintain with moisture from the soil or from a dependable supply in the wood under attack. The danger of attack and the speed at which destruction occurs increase with average temperature and with moisture availability.

Subterranean termites are found in most tropical and temperate regions of the world. The accompanying map indicates where they are a major cause for concern.



**Relative hazard of termite attack in the United States.**

## Recognizing Termites and Their Work

Because subterranean termites must avoid contact with dry air, their work often goes unnoticed until damage is serious or until the colony produces a flight of winged adults called a swarm.

In the East, **swarming** occurs most frequently on sunny spring days. Flights may occur in almost any month in warm, humid parts of the country, however.

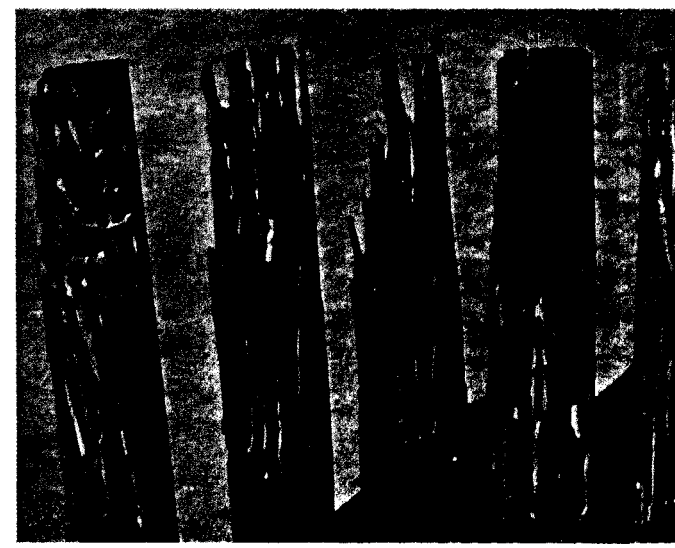
**Winged termites** inside the house are almost a sure sign of trouble. They are fairly easy to recognize. They have yellow-brown to black bodies and two pairs of long, whitish, translucent wings of **equal size.** The reproductive forms of ants, with which winged termites are often confused, have two pairs of wings of unequal size. Termites have **thick waistlines,** whereas ants have hourglass figures.

**Winged adults are often the first sign of a termite infestation.**

Soon after the flight the wings are discarded by adult termites. **Discarded wings** are often found beneath doors or windows and around light fixtures, because the winged forms are attracted to light. Their presence inside the house is a strong indication of infestation. Because there are many colonies outside in stumps and the like, adults seen near the house are not necessarily a sign of trouble.

**Damage to wood** usually cannot be observed unless the exterior is stripped away. When it is, a series of galleries that give the wood a honeycomb appearance is revealed. The inside of feeding galleries is covered with grayish specks of excrement and earth. Infested softwoods appear honeycombed because termites feed on the softer wood a tree produces in spring and avoid the denser wood grown in summer.

**Wood attacked by subterranean termites often appears honeycombed.**

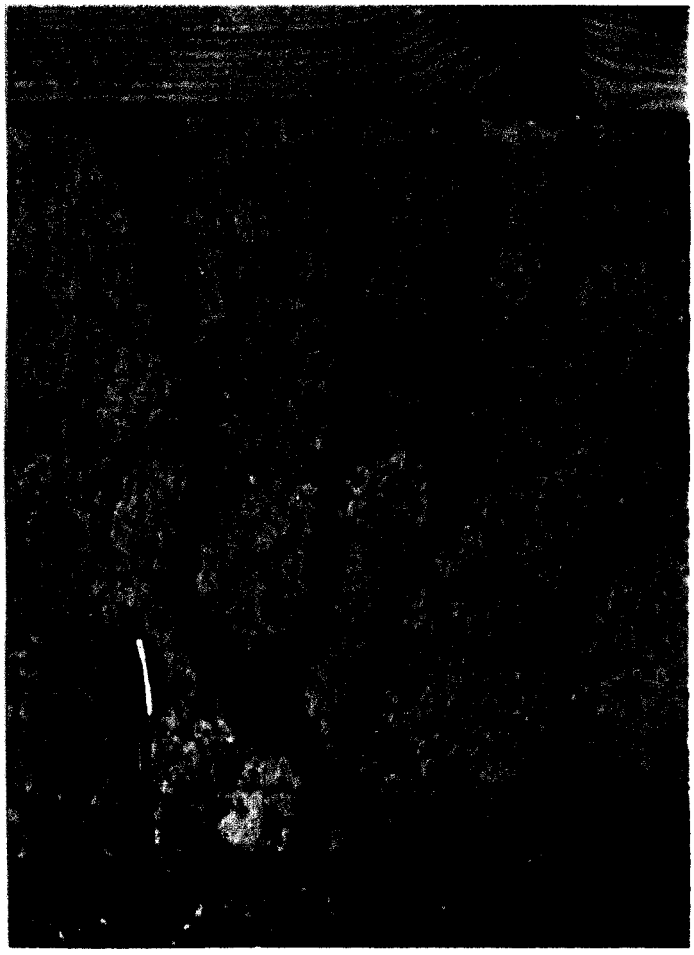


**Workers** may usually be seen when a piece of infested wood is examined. Both workers and soldiers are wingless and grayish white. Workers destroy wood, while soldiers guard the colony. The two forms are similar in size, but soldiers have much larger heads and longer mandibles or jaws.

**Termite tubes** are another sure sign that the insects have been at work. Subterranean termites often build these structures to enter a house from the soil. The tubes, about ¼ to ½ inch wide, provide passageways between the wood of the house and the soil from which the termites obtain moisture.

Subterrane

**Termite shelter tubes usually mean trouble.**



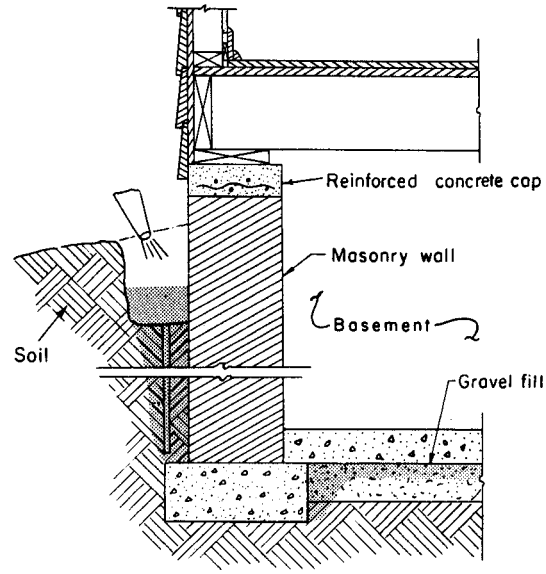
## Prevention and Control

The only practical way to prevent subterranean termite attacks or to rid a house of the insects is to deny them a source of moisture. Without moisture, a colony in a house will die. Thus, many of the tips for keeping wood dry to prevent decay are equally applicable for termite prevention.

It should be remembered, however, that termites can attack dry wood by transporting moisture from the soil. How can the soil be eliminated as a moisture source?

**Chemical barriers.** Subterranean termites cannot maintain a connection between the soil and the wood in a house if the soil around and under the foundation is properly treated with an appropriate insecticide. Several insecticides

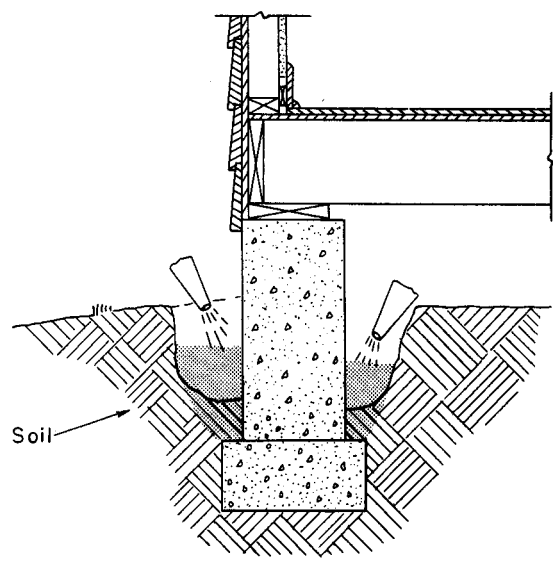
mites with queen at center.




**Soil around walls and under floors of basements should be treated with insecticide.**

have proved highly effective for this purpose. In tests near Gulfport, Mississippi, where termite activity is very high, sufficient quantities of these chemicals applied to the soil have protected wood in contact with the soil for more than 20 years. The effectiveness of these insecticides in building protection depends upon the type of construction and the throughness of application.

The most practical time for applying insecticides is during construction of the house or any addition to the house. Then, the soil can be treated before concrete is poured. Once the house is built, it can be very difficult and expensive to get insecticide under the concrete in a slab or basement floor. Application during construction, or pretreatment as it is called, is required by many building codes.

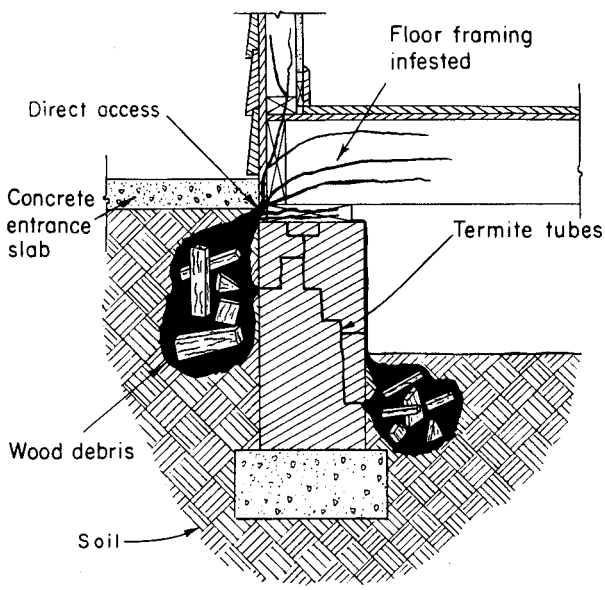



**Soil along inside and outside of foundation walls should be treated with insecticide.**

## Termite Hazards

Certain construction features favor termite attack. A buyer should be aware of these features when he is inspecting a prospective home. An owner should understand the risks he is taking if he does not correct such features.

**Earth-wood contacts.**—Unless it has been pressure treated with a preservative, wood should never be placed in contact with the soil. Yet such contacts are common in many homes. Wooden steps, trellises, fences, lattice work, and framing around crawl space access doors all may be connected to the house and ground. All are potential hazards. If the wood must touch the ground it should be pressure treated with preservative. The soil where the wood is touching should be treated with insecticide. Piers and steps should be placed on a concrete support at least 4 inches above ground level.




**Subterranean termites usually enter a house from the surrounding soil, either by tubing over foundation walls or by attacking wood in contact with soil.**

**Wood debris.**—Removing wood debris and providing good drainage reduce the termite population close to houses. Wood debris adjacent to wood in the house can compromise the house's chemical defenses. All wood, including stumps and dead roots, should be removed from the building site before construction. Form boards and loose scraps of lumber should be removed before fill is placed around the new foundation. Underneath existing homes all loose wood should be raked out and removed. Stumps and large roots may be treated with insecticide rather than removed if they are not very close to foundation timbers.

**Earthfill.**—Earthfilled porches are a common entry area for termites. They should be constructed as described under DECAY, and the fill in them should be treated with insecticides. In existing porches, treatment often requires drilling through a concrete wall and resealing. Earthfills for carports, patio slabs, terraces, walkways, and the like should be treated at the junction with the house foundation.

**Additions.**—To expand their house, many owners enclose their former carports. Ordinarily, the soil beneath a carport is not thoroughly treated with insecticide. If an addition is planned, the entire soil area beneath the carport or slab addition should be treated.

**Foundation wall voids** exist in many homes and are a possible termite entryway. Proper control includes treatment of the voids in bricks or blocks.

**Planting soil.**—Homeowners often place soil against walls to plant flowers and shrubs. Unless this soil is treated with insecticide, it can provide an entryway for termites.

**Termite shields.**—Since termite shields are rarely properly installed and maintained, they give the homeowner a false sense of security. Shields are well-suited for capping masonry piers, and do give a house with a crawl space considerable protection. Properly installed, they can deter attack and force termites to tube over them into the open where attack can be observed. Shields on interior parts of piers or walls should extend 2 inches outward and 2 inches downward at a 45° angle. For appearance sake, a smaller extension is acceptable on exterior portions. Here, the 2 inches bent downward 45° are generally regarded as sufficient. There must be no cracks in the metal, and the shields must be 12 inches above ground.

### Frequent Inspection

Since even the most prudent homeowner has no way of knowing how thoroughly the soil around and under his house has been treated with insecticide, frequent properly conducted inspections for evidence of termite attacks are excellent insurance. In the South and Pacific Coast States inspections should be made once a year. Look primarily for shelter tubes on piers and foundation walls, but also look for leaks that cause wood to become wet.

If discarded wings, shelter tubes, or other evidence of termite attack are found, do not be scared into hasty decisions. Well-established methods of control and expert assistance are available.

### Seek Professional Help

Since control of subterranean termites requires application of insecticides that can be hazardous, it is often best to hire a professional pest control operator. This booklet gives only general information about treatment. Before attempting to control termites himself, a homeowner should read detailed instructions in "Subterranean Termites, Their Prevention and Control in Buildings," USDA Home and Garden Bulletin 64.

To avoid worry, many homeowners in areas of high termite hazard contract with a pest control company for control of subterranean termites. The company typically inspects the house and does whatever treating it deems necessary at a price that depends upon the amount of work. Thereafter, the company usually inspects annually for a fixed price. The company usually guarantees its work by repairing free any damage caused by subterranean termites.

In areas where the termite threat is great, the home buyer should ask whether the house he is looking over is covered by a pest control contract. These contracts usually are not transferable to the new owner, but their existence is a good indication that proper control measures have been taken.

A termite inspection is required before an FHA or VA loan can be obtained, and in many instances these inspections are thorough. The buyer can reassure himself, however, by arranging for an inspection by a pest control expert of his choice. It is a good idea to make certain that at least one such inspection is made because damage by other structural pests is often overlooked or ignored.

## DRYWOOD TERMITES

Drywood termites cause serious damage in the Deep South, in southern Texas, New Mexico, and Arizona, and along the Pacific Coast in California. Damage by these insects can be recognized by the presence of **large, clean cavities** cut across the grain of comparatively **dry wood.** These cavities contain slightly compressed pellets of partially digested wood. Some of the pellets may be pushed through tiny openings in the wood surface. **Piles of pellets** below damaged wood are often the first signs of infestation. Drywood termite entrance holes are difficult to detect because they are sealed with a brownish-black, paper-thin secretion, which may contain pellets.

Drywood termites usually damage wood more slowly than subterranean termites. Thus, structural weakening by them is most likely to occur in old buildings.

Since drywood termites do not have ground connections, they must be killed by applying insecticide to galleries in the wood they are attacking. To reach the galleries, holes must be bored into the wood. After insecticide is injected, the holes should be sealed. In some instances, insecticidal dusts may be preferable to liquids. Dusts adhere to the bodies of the termites and may be spread from gallery to gallery until the entire colony is destroyed. Very severe infestations may require fumigation if the areas under attack are inaccessible. This is a job for a pest control operator.

**Fumigation is too expensive to justify unless an infestation of drywood termites or beetles is large, active, and inaccessible.**

## WOOD-DESTROYING BEETLES

Beetles in three families cause extensive damage to the wood in buildings. *Lyctus* or powder-post beetles attack recently seasoned hardwood sapwood, and thus are usually found in new homes. Anobiid beetles feed on both hardwoods and softwoods and are usually associated with buildings older than 10 years. Old house borers only attack softwoods, primarily framing lumber. They prefer recently seasoned wood and most often occur in homes less than 10 years old. Damage by these beetles may occur anywhere in the United States, but the most severe attacks occur in warm, humid climates.

The damage is done by **larvae** or grubs, which tunnel in the wood for months or years before emerging as adult beetles. Since the larvae never come to the surface, their tunneling may be extensive before it is noticed.

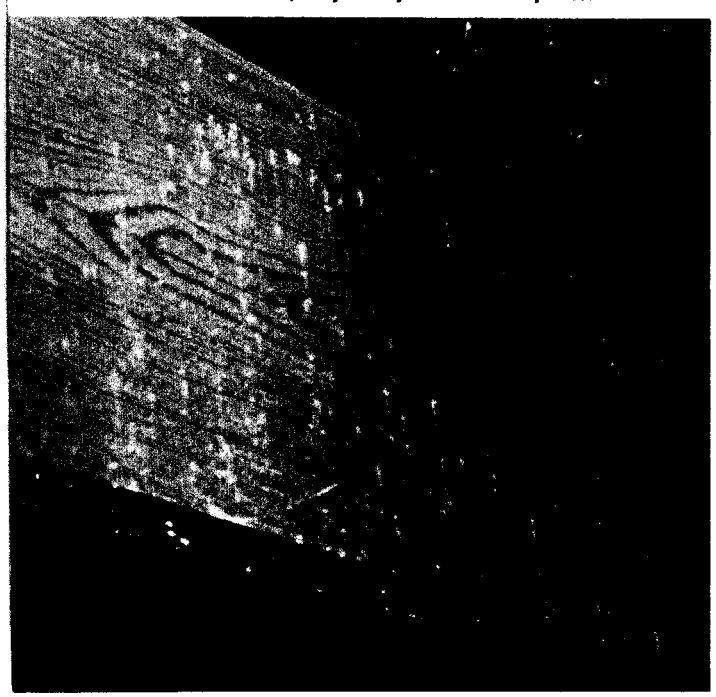
All species must have **bare wood** on which to lay their eggs. Hardwood items in the home

are usually finished with varnish, shellac, sealer, or wax, any one of which will prevent egg laying if no bare wood is exposed. Most lumber today is kiln-dried, and the heat of this process destroys eggs, larvae, and pupae. Sometimes, however, the lumber becomes infested during storage. That explains the emergence of beetles from wood during the first 5-10 years after a house is constructed.

The exposed, **unfinished wood in crawl spaces** is open to attack as long as a building stands. Keeping the crawl space dry through proper drainage and installation of a moisture barrier will minimize the risk. Crawl spaces and other places where bare wood is exposed should be inspected annually for evidence of attack.

Look for piles of **very fine sawdust** on or beneath wood, and for small **round** or **oval holes** in the wood surface. These holes are made by adult beetles when they emerge, usually during April through July. Since the commonest species are active mainly at night, no beetles will normally be seen during inspections.

**Wood-destroying beetles (anobiids in this case) make small holes and leave powder on unfinished wood, especially in crawl spaces.**

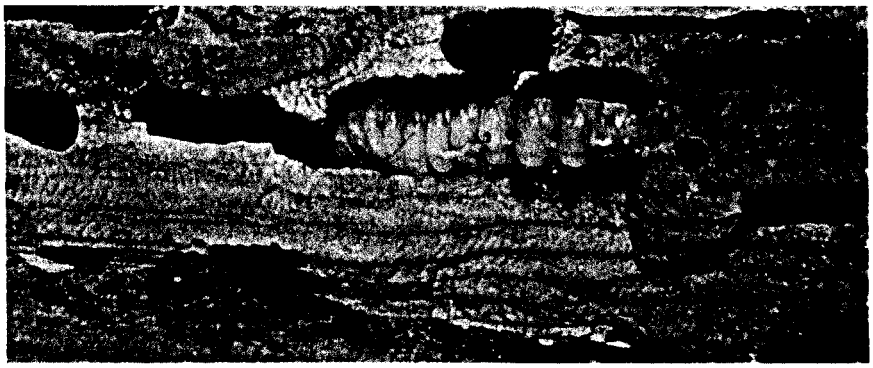


Attacks in unfinished wood can be expected to intensify until control measures are taken. Reinfestation is less likely in finished wood, but the beetles often lay eggs in their own exit holes.

When there are just a few exit holes in a piece of furniture, for example, insecticide can be injected into them. Small, easily accessible infestations in structural members of buildings can be sprayed or brushed with insecticides. If the pests have spread into the walls of the house, however, fumigation may be required. This work is dangerous, and should only be done by a professional.

Since fumigation is expensive the homeowner should assure himself that it is necessary before agreeing to it. He should make sure the infestation is **still active.** One way to do that is to clear all powder away from the suspected area. If new powder and holes appear, the insects are still active.

The homeowner should also make sure that the holes are being made by a species that will reinfest the wood after emergence. Damage by other insects is often mistaken for that of the wood-destroying beetles described. Ambrosia beetles, for example, attack dead and dying trees and logs in the woods, making small holes which often have **stain** around them. When a crawl space or other area is being inspected for troublesome damage, the homeowner may find wood with holes in it made by ambrosia beetles. These holes were made before the wood was

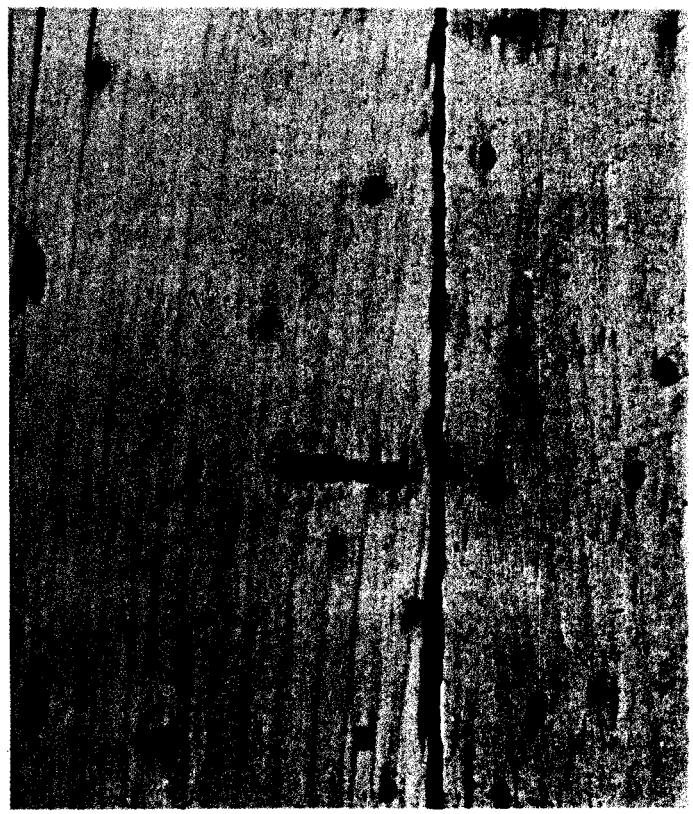


**Larvae, not adult beetles, feed on wood. Larvae of old house borers make oval holes up to 1/4 inch in diameter.**

sawn. These beetles do not reinfest dry wood so the damage will not increase. Ambrosia beetle holes contain **no powder**, while the tunnels of beetles that attack dry wood always contain powder. Holes of the latter usually come straight out of the wood, but the angle of ambrosia beetle holes is often far different from 90 degrees.

Various wood borers attack dying trees or logs in much the same way that old house borers attack wood in buildings. These other borers, however, do not reinfest the wood in houses once they have left it. Such insect holes may appear during the first 5 years after a home is built. The damage will not get worse. The best way of distinguishing the relatively unimportant damage of these borers from the very serious damage of the old house borer is by looking at the powder around the exit holes. Old house borers produce a **fine, tightly-packed powder.** Other borers produce loose, **fibrous** shavings.

Bark beetles feed upon the inner bark of trees. Rough-sawn framing lumber often has small pieces of bark on it. Shallow **holes in and around bark** were made in the woods. They are no cause for worry.



**Holes of ambrosia beetles are made before wood is sawn. Damage will not get worse. Note stain around holes.**

## WOOD-NESTING INSECTS

Unlike other insects mentioned here, carpenter ants and carpenter bees do not eat wood. They simply nest in it. This concept is of small comfort to the owner of a home that is infested, however. These insects cause considerable damage in making their nests, and are a major nuisance around the house.

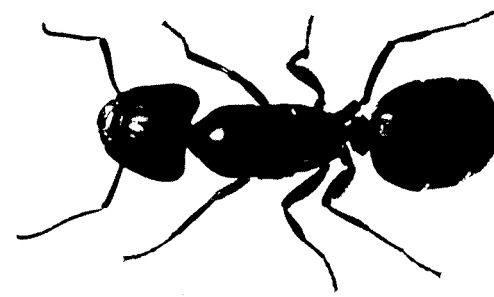
**Carpenter ants** are easy to recognize; they are large and reddish-brown to black. Workers are from ¼ to ½ inch long. Indoors these ants feed on sweets and other foodstuffs. The workers have strong jaws and will bite when disturbed.

Colonies are started by mated queens, which seek damp wood for a nest. Once it is established, however, the nest will be expanded into dry, sound wood. The ants carve out galleries for living quarters, and they keep the galleries clean and smooth. Excavated sawdust is dumped outside the nest.

While the presence of large ants around the house is usually the first sign of an infestation, it does not necessarily mean that the nest is inside the house. The nest may be in a stump or hollow tree adjacent to the house.

The homeowner needn't be told to kill all the ants he sees; he will do that on his own. Frequent spraying of insecticide on areas where ants are seen sometimes eliminates a colony. Since this is a slow process and may not be effective, however, great effort should be made to locate the nest. Insecticide applied to it will eliminate the colony.

Wood that may have become damp should be inspected. Objects that are often attacked include porch pillars and supporting timbers, sills, girders, joists, studs, and window and door trim. It is a good idea to probe suspected wood with a sharp object. If the wood gives way under probing and ants come tumbling out, the nest has probably been located.



**Black carpenter ant.**

**Carpenter bees**, which look a lot like bumblebees, occasionally nest in the wood in buildings in many parts of the United States. They can be recognized by their bare, shiny abdomens. The abdomens of bumblebees are covered with rows of dense, yellow hair.

Relatively soft wood is preferred for nesting, and unpainted, well-weathered wood is far more likely to be attacked than wood on which a paint film has been maintained. Typical nesting sites on houses include porch ceilings, windowsills, doorframes, headers, siding, and other places that are somewhat sheltered.

The bees cut an entrance hole about ⅝ inch in diameter across the grain of the wood, and construct galleries with the grain. The damage caused by one or two bees is usually slight, but if they are not controlled they can cause serious damage over a long period.

The only practical control method is to apply insecticide to the nest galleries. By observing the bees, their nests can usually be located without difficulty.

# HEALTH CHECKLIST

If you are thinking of buying a house, you will want to assure yourself that it is healthy. The questions listed below will help you make a thorough inspection. Most are also applicable to a house you already own.

1. *Is all wood in the house above the level of the soil?*
2. *Does water drain away from house?*
3. *Does the crawl space have adequate clearance and ventilation? Is its soil covered with a moisture barrier?*
4. *Are there signs of dampness in the basement?*
5. *Are earthfilled porches and other structures separated from the house?*
6. *Is roof overhang sufficient?*
7. *Has caulking around windows, doors, and joints been maintained?*
8. *Are gutters and downspouts intact?*
9. *Is attic vented?*
10. *Is roof decking completely covered, especially at roof edge?*
11. *Does roof sag, indicating possible rafter decay?*
12. *Is paint peeling or blistering?*
13. *Are decorative and other items attached to the house likely to admit or trap moisture?*
14. *Is plumbing, including drains, free of leaks?*
15. *Do doors sag or windows stick? Are frames decayed?*
16. *Is caulking around tubs, sinks, and showers intact?*
17. *Are floors level? Do spots feel spongy when walked on?*
18. *Do ceilings have water damage?*
19. *If the house is in a zone of high termite hazard, is there a structural pest control contract on it? Does the contract include a guarantee?*
20. *Was the soil under the house treated with insecticide during construction? Afterward?*

21. *Has the soil under additions been treated?*
22. *Are any termite shelter tubes visible on foundation? On pipes?*
23. *Does the crawl space contain stumps or wood debris?*
24. *Are there small holes in unfinished wood in the crawl spaces or elsewhere with powder under them?*
25. *Will an expert inspect the house for termites or other structural pests before the sale?*

# ADDITIONAL INFORMATION

County agents, State forestry agencies, and university extension workers are excellent sources of information on pest control. In addition, helpful publications of the U. S. Department of Agriculture are available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. Some publications and their prices are:

*Controlling wood-destroying beetles in buildings and furniture.* 1972. Williams, L. H., and Johnston, H. R. USDA Leaflet 558. 10 cents

*Protecting log cabins, rustic work, and unseasoned wood from injurious insects in the Eastern United States.* 1970. St. George, R. A. USDA Farmers' Bulletin 2104. 15 cents

*Subterranean termites, their prevention and control in buildings.* 1972. Johnston, H. R., Smith, V. K., and Beal, R. H. USDA Home and Garden Bulletin 64. 20 cents

*Wood decay in houses: how to prevent and control it.* 1972. USDA Home and Garden Bulletin 73. 15 cents

Another reference that may be helpful is "Principles of Protecting Wood Buildings From Decay" by T. C. Scheffer and A. F. Verrall, USDA Forest Service Research Paper FPL 190. Single copies are available free from the Forest Products Laboratory, P. O. Box 5130, Madison, Wisconsin 53705.

# PRECAUTIONS

This booklet does not contain recommendations or specific instructions on the use of pesticides. Such chemicals often are needed to protect wood from insects and decay. Specific information on the proper chemicals and their use should be obtained before any attempt is made to apply them.

Pesticides used improperly can be injurious to man, animals, and plants. Follow the directions and heed all precautions on the labels.

Registrations of pesticides are under constant review by the Environmental Protection Agency. Use only pesticides that bear the EPA registration number and carry directions for home and garden use.

PROTECT

*Use Pesticides Safely*

FOLLOW THE LABEL

U.S. DEPARTMENT OF AGRICULTURE