Insect Pests of Standing Trees
Standing trees, particularly if unhealthy or damaged, may be attacked by a number of types of insects. Certain moths, including the Goat Moth, Leopard Moth and some clearing moths, breed in trees. Oak, Ash, Elm and other hardwoods may be attacked by the first named, Pear and other fruit woods by the second and Willow and Alder by the third. The injury is not to be seen until the trees are felled and it is too late to take action. Poplars are often damaged by the large poplar longhorn beetle, the larvae of which bore more or less vertical galleries about the size of a pencil, from near the base of the tree upwards to a height of 8 to 12 ft. or more.

Sickly confer stems, e.g. Larch and Spruce, are frequently found on examination to be the breeding grounds of either the giant wood wasp or the steel blue wood wasp. Occasionally adult insects of these species emerge from scaffold planks, ladders and even wood in buildings.

These are examples of insects which breed in standing trees and which may emerge from newly felled wood. They are the enemies of the forester and their larvae are being converted and the gallerius in which they are feeding are exposed. It is seldom that any insect pest of standing timber will cause anxiety to the householder.

Insect Pests of Converted Timber
The more important pests, the larvae of which attack felled and converted timber, are beetles of the order of coleoptera. They are very numerous and extremely varied in their general appearance and feeding habits. They include some of the largest and some of the most minute of living insects, but relatively few species infest converted timber in Great Britain. The larvae of some beetles, such as Lyctidae and Bostrychidae, derive their nourishment from the starch or other carbohydrates which are present in the sapwood cells for some time after the trees are felled. Others, such as the common furniture beetle of the genus Anobium and the death watch beetle, genus Xestobium, of the Anobiidae, actually feed on the wood substance, consuming the cellulose and other constituents of the cell walls.

Preventive Measures
Attack by any of the wood-destroying beetles found in Great Britain can be prevented by adequate treatment, with a suitable preservative, of the wood before use. The vacuum and pressure method gives the maximum protection with any timber. Permeable timbers may be effectively treated by the hot-and-cold open tank process or by prolonged soaking for several days in suitable preservatives. Dipping, brushing and spraying with a suitable preservative can give effective protection if the preservative is thoroughly applied.

Common Furniture Beetle-Anobium punctatum
The common furniture beetle naturally inhabits dead stumps and fallen branches in woods and hedgerows, but at the present time is found far more abundantly in the woodwork of buildings and furniture than in its original habitats. Today it is exceptional in some parts of the country to find a building dating back more than 20 years which is entirely free from infestation, and in Great Britain most of the damage is found in timber which has been in use for 10 years or more. It is seldom found in furniture manufactured for less than that period, although attacks sometimes occur in the osiers used in basketwork of less than that age. In New Zealand, where it is also a serious pest, timber is sometimes infested in little more than a year after felling.

Description of the Beetle
The adult beetles are 2.5mm-5mm in length and are reddish to blackish brown in colour. The first body segment (prothorax) is hood-shaped and when viewed from above almost completely hides the head. The upper parts of the body are clothed with a fine covering of short yellow hairs, and rows of small pits or punctures on the wing covers are well defined.

The females lay eggs in grooves on the surface of the wood, in joints which have opened slightly, or on the surface where the grain has been torn in planing. The eggs hatch into white grubs having six minute legs and when mature are about 6mm long. The terminal segment of the grub is rather bulbous and the whole grub is bent into a crescent shape.

As the larvae feed on the wood they bore galleries which become partly filled with granular wood dust which feels like very fine sand. When fully developed, after one to three years, the grubs or larvae approach the surface of the timber and pupate. After the pupation period has become completed, the adult beetles bore small round exit holes about 1.5mm in diameter. The adult beetles are capable of flight and this enables them to travel and infect other timbers. In the period from May to September, beetles may frequently be found on the window ledges of houses containing infested wood.

Treatment
1. Furniture and small wooden articles may be treated by gas fumigation but this should only be carried out by specialist firms.

2. The most convenient way of treating infested timber whether in furniture or in buildings, is by the application of an insecticide solution to all parts showing signs of infestation, as well as to the adjacent timber.

Special attention should be paid to the undersides of drawers or tables, unpolished ends of legs, and to both the inside and outside surfaces of the backs of cabinets. All joints or cracks, whether in furniture or in structural timbers, should be well treated.

With structural timbers, dust and dirt should be cleaned off and surface covers such as carpets and linoleum should be removed so as to give access to the timber.

The insect does not lay eggs on painted or polished surfaces but may use old flight holes. This can be prevented by the regular application of furniture polish.
3. Where the attack is so severe that the strength of the timber is affected it may be necessary to replace the infested parts with new wood or plywood which should be treated before being used.

4. The most effective time for application of insecticides is early Spring to the late Summer.

5. The insecticide may be used by brush, but where the timbers are not very accessible a spray may be required. The atomizer type of spray is not suitable. In addition it is advisable to inject the insecticide into exit holes with an injector or oil-can having a fine nozzle. This assists in eliminating insects which are still active inside the timber.

6. In some circumstances the use of heat or freezing techniques can be considered. Both procedures must be conducted by properly trained and competent technicians.

**DEATH WATCH BEETLE – Xestobium rufovillosum**

The natural habitat of the death watch beetle is in decayed parts of old trees, especially willows and oaks. In buildings, timbers which have been decayed for a number of years, before ever attacked, the eggs being laid almost invariably in more or less decayed parts of the timber. Laboratory research tends to show that the duration of the larval period is affected by the extent of decomposition resulting from fungal activity. Thus, although the average length of the larval period is approximately three years, it is reduced very considerably by breeding the beetle in wood which has already been decayed by selected fungi, the temperature and humidity of the air being controlled. The condition of the wood appears to be important both to the common furniture beetle and the death watch beetle, for sometimes the infested wood will be deserted by the beetles on account of some change in the condition of the timber or because of the action of predatory insects.

The preference of the beetle for hardwoods (although softwoods are not immune) may account for the total damage by death watch beetle in the country being smaller than that due to the furniture beetle. The larger larval size of the grub and the long larval period may, however, result in the actual damage being more serious in the area infested. In circumstances favouring attack, structural timbers may be so weakened that replacement is essential. In old churches and other buildings damage by both death watch and furniture beetles may be present in the same piece of wood. The timbers of old barns and old wooden ships may also be attacked. The “Victoria”, Nelson’s old flagship, has been very seriously infested for a number of years.

**Description of Beetle**

The death watch beetle, the largest of the British Anobiidae, measures from 6mm-8mm in length. Its colour is dark chocolate brown with patches of short yellowish hairs, which give the insect a variegated appearance. In old specimens these hairs may have been rubbed off, in which case the mottled appearance is less obvious.

The eggs, which are white, lemon-shaped and measure about 0.5mm in length, are laid in open joints between adjacent timbers, in cracks or crevices in the surface of the wood, and sometimes within old tunnels and exit holes.

The larvae are curved white grubs covered with long fine yellowish hairs and are over 6mm in length. The phases of the life cycle are the same as for the furniture beetle, but the beetles commonly emerge in April, May or June, leaving a round exit hole about 3mm in diameter. The death watch beetle can be easily distinguished from that of other wood boring insects by the presence of small bun-shaped pellets in the bore dust produced by the grub.

**Treatment**

Timber infested by the death watch beetle should be very carefully inspected, before any treatment is undertaken. Such inspection should, if possible, take place during the period April to June in which the beetles emerge.

Treatment with an insecticide by brush or spray during the emergence period of the beetle in Spring or early Summer is useful in destroying eggs and young larvae before they enter the wood but it is doubtful whether such treatment will kill older larvae working below the surface at any appreciable depth.

The following is a summary of the recommended stages of treatment in an infected building:

1. Removal and replacement of actively infested timbers, the strength of which is deemed by a competent person to have been seriously affected. Strengthening of such timbers to avoid their removal involves a risk of continued activity and spread of attack unless insecticidal treatments are also given, not only to the infested timber but also to timbers used for replacement.

2. Removal of the superficial bore dust and debris from timber by scraping and the use of a vacuum cleaner before treating with an insecticide.

3. Two applications of an insecticide by brush or spray during the period of April to June. Annual applications during this period for at least four consecutive years are desirable, supplemented by application with preservative paste.

4. Search for and destruction of death watch beetles on floors or beneath infested timbers during the above period.

5. Inspection of timbers each Spring for a period of years after treatment to detect any evidence of continued activity in the form of fresh exit-holes or bore dust, in which case further insecticidal treatments will be necessary as long as any activity remains.

Wood showing evidence of even slight damage ought not to be re-used unless it can be “sterilised”. New timber should be sound, adequately seasoned and free from sapwood in which is particularly liable to attack by fungi and insects. Where oak heartwood is used, treatment with a preservative is not necessary, but softwoods (coniferous timbers), which are much less resistant to decay, should be given at least a surface coating with a good preservative having both fungicidal and insecticidal properties. If replacement timbers are pressure treated with an approved preservative it is unnecessary to remove sapwood.

**POWDER POST BEETLES - Lyctidae (Lyctus) and Bostrychidae Lycidae**

Of the lyctidae, two species namely Lyctus brunneus and Lycus lineolaris occur in Great Britain and Northern Ireland. The former is slightly the larger and by far the more numerous.

Lyctus beetles are found in unseasoned or recently dried hardwood timbers, the pores of which are large enough to admit the ovipositors of the females for egg laying. Oak, Ash, Elm, and Sweet Chestnut as well as some imported timbers are commonly infested.

Only the sapwood is attacked as it is the starch in this portion of the wood which provides the food for the larvae. In timber which has been cut for some time the starch may be so depleted that the grubs are unable to feed. Hence these pests are never found in old wood, but may be encountered in timber yards, fencing and also in comparatively new furniture if any sapwood has been included. Many cases of infestation have been reported by merchants holding stocks of susceptible timbers, and the presence of the pests is often revealed by small piles of fine powder boards in the stacks. Kiln drying the timber before use will sterilise it if it has been infested, but whilst any starch remains...
in the sapwood cells renewed attack is not impossible.

**Description of the Beetle**

The beetles are of slender form, distinguishable from the Anobiidae and from the Bostrychidae by the thorax which does not protrude over the head.

_**Lyctus brunneus**_ is 5mm-6.5mm long and is of a brownish colour. The widest part of the thorax is almost as wide as the abdomen. _Lyctus linearis_ is slightly shorter, the wing cases are more definitely marked by the parallel ridges and the thorax is distinctly narrower than the abdomen. The eggs are spindle shaped and usually several are laid in a single pore. The larvae are curved white grubs with a yellowish head and dark brown jaws and when fully grown measure approximately 6mm in length. The exit holes are about 1.5mm in diameter and are usually filled with a fine flour like loose dust.

**Treatment**

Treatment is perforce very largely preventive, directed toward discouraging the female beetles from laying eggs in wood containing starch. This is achieved by spraying with an insecticide which is either repellent to the adult female or toxic to the larvae as they emerge from the eggs, or both. The grubs are similar in shape and size to those of the common furniture beetle, but are less bulbous at the ends and have more prominent breathing pores along the sides. If the larvae are found in wood which has been taken into the factory or workshop, all sapwood should be cut away and burned. It is not advisable to use sapwood for furniture or interior woodwork such as paneling unless it has been effectively treated with an insecticide and is known to be free from infestation.

**Bostrychidae**

Bostrychidae are more prevalent in warm countries and are of minor importance in Great Britain, but may be found in some timbers imported from tropical countries, particularly West Africa.

**Description of the Beetle**

The adult beetle may be from 3mm long, usually dark brown or black in colour. The body is cylindrical, the antennae fairly short, and the head and prothorax, the first body segment, are thickly covered with grey hairs except for a smooth central line on the prothorax, which goes either lengthwise or crosswise. On each side of which is a shiny black prominence. On each wing cover the grey hairs are grouped in patches which are often fused to form two transverse bands.

The larvae are straight-bodied fleshy white grubs, clearly divided by deep transverse folds into a number of rings or segments. The head is sunk in the prothorax segments so that only the dark brown jaws are visible. When fully grown the larvae are commonly 18mm long but may attain a length of about 30mm. The grubs feed for a relatively long time, which, however, varies to some extent as in the case of other longhorn beetle larvae, with the moisture content of the wood and with the temperature.

**Treatment**

Eradication of the pest is not an easy matter, as will be obvious from what has been said. On the Continent, roof timbers have been treated by sealing the roof space and blowing in steam. It is not advisable for a householder to attempt any treatment for exterminating this pest himself; he would be well advised to call in an expert who will supervise the work. To ensure immunity from attack the timber must be given treatment with a suitable preservative resulting in complete penetration of the sapwood by the preservative prior to its installation.

_**Phymatodes testaceus**_

Another species of longhorn which causes slight damage to the sapwood or hardwoods and may spread in a timber yard to stock, on which the bark is still present. This pest is sometimes confused with the house longhorn beetle, but it is not a serious pest and does not attack timber in buildings.

**PIN-HOLE BORERS -Scolytidae and Platypodidae**

Pin-hole beetles are borers which attack freshly felled logs and possibly, in some cases, sickly standing trees. They are found chiefly in tropical and sub-tropical forest regions, and appear in a matter of a few days or even hours when wood has been felled in an area. These beetles do not continue working or extend the damage in seasoned timber.

The adults of these insects are responsible for the bore holes which are used to receive the eggs, which are deposited in niches along the galleries. The beetles carry into the bores the spores of certain fungi from which mycelium develops in the galleries and provides the food for the grubs. The growth of fungus in the galleries often causes staining in the surrounding wood, and on the surface the form of dark rings round the opening or bore holes. The peculiar feeding habits of the larvae of pin-hole borers have given rise to the name “Ambrosia Beetles”. It is characteristic that the tunnels seldom contain any bore dust. Various types of galleries are made by different species of borers and they do not usually follow the grain, but rather penetrating the wood radially for a short distance, change direction and often take a course at right angles to the original one and possibly following the boundary of a growth ring. This change of direction may be repeated two or three times.

The beetles vary in size, the smaller species making galleries of the diameter of a fine needle, whilst those of the larger species may be 6mm or more across. It is important to be able to recognise these peculiarities because the adult beetles do not appear in converted seasoned timber, manufactured wood or furniture. Although the borings are regarded as a serious defect by the merchant it is quite safe to
use timber having ambrosia beetle damage, i.e. pin-hole borings, for purposes where the surfaces marred by the pin-holes are not visible, it is unusual for the damage to be sufficiently extensive to reduce the strength of the wood to any significant extent.

Ernobius mollis
It sometimes happens that building timbers, particularly rafters, are used with the bark adhering to them. If holes are found in the bark it may lead householders to think that Furniture Beetle is present. The beetle responsible is *Ernobius mollis*. The workings are confined to the bark and there is no risk of other parts of the wood being attacked.

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