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TERMITES OR "WHITE ANTS"

By C. F. H. JENKINS, M.A., Chief, Division of Biological Services

TERMITES are commonly but erroneously called "white ants." Actually they are more nearly related to cockroaches than to ants, but their general appearance and subterranean habits have given strong support to the popular designation. They may be divided into two major groups from an economic point of view, viz., wood-dwelling and earth-dwelling termites.

The *wood-dwellers* enter wood directly from the air, and often the colony is wholly confined to the particular piece of timber in which it is working, but with the earth-dwellers the conditions are somewhat different.

Earth-dwelling termites destroy wood by attacking it from the ground or from another piece of timber in contact. The main colony is situated underground and they often build tubes or covered runways from the ground over wood, bricks, plaster, etc., to wood at higher levels. It is to this earth-dwelling group of termites that the principal economic species in Australia belong and consequently it is against them that our control measures are levelled.

LIFE HISTORY

Like ants and bees, the termites are social insects with specially developed types or castes. Again, as in the case of ants and bees, the vast majority of individuals are *workers* which have the duties of food getting, construction and care of the young. A small percentage of individuals have their jaws greatly enlarged, not for gnawing wood, but to serve as weapons, and these large-headed, strong-jawed members of the community are termed *soldiers*. When a gallery wall is breached by an enemy, it is the soldiers' duty to protect the colony until the damage has been repaired by the workers. In some of the higher groups of termites a different type of soldier is met with. The jaws are very poorly developed, but the

fore-part of the head is produced into a prominence or rostrum, and a corrosive milky fluid is exuded from a pore at the apex. This fluid serves as a very effective weapon of defence, and being acid in nature, is responsible for the etching of metals traversed by termites, and makes the penetration of lime and mortar possible. This particular type of soldier is known as a *nasute soldier*.

The *Royal pair* are solely interested in perpetuating the race and although when first starting a colony they have a multitude of duties to attend to, after the first brood of young has developed, the queen assumes massive proportions, and becomes little more than an animated egg-laying machine.

The swarming of termites has been observed by everyone. This is merely the emergence of the winged males and females, preparatory to forming new colonies. Warm, humid weather is usually chosen for the flight which is only of short duration. The wings are then shed, pairing takes place, and the couple burrow into the soil near some log or stump to commence the task of founding a new colony.

Termites react negatively to light, and so will only work in the dark. They are also very sensitive to desiccation and thrive best in a humid atmosphere. Both these facts are important in considering some of the control measures recommended.

PREVENTIVE AND CONTROL METHODS

Resistant Timber

All timbers are not equally attractive to termites, and consequently where possible termite-resistant timber such as Jarrah (*Eucalyptus marginata*), Native Pine (*Calitris spp.*) and Jam (*Acacia acuminata*) should be used for building or fencing.

Treatment of Timber

Coal-tar creosote has been found the most effective medium with which to treat timber against termite attack.

The immunity obtained varies according to the method of treatment and the degree of penetration of the chemical. The Pressure Process is the most effective but as the timber is subjected to vacuum treatment, it is not applicable to general usage, and need not be enlarged upon here.

The Open Tank Process, which merely involves dipping timber likely to be buried or in contact with the soil, is a method which is readily usable. If the creosote is heated and the timber allowed to steep for some hours until the mixture has cooled down, a better penetration will result than from a cold dip, but even the painting or spraying of timber, especially if several times repeated, will give protection.

METHODS OF TERMITE-PROOF CONSTRUCTION*

"There is no easy method of eradicating termites once established in a building. Measures taken during planning and construction are the best means of dealing with the problem. Experience in the use of ant-caps or shields has shown that they give excellent results when properly made and fitted; where termites gain entry in spite of caps or shields, failure is almost invariably due to incomplete protection or poor workmanship.

"A bent-over sheet of metal can prevent termites constructing their galleries from a stump or a wall onto constructional timber. Metal turned down at an angle of 45° requires termites to construct a downward gallery and negotiate the edge in order to pass; for some reason termites are very seldom able to do this.

Termite Shields and Caps

"Building of concrete, brick, brick veneer, or timber should be fitted with shields or caps thus:—

- (i) The shield should be constructed of 24- or 26-gauge galvanised iron or copper, and the outer edges should project at least 2 in. from the wall or stump on which the shield is placed
- (ii) Shields should be stamped out, but if cut from sheet metal all joints should be mitred and soldered.
- (iii) The shield or cap should project horizontally from the top of the wall or the stump for at least $\frac{1}{2}$ in. and should then turn down at 45° for another 2 in.
- (iv) Where strip-shields are used, or where shields join at wall junctions, all joints should be soldered with a lap of 1 in.
- (v) Galvanised iron shields should be laid on a damp-proof course. Sheet copper can be arranged to serve both as ant-capping and damp-proof course.

Site Clearance

Debris, mortar, or timber should not be left under a building to provide access over the metal shield to the timbers above. Wood should be removed from under fireplaces, steps, terraces, or porches, where an earth or a concrete fill is used."

Crawl Space—Ventilation and Inspection

In the case of suspended timber floors there should be a minimum of 18 in. between the beams and joists to allow sufficient space for regular inspection. Access should be provided for in the construction. The termite activity can be minimised by providing adequate drainage and cross-ventilation and thus keeping moisture level to a minimum.

Protective Barriers

The most effective chemical barriers are those applied before the foundations are laid. The total area of the ground in contact with the building can, at this stage, be treated easily with long-lasting insecticides. The bottom and sides of the

* This extract is taken from a leaflet entitled "The Science of Building" and published by the Division of Forest Products, C.S.I.R.O., Melbourne.

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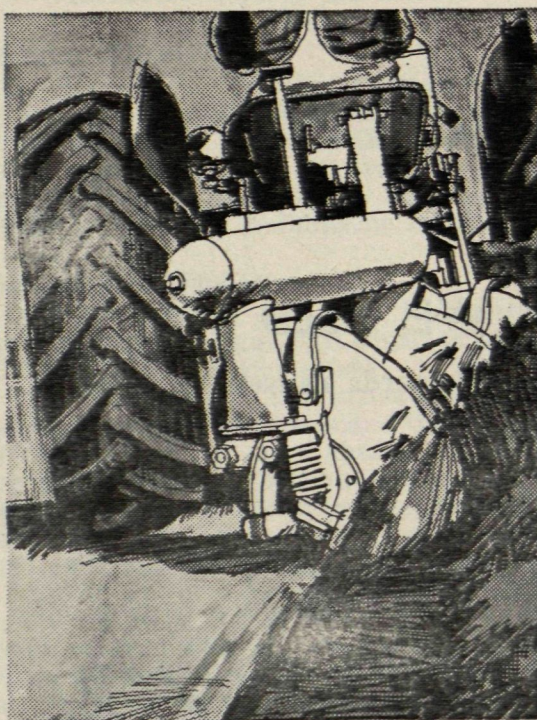
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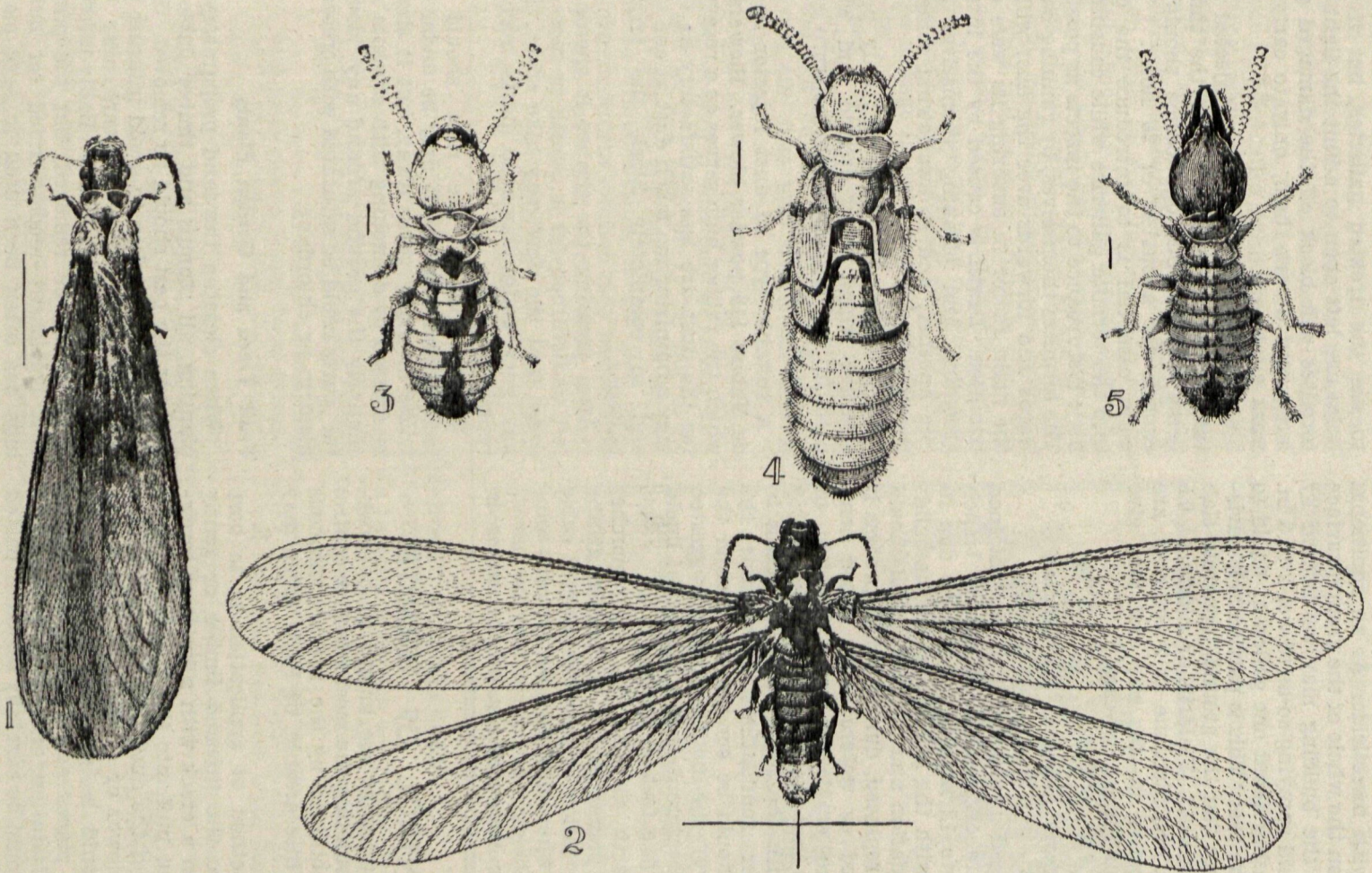


Fig. 1.—1 and 2, Male and Female Winged Termites; 3, Worker; 4, Nymph; 5, Soldier
(After Froggatt)

foundation trenches should be thoroughly wetted with insecticide. As an additional precaution the whole of the ground surface beneath the building may be treated by raking and spraying so as to wet 2 to 3 in. of soil, using about one gallon of liquid to ten square feet. This is particularly advisable where "on the ground" concrete slab floors are used. Dieldrin or Aldrin at 0.5 per cent. or Chlordane at 2 per cent. are very effective in this way and may give protection for many years.

Precautionary Measures for Existing Buildings

Prolonged protection can be obtained by the trench method. A narrow trench about 6 to 12 in. deep should be dug in contact with the inside edge of the building foundation and piers. The soil should then be replaced, during which process it is sprayed or watered with 2 per cent. Chlordane or $\frac{1}{2}$ per cent. Dieldrin or Aldrin so that the insecticide is thoroughly mixed with the soil. Where no access to the inner foundations is possible the trench should be constructed around the exterior of the building. The suggested rate of treatment is two gallons of liquid to every five feet of trench.

Any earth fill such as under porches and fire places should be treated at the rate of 1 gallon of insecticide per 2 cubic feet and where desired a 0.5 per cent solution of Dieldrin or Aldrin may be substituted for the ordinary mixing water in the preparation of concrete.

CONTROL OF TERMITES

When termites are known to be working in a building the most effective control will be obtained by the use of poisonous dusts. White arsenic, or Paris green may be used.

The method of application is to bore holes into the infested timber or gently prise open a crack with a knife or screw-driver and puff into the galleries a small quantity of the dust, using a small rubber powder-blower or a dust-gun. The treatment should be given at a number of different places according to the extent of the infestation, and the bore holes and cracks should be carefully sealed or pasted over. This latter is essential, for if the

hole are covered the insects will continue to use the treated galleries, but if the holes are left open to admit the light the termites will block off the damaged galleries and desert them, only to carry on work elsewhere.

The amount of dust to be injected will vary according to the size of the timber being treated, but one ounce should be enough for about 20 or 30 holes. The main essential is to introduce the dust into the termite galleries while causing as little disturbance to the insects as possible. The termites themselves, by running backwards and forwards over the dust will be the main factor in ensuring its wide distribution. Death is caused by the insects grooming and cleaning themselves and one another, and so swallowing some of the poison.

These poisonous dusts will only prove effective when finely ground and when used in dry situations as moisture soon clogs and cakes them.

A suitable type of dust injector is the de Vilbiss 119 powder blower. Blowers in which the rubber bulb serves as a reservoir for the dust are less satisfactory as they may administer too much dust at one time and so completely block the termite galleries.

After treating the timber it should be left undisturbed for a month or more, in order that the dust may take effect, then any very badly damaged parts may be replaced.

Where possible the nest should be located and dug up. It may be under the house or many yards away, but it should be treated by drenching with creosote and similarly the ground around any "doubtful" parts could be saturated with creosote, dieldrin or chlordane.

Fruit Trees and Garden Plants

When clearing the land preparatory to planting, all stumps and timber liable to harbour the pest should be removed. Care should also be taken to avoid injuring the trees as dead roots or scars near the ground may induce attack. Badly infested trees should be removed, but the poison dust treatment recommended for buildings has often been used to save plants which are not too far gone.

Holes should be bored into the infested portion of the trunk just above ground level and in such a manner as to enable dust to be blown into the actual termite galleries. As in the case of structural timber all bore holes should be sealed with grafting wax or some other suitable material. Where the roots of plants are attacked, the use of a fumigant such as Paradichlorobenzene is suggested. A trench three or four inches deep should be dug about six or nine inches from the base of the plant and scattered with two ounces of fumigant. After filling in, the gas will gradually disseminate into the soil. This will be more effective when the soil is warm. When transplanting young trees, the pruning of roots causes portions to die back, and together with the shock of the change in environment, checks the growth so that the young trees are pre-disposed to termite attack. Protection may be obtained either by adding insecticide to the pot before transplanting, or by treating the hole into which the tree is to be placed.

For the pot treatment, a 2½ per cent. Dieldrin or Aldrin dust may be mixed with the soil at the rate of 1½ lb. per cubic yard. If the pot soil has not been treated prior to transplanting, a 0.5 per cent. Dieldrin or Aldrin solution may be watered on to the roots and surrounding soil at the time of transplanting.

Granular formulations of insecticide may be worked into the surface soil at the

rate of ½ lb. of 10 per cent. Dieldrin or Aldrin per 10 square feet of soil surface.

Poison Baits

There is no evidence to suggest that effective control of termites can be obtained with poison baits, and their use is not recommended.



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"SCIENCE IN SHEEP BREEDING" CONFERENCES FOR FARMERS

Two farmers' conferences in Katanning and Geraldton during July and August of this year have been arranged by the University Adult Education Board Country Extension in association with the Katanning and Northern Zone Councils of the Farmers Union of W.A. and with the co-operation of the W.A. Department of Agriculture.

The subject is "Science in Sheep Breeding" and the two principal speakers are to be Miss Helen Newton Turner, Senior Principal Research Officer in the Animal Genetics Section of C.S.I.R.O., and Dr. R. B. Dun, Director of Animal Production, New South Wales Department of Agriculture.

The conferences will mark the culmination of a series of talks which began with the visit of Dr. Dun to Merredin in 1963, and continued in 1964 with Miss Newton Turner leading follow-up conferences with farmers in Katanning and Merredin.

In the forthcoming conferences, farmers will be given the opportunity of meeting and hearing both these distinguished scientists, who together have developed the new techniques of performance testing and fleece measurement in Australian Sheep breeding.

Nearly 1,000 farmers attended the previous talks by Dr. Dun and Miss Newton Turner, and it is expected that interest in the 1966 conferences will be even more widespread.

Supporting speakers will include Department of Agriculture sheep and wool specialists, farm management consultants, flock owners, breeders and staff members of the University of Western Australia.