

NOTE ON THE EFFECT OF TEMPERATURE ON
BORERS ATTACKING SEASONED AND
UNSEASONED TIMBER

(WITH SPECIAL REFERENCE TO THE FURNITURE BEETLE
Anobium striatum).

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AT the present time the borer problem is of great importance, and it is thought that the following results of an investigation into one method of eradication which has proved successful might be of interest. The usual method of treatment is by painting or spraying the timber with some deterrent liquid. It was found that in many soft woods particularly the softer pine timbers, as New Zealand White Pine (*Podocarpus dacrydioides*), the penetration of the most efficient liquid used was effective possibly up to an inch under ordinary conditions of application, whereas in sound hardwoods, as Eucalyptus spp., the degree of penetration was extremely low, except where sun cracks or crevices of any kind allowed the liquid to enter more freely. This penetration in sound hardwood was found to be only from $\frac{1}{16}$ " to $\frac{1}{8}$ ", except on end grain, where the vessels, being cut transversely, offered a readier means of entry, unless they are blocked by an ingrowth of thin walled parenchymatous tissue or tyloses, which is by no means infrequent.

It is thus obvious that even in moderate sized timber, the degree of penetration is not sufficient to assure the efficacy of any liquid deterrent. To make sure that certain affected timber specimens in the Technological Museum which had been attacked by the Furniture Beetle (*Anobium*

striatum) and the Powder Post Beetle (*Lyctus brunneus*) were freed from the boring insects, they were subjected to a process of steaming in a large digester for several hours. Although twelve months have elapsed since the treatment was applied there has been no recurrence of the trouble. It must be understood, however, that steaming does not render the timber immune from further attack, and a subsequent poisoning treatment was given which it is hoped will prevent any further ravages.

Altson¹ mentions the use of temperature of 70° for two hours, giving an extra hour for each additional inch of timber above 1", as an effective remedy for the borer, but so far as could be determined no test has been made as to the actual temperature which was fatal to both beetles and larvæ. For this reason a number of tests were made at different temperatures, exposing both beetles and larvæ for different periods of time to a moist atmosphere, such as would be set up during steaming. It was soon found that a comparatively low temperature for a short time is sufficient to kill the insects. The results obtained being as follows:

<i>Anobium striatum.</i>	No.	Temp. °C.	Time in Seconds.
Larvæ	6	44	60
	2	43	60
	3	46	30
	6	46	60
	5	45	120
Beetles	1	42	50
	2	45	22
	4	46	30
	4	46	60
	5	45	120

In each case a number of the larvæ or beetles were introduced into a moist atmosphere at a temperature of 42 –

¹ Beetles Damaging Seasoned Timber, 1922. W. Rider & Son, London.

46° C. and after exposure for the length of time given in the third column, were removed to atmospheric temperature and placed under observation for some days. In no case was any life detected subsequently, thus indicating that, in this particular series of experiments, possibly a slightly higher temperature was used than was absolutely necessary.

Similar experiments carried out with the larvæ and beetles of the Powder Post Beetle (*Lyctus brunneus*) also showed that a temperature of 45° C. for approximately 60 seconds was in most cases fatal.

Since both these borers attack only seasoned timber and as both, but in particular the Furniture Beetle, cause considerable damage to furniture, experiments were made with the object of determining the time occupied in raising the internal temperature of wood of dimensions such as are used in cabinet work to 45° C., when exposed to air at temperatures not greatly in excess of this.

A piece of Queensland Maple (*Flindersia Chatawaiana*) 3" × 3" × 12" was exposed to an air temperature of 50° C. After two hours the internal temperature reached 45° C. A similar piece in air at a temperature of 60° C. reached an internal temperature of 45° C. in one hour. Since at these temperatures french-polish is not affected, it should furnish a ready means of treating small articles, although as already pointed out, it does not render the timber free from risk of reinfestation.

The Shot-hole Borers, of which the principal are *Platypus* spp. and *Xyleborus* spp., cause very serious damage to unseasoned timber, especially to logs before cutting. These pin-holes in constructional timber are not detrimental to any great extent, but in cabinet timbers depreciate the value of the wood by over fifty per cent. At the present time a firm of timber merchants in Sydney is treating its

logs with live steam in a wooden digester practically at atmospheric pressure, and it is claimed that the method is efficacious in exterminating the borer. In an examination I have made of the affected logs after treatment, no evidence of live borers was found. The exposure of timber to these temperatures for several hours is not sufficient to influence the strength of the material. Not only are the Shot-hole Borers destroyed, but also any Powder Post Borers, if present, though obviously the timber is not rendered immune from future infestation. Tests made under similar conditions to those applied to the Furniture Beetle have shown that a temperature of 47° C. for one minute produced fatal results to both the beetles and larvæ. No direct tests were made of the degree of heat capable of being sustained by the eggs, but since no insects have developed in timber already treated, it seems probable that they too were destroyed. Since the log retains sufficient moisture to enable these Shot-hole Borers to work for a considerable time, the damage varies directly as the length of time between infestation and conversion, whereas by early steaming a large amount of the damage can be unquestionably avoided.

Summary.

The application of heat to both seasoned and unseasoned timber affected with borers has proved a most efficient remedy for the trouble.

Exposure of both larvæ and beetles of the Furniture Beetle (*Anobium striatum*) to a comparatively low temperature of about 45° C. for one minute in moist air, has in the majority of cases proved fatal.

The treatment can be successfully applied to logs, sawn timber, and smaller made-up articles.

Similarly, it has been found that the Powder Post Beetle and the Shot-hole Borers are unable to sustain temperatures of about the same order.



Welch, Marcus Baldwin. 1923. "Note on the effect of temperature on borers attacking seasoned and unseasoned timber (with special reference to the Furniture Beetle, *Anobium striatum*).*" Journal and proceedings of the Royal Society of New South Wales* 57, 227–230. <https://doi.org/10.5962/p.359852>.

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