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**Citation:**

Buckeridge, J 2008, 'The barnacle and the building: a modern morality tale', *Integrative Zoology*, vol. 3, no. 2, pp. 68-74.

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Link to Published Version:

<http://dx.doi.org/10.1111/j.1749-4877.2008.00080.x>

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## ORIGINAL ARTICLE

# The barnacle and the building: a modern morality tale

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## Abstract

A rare and almost complete barnacle fossil, previously described on the basis of two isolated shell fragments, was recently exposed in a limestone block on the outer wall of Melbourne's Old Magistrates' Courts in Victoria, Australia. These courts comprise one of the oldest and grandest buildings in Melbourne and because of this they have a heritage listing. As heritage-listed buildings are protected from alteration by law, and as removal of the fossil would be deemed "alteration", official permission had to be obtained to extract the specimen. This paper discusses the processes involved with extraction of a unique specimen from a protected building and provides an overview of the palaeontological significance of the fossil. Consideration is given to the likely fate of a fossil of this nature, situated a little below eye level on a busy city street, if it was left *in situ*; finally, the implications of designating a holotype from material removed from a building are assessed.

**Key words:** conservation, fossil barnacle, heritage-listed buildings.

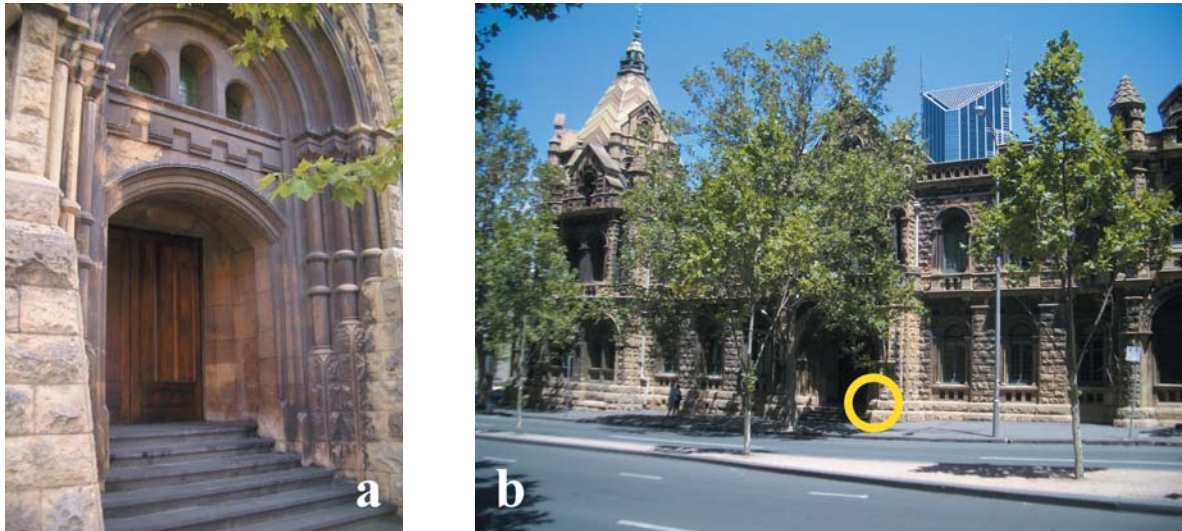
## INTRODUCTION

The term "Romanesque Architecture" was originally applied to eleventh and twelfth century buildings that resembled classical Roman architecture – in particular it involved the incorporation of heavy articulated masonry and rounded arches (Fig. 1a). A newer version, known as Romanesque Revival Architecture, was used from the 1890s to 1910s for buildings of civic importance in Australia. One of the more impressive of these is the Old Magistrates' Court, situated at the corner of Russell and La Trobe Streets in the Central Business District of Melbourne, Victoria. This building was completed in 1911 and at the time of construction it was considered to be one of the grandest buildings in Australia; it is made entirely of local

materials, one of which, the Miocene age Batesford Limestone, is clearly fossiliferous. On 20 August 1982, the building was recognised as being of architectural and cultural significance and was heritage listed. In 1997, the building was officially incorporated within the RMIT University campus, renamed "Building 20", and now accommodates the University's two highest office bearers, the Chancellor and Vice Chancellor.

In 2006 a retired RMIT geologist, Phil Bock, noticed an unusual fossil in a block of limestone on one of the door columns near the Russell Street exit of the building (Fig. 1b). He advised me of this and, following inspection, the fossil was identified as an almost complete specimen of *Tetraclitella*, a genus of sessile shallow-water barnacles, both living and fossil, found in warm, temperate waters globally (Buckeridge 1983). Although living *Tetraclitella* are widely distributed in rocky subtidal environments throughout southern Australia (as *Tetraclitella purpurascens*) and New Zealand (as *Tetraclitella depressa*), fossil representatives have previously been recorded only from fragments. This paucity of material, and

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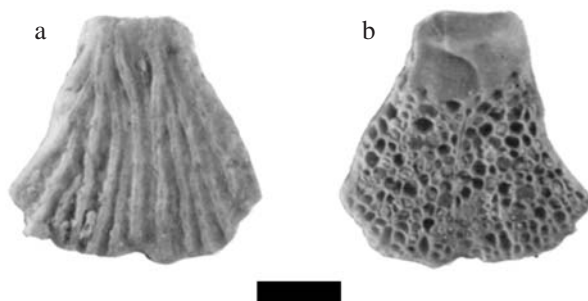


**Figure 1** (a) RMIT University's Building 20 (previously the Melbourne Magistrates' Courts) fronting La Trobe Street, Melbourne. The heavily colonnaded portal is characteristic of Romanesque Revived Architecture. (b) Building 20, fronting Russell Street, Melbourne, with the fossil barnacle site circled in yellow. Photograph taken in January 2008.

the taxonomic uncertainty that it generated, resulted in the fossils from Australia and New Zealand being collectively assigned to *Tetraclitella* sp. cf. *T. purpurascens* (Wood 1815) in Buckeridge (1983, 1985) (see Fig. 2).

In 1986, Foster and Anderson revised the systematics of the extant species of *Tetraclitella* from Australasia, which until that time had all been classified as *Tetraclitella purpurascens* (Wood 1815). Two separate species were identified: *Tetraclitella purpurascens* (range: Victoria,

Tasmania, South Australia, New South Wales, southern Queensland and southern Western Australia) and *Tetraclitella depressa* (range: New Zealand) (Foster & Anderson 1986). The fossil material from both sides of the Tasman Sea, which had previously figured and classified as *Tetraclitella* sp. cf. *T. purpurascens* in Buckeridge (1983, 1985), was now no longer a valid or useful taxon (Fig. 2). Changes resulting from nomenclatural refinement and from the new material found in the Old Magistrates' Courts building provided new alternatives: either the fossils were of the same taxon (this would probably be a new species), and this taxon was ancestral to both extant species, or they represented two or more distinct taxa. The systematics of these fossils and a revision of the genus will be provided in Buckeridge (unpublished data).



**Figure 2** *Tetraclitella* sp. cf. *T. purpurascens* from Buckeridge (1985: p. 147; figures 4a,b). This material, recovered from the Batesford Limestone Quarry at Dog Rocks, Victoria, represents two articulated fragments of a flat, circular shell wall that would have been approximately 15 mm in diameter. External view on left; underside on right with most of the view showing the base of the tubiferous wall. Scale bar 2 mm.

## THE PROBLEM

### The importance of the barnacle fossil

Apart from the discovery of an almost complete shell of a taxon hitherto known only by isolated fragments, this material is significant in that it is representative of the first known species of acorn barnacle that possessed a tubiferous calcite shell wall. The development of tubiferous walls was particularly important because it permitted maximum shell wall strength in association with the minimum use of calcite. For sessile organisms, such as barnacles,

which cannot escape predators by flight, the development of a protective shell was essential for survival; however, extraction of calcium carbonate from seawater is an energy-consuming process, even more so when the thick protective shell is comprised of solid calcite. Incorporation of vertical tubes within the wall retains the strength of the wall while improving the efficiency of the barnacle system.

To the best of my knowledge (and the Australasian fossil record supports this), *Tetraclitella* has always inhabited upper sub-tidal, high-energy environments. The advantage of living in a shallow-water, photic environment is clear: food is abundant. However, after death the shells can confidently be expected to quickly disarticulate and break down into small fragments (Buckeridge 1983, 2000). They are less likely to be fossilised than barnacles that inhabit deeper water, and as such never form the extensive fossil horizons known to occur with taxa like *Bathylasma* and *Tetrachaelasma* (Buckeridge 1983, 1999). The barnacle fossil in this building is unique and, against all odds, has survived transport to deeper, quieter conditions within a submarine slurry approximately 19 million

years ago.

### The importance of the building

During the period from 1960–1970, the Victorian Housing Commission demolished large parts of the city of Melbourne. Later, in the 1970s, this led to a growth of “façadism”, particularly in inner city areas like Collins Street. Widespread concern about this cultural loss was voiced by conservationists and concerned citizenry, leading in 1981 to the passing of the Historic Buildings Act, which was subsequently streamlined and clarified as the Heritage Act, 1995 (R. Howe, Heritage Victoria, personal communication). A walk through present-day central Melbourne confirms that much of the late nineteenth century and early twentieth century character that the city once had is lost. A building like the Old Magistrates’ Court is now rare, even more so because it not just a façade, but also retains most of the original interior layout and fittings. This building is unique and represents a significant, invaluable part of Melbourne’s social and architectural

**Heritage Act 1995**  
**Heritage (General) Regulations 2005**

While an object is deemed to be a registered object, subject to the Act, section 64(2) of the **Heritage Act 1995** provides that, a person must not—

- (a) remove or demolish; or
- (b) damage or despoil; or
- (c) alter—

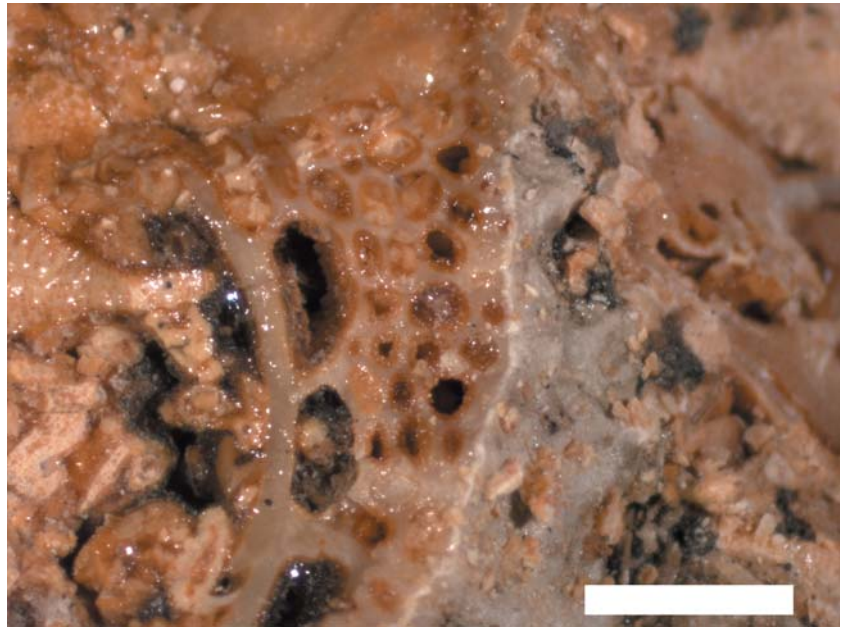
that registered object.

The maximum penalty for a contravention of section 64(2) is in the case of a natural person: 2400 penalty units or imprisonment for 5 years or both;

**Figure 3** Extract from the Victorian Heritage Act (1995). The “penalty units” stated herein permit variation in fines. They were last adjusted by the Parliament of Victoria in 2005 and currently stand at \$100.00 per unit. Alterations may be made to a Heritage listed building and although “conservation” is one of these, the term is incorporated for conservation of the building rather than conservation of organisms within it.



**Figure 4** *Tetraclitella* sp., to the lower right of the one-euro coin, sitting proud in its Batesford Limestone matrix. Photograph taken on 29 January 2006, several months before removal from a column in Building 20, RMIT University (Old Magistrates’ Courts), Russell Street frontage, Melbourne. The diameter of the coin is 23.25 mm.



**Figure 5** *Tetracitella* sp. Interior through the base of the porous shell wall (approximately 2.00 mm wide, running vertically through the center of the image) exposed by a fracture of the specimen during removal from Building 20, RMIT University. Photographed by J. Reeves. Scale bar 2.0 mm.

heritage. Degradation of the essence of the building would be anathema.

### The Legislation

In the State of Victoria, a building gazetted under the Heritage Act (1995) is protected from alteration in any way without official approval (Fig. 3). Punitive action following conviction for transgression currently includes imprisonment and/or fines up to AUD\$240,000.00. Although the barnacle (Fig. 4) is not large and could, presumably, be removed with little real damage to the building, permission must be obtained before attempting to remove it because removal necessitates loss of stone from the column, thus constituting “alteration”.

### Risks

The fossil is not large (Fig. 4) and although it was located at a prominent site next to a door that opens onto a busy city street, damage should be minimal. However, Batesford Limestone can be brittle, especially on surfaces that have been exposed to a century of urban weathering. Consequently, removal of the fossil may require a larger than normal excavation to prevent the fossil shattering.

It is clear that to act within the law, a permit should be applied for to extract the fossil. Heritage Victoria has a schedule of fees and these vary from AUD\$100.00–7,610.00 according to the nature and magnitude of the

proposed activities. Waiver of fees is available, but the only criterion for exercising this that would have even remote relevance to this situation is specified as being “... *for the purposes of conservation, maintenance, repair or restoration of the registered place or registered object;*”. Clearly the finding and planned removal of a fossil from a heritage-listed building is far from the objectives the legislators had when drawing up the Act.

If a permit was applied for and if permission to remove the fossil was denied on the basis that the building had greater cultural value than the fossil, then the likelihood of the fossil being lost is fairly high. The amount of time it had been exposed is of course impossible to determine; however, it was, in January 2006, clearly visible at a little below eye level – perhaps at a good height to be inadvertently damaged by pedestrian traffic and, perhaps, with publicity growing about its significance, it could have been vandalised or removed by private collectors or miscreants. Even if it managed to survive the above, its calcareous composition would ensure that the city air and rain would eventually dissolve it.

The question then is: does one apply for permission to remove the fossil, if in doing so, it will result in a heightened awareness of the fossil (and the palaeontological value) to both Council officials and the wider public? An option suggested by one enthusiastic graduate student was that he could go to the site late one evening, with

hammer and chisel, and remove it before anybody else became aware of the find.

## THE ETHICS

### Analysis of options

The two most widely used moral codes are deontology (where the rightness of an action is determined on the basis of obligation) and utilitarianism (where rightness is determined on the consequences of any action). In deontology, the consequences are not necessarily important because it is duty that drives the decision, whereas utility can be determined on the greatest happiness of the greater number of people, and “duty” may have no bearing on the decision at all. From a deontological perspective, a duty to society may appear to be a clear driver at first, that is, one must follow the rules (and in this case apply for a permit), however, some scientists argue that there is a duty to “truth” and that this may supersede any social obligation. In utilitarianism, if the outcome is approved of by the majority of the people who have some form of ownership of the objects/concepts under discussion, then that decision is the correct one. However, whether the majority of ratepayers in the Melbourne central business district (i.e. those who have an immediate financial interest in the activities within the city) would consider a small fossil to be of value is probably doubtful.

In both moral codes, there is a need to determine the value of the objects/parties that will be affected by any decision (Buckeridge 2008). In this case, we could argue that the value of a unique, tiny fossil is less than that of a large aesthetically appealing building. If it came down to either one or the other, it is clear that the building would be the victor. However, moral decisions can also be compromises, and if the parties involved can be persuaded that there is acceptable risk in a particular decision, then that option should be pursued.

### The rôles of the interested parties

One rôle of a university is to act as critic and conscience of society, as such, a university is expected to behave in an ethical fashion when making decisions, thus demonstrating good civic leadership. In light of this, illegal removal of the fossil is not a good option. Indeed, RMIT University has an obligation to inform the public (and those who make decisions on behalf of the public) of the value of both the building and the fossil; thus simply ignoring the fossil is not an option. A formal description of the material must be made in the interests of science and this

is not possible simply by photographing the specimen *in situ*.

Any action that draws attention to the significance of the fossil would clearly lead to its demise, unless it could be protected. Options for protection include a safety glass cover bolted to the building, with perhaps an associated plaque describing the fossil. However, this would still damage the building, perhaps as much as removal of the fossil itself. Furthermore, although perhaps “informative” it is impractical because it would be susceptible to general street damage and vandalism.

RMIT University has no ethical option other than to go through the process of applying for a permit and, at the same time, trusting that a fees waiver opportunity may arise. This approach is primarily deontological because the consequences of this could well be refusal. Notwithstanding this, if approval were to be granted, permit fees are likely to be levied, and there could be no guarantee that either the building or the fossil would not be damaged during extraction. The other significant interested party is Heritage Victoria, which has been charged by the State to preserve the character and integrity of the building. In this case also the stance is more deontological than utilitarian.

## THE OUTCOME

### Removal

An approach was made to Heritage Victoria in which the significance of the fossil was outlined. Advice was given that, when extracted, the fossil would be held in the collections of Museum Victoria. In the application for a waiver of the fees it was indicated that this could well be a useful opportunity to publicise both “building and barnacle”, with media being invited to record the removal of the fossil for posterity.

Heritage Victoria favourably received the application for removal of the fossil and kindly waived the application fee on the basis that the fossil was worth conserving and that the damage would be very minor. On a hot day in early March 2006, with newspaper reporters and television crews in attendance, *Tetraclitella* sp. was removed from the Old Melbourne Courts. Imagery of the activity was beamed around the world that evening, with many comments coming back to the University. There was, however, one small problem, initially considered unfortunate: the Batesford Limestone was much more brittle than originally anticipated. As a result, at the last phase of removal, the edge of the fossil cracked – and

this, of course, was shown on television! However, it was serendipitous because it allowed examination of the interior of a unique specimen (Fig. 5), an outcome that would not have been easy to achieve if the fossil had been removed intact. The specimen is now in the process of being formally described, and in doing so has provided an opportunity to re-evaluate the whole genus. After publication of the formal description of the new species, it is intended that this fossil will become the holotype, (i.e. the single specimen from which this species is defined); it will be available for both public viewing and research at Museum Victoria. The hole produced by the excavation was 78 mm in diameter and approximately 20 mm deep. As the limestone has a natural, rather than polished, surface and the hole is small, it was decided not to attempt to fill it, particularly as it will immediately undergo weathering. Indeed, in the 2 years since the excavation, the scar has faded somewhat, such that it would only be noticed by an attentive observer.

### The type location

When a holotype of a new species is selected it is done so on the basis that it represents, as much as possible, the salient characters of that taxon. In almost all cases, the location from which the specimen was recovered or found is of particular interest. This place is known as the “type locality” and is listed in the formal description of the species so that later workers may both revisit (and collect?) or establish other criteria about the taxon. Type localities are generally designated through cartographic grid references, permitting the exact location to be found.

However, this is a very unusual situation because the precise origin of the material collected is truly unknown (even though the building has not moved). I am very confident, on lithological grounds, that the limestone was quarried from somewhere in the Batesford Limestone Quarries, and these are located west of Melbourne. However, the quarry has been operating for at least a century, and the beds from which the building blocks in the Old Magistrates’ Courts were built are now long gone. The type location is clearly not where the fossil was “collected”, although the building it was collected from is probably the best place to look for further material; however, that option is clearly fraught with difficulties.

### REFLECTION

So, what are the moral issues, and what relevance do these have to zoology or palaeozoology? Those of us who work in the fields of systematic taxonomy and

biodiversity, irrespective of whether it is with fossilized or living taxa, will increasingly be asked to evaluate value. As noted, it is value that underpins the moral framework of a society.

In general, decisions will not involve buildings versus barnacles, but they will, nonetheless, involve evaluating the relative importance of resources, whether they are natural or economic. Over the past few decades we have witnessed a significant decline in global biodiversity, and this seems set to continue. Fortunately there has been a concurrent economic regime that has encouraged and permitted significant financial resources to be used to save endangered taxa, for example, the Chatham Island black robin, *Petroica traversi*, which has recovered from its status during the early 1980s as the world’s rarest bird. However, it took an extraordinary amount of money to achieve this, and it could be argued that this would have been better spent saving less critically endangered species with a greater genetic diversity: consider that during the 1980s the *P. traversi* population was reduced to five individuals (BirdLife International 2004). Perhaps the greatest threat conservation biology faces will be when the financial market tightens and the funding available for nature conservation is more restricted.

### ACKNOWLEDGMENTS

I thank Dr Jessica Reeves, RMIT University, who helped with photography. Mr Ray Osborne, Heritage Victoria, and Mr Chris White, Acting Pro-Vice Chancellor (Group Governance), RMIT University, managed the legal paperwork, making extraction of the fossil both economically and mechanically feasible. This paper was presented orally at the Second International Symposium of Integrative Zoology at the Institute of Zoology, Chinese Academy of Sciences, Beijing, China, on 10 December 2007.

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