

Sydney University Quadrangle Building restored using Capricorn Custom Buff. (Photo: Jasper Swann, 2007)

# SYDNEY YELLOWBLOCK IS ITS REVIVAL A BLESSING OR A CURSE?

JASPER SWANN investigates how the recent stockpiling of yellowblock sandstone is causing a collision between principles and practice in the conservation of Sydney's prominent sandstone buildings, and explores some alternative approaches.



Photo 1: Art Gallery of New South Wales, restored using Capricorn Custom Buff. Photo 2: Darlinghurst Law Courts, Sydney. Photo 3: Replacement of the cornice and balustrade at the Australian Museum. (Photos: Jasper Swann, 2007)

When the NSW Department of Public Works and Services (DPWS – now the Department of Commerce) negotiated purchase agreements with developers in 2000–01 to extract yellowblock sandstone from the McCaffrey's Hill redevelopment site in the inner Sydney suburb of Pyrmont, a wave of excitement swept through the ranks of the government department's Centenary Stonework Program.

Long since built over, the Pyrmont quarries of the late nineteenth and early twentieth centuries had been the source of arguably the nation's finest quality sandstone, used widely in the construction of the majority of Sydney's prominent buildings during that period. Landmarks including the State Library, the Australian Museum, Central Station – and now in the spotlight, the Sydney Town Hall – were all built from this rich honey-coloured stone.

It was a commendable move on the part of the state government to try to secure a future supply to conserve these important and elegant buildings. For some decades beforehand, the sourcing of a suitable stone had been something of a problem. Although good quality stones had been readily available from the Debden and Piles Creek quarries of the Gosford region, use of these stones had not always yielded satisfactory outcomes, and ultimately the DPWS – amid some controversy – excluded their use in the conservation of state-owned buildings. It was a surprising move, particularly as these stones had proved a better match for the buildings than the almost pure-white stone extracted from a city development in Kent Street and used, for example, in the Department of Education Building in Bridge Street and the Land Titles Office.

A subsequent dalliance with a Queensland stone, Capricorn Custom Buff, for a number of significant buildings, such as the Art Gallery of New South Wales and Sydney University Quadrangle Building, produced outcomes that couldn't really be said to be satisfactory. The Custom Buff may have been a good quality stone, and it may have been a perfect match for the nineteenth-century buildings of Rockhampton and certain colour-stable stones around Australia, but it was far from being a suitable match for Sydney yellowblock, as inspection of either of those buildings will reveal.

With the Gosford stones having been rejected, the DPWS might well have had a few moments of self-doubt over its choice of stone for restoration of such prominent buildings. So all the greater its probable relief when the agreements to extract Pyrmont yellowblock came to fruition, and quarrying – albeit a little less refined than modern commercial methods – recommenced in the suburb for the first time in more than 70 years.

As the millennium turned, 4500 cubic metres of McCaffrey's yellowblock stone were extracted and stockpiled, and the dawn of a new era for stonemasonry in Sydney was proclaimed. The NSW Government now had sufficient stone to restore Sydney's prominent stone buildings and to underpin its Centenary Stonework Program for many years to come.

But one highly significant factor was misjudged. So significant, in fact, that anyone with an appreciation of classical architecture (and indeed their children and grandchildren) may come to wish that the stone had remained in the ground. Sadly, despite the noble intent of the DPWS in investing in this stone, not only has it turned out to be an equally poor

match for many of the buildings that it has been used to 'conserve', but its sudden availability and much-trumpeted tag of 'the real thing' has fuelled an extensive program of works that has left a growing number of significant buildings perhaps indelibly affected.

The tragedy is all the greater when one sees that the craftsmanship that has gone into working the new stones is second to none. The skills of the masons involved must be applauded. But buildings such as the Darlinghurst Law Courts, the Australian Museum and the Sydney Observatory have had such large quantities of original fabric replaced with the McCaffrey's stone that their architectural aesthetic, which comprises a considerable part of their significance, has become compromised. This is demonstrated well at the Darlinghurst Law Courts, where the entablature of the south elevation is now divided into two visually distinctive parts, with the cornice and blocking course having undergone almost total replacement. The effect upon the observer's eye is a considerable reduction of building mass in its upper courses, significantly disrupting the architectural form.

At the Australian Museum, the wholesale replacement of the cornice and balustrade of the nineteenth-century wing has given rise to a situation where, owing to the significant difference in colour at parapet level, the eye reads this part of the building as lower than the contemporary wing to the east, which was clearly not the intent when the newer wing was designed.

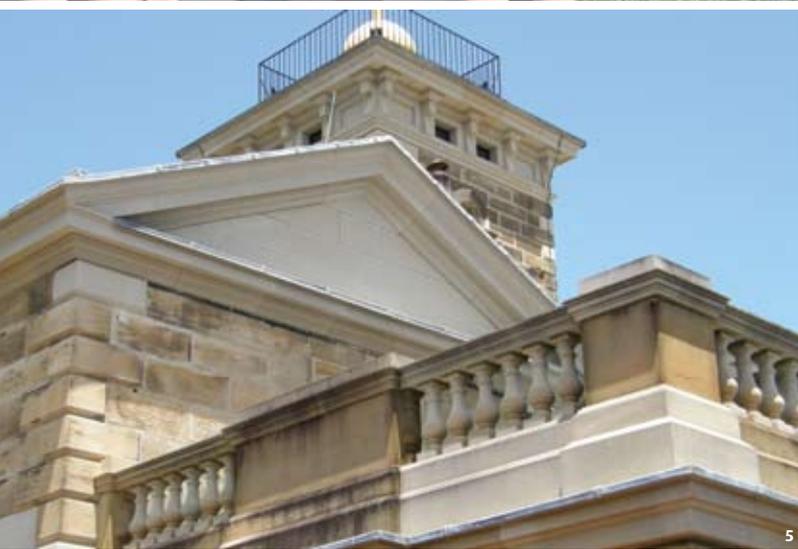
Replacement of small quantities of stone can also be disfiguring. New stones introduced at the State Library of NSW and the Anderson Stuart Building at the University of Sydney are conspicuous in their stark unsuitability.

And at the Sydney Observatory, so much stone has been replaced that the buildings verge on losing their historical character.

So why, when those involved set out with such righteous intention, has this occurred?

The critical factor misjudged in the stockpiling of the McCaffrey's stone was the capacity of the stone to retain an oxidising potential when allowed to remain exposed to the atmosphere for long periods prior to processing. In truth, this might have been foreseen.

Yellowblock is an oxidising sandstone. When freshly quarried, it has a pale grey-white colour, but as moisture ('quarry-sap') within the stone moves to the surface, trace elements such as iron, silica and calcium are deposited (at 1–3 mm depth) in the form of iron hydroxide/oxide, silica and calcite. Their oxidation on reaction with the atmosphere leads to a yellowing of the surface through staining of the intergranular clays within the stone. The presence of siderite within the stone also contributes significantly to the yellowing on exposure to the atmosphere. Within a short period after quarrying (2–8 weeks), the stone has its characteristic colour. If, after a longer period, the surface colouration is removed, the yellowing will not occur again. In short, the stone oxidises only once. So whilst the multitude of McCaffrey's quarry blocks have yellowed beautifully on their external faces in the stockpile, when eventually sawn and processed by the masons, they retain little or no ability to oxidise. (Exceptions appear to be limited to stones of small dimension that may have been recovered from the deepest regions of individual quarry blocks, where small levels of oxidation are evident).



**Photo 4: Replacement stone in the parapet at the State Library of NSW. Photo 5: Wholesale replacement of stone in the pediments, tower and balustrades of Sydney Observatory. Photo 6: McCaffrey's stone in the Anderson Stuart Building, University of Sydney. (Photos: Jasper Swann, 2007)**

What has been misjudged, in other words, is that the source of a yellowblock sandstone needs to be active, with stone moving swiftly from the quarry, to the masons' shop, to the work site. This was once well understood and was the normal practice when Sydney's major public buildings were built. Indeed, as recently as 2001, a clause appeared in almost every specification to that very effect. Today, however, this process appears to be less well respected by those choosing to specify the McCaffrey's stone, and the clause no longer appears.

Perhaps even more surprisingly, the practice of replacing stone in such significant buildings with a material that is proving to be essentially the wrong colour has flown in the face of accepted conservation policy, and this latter fact appears to have passed unnoticed.

The Burra Charter, adopted by the Australian National Committee of the International Council on Monuments and Sites in 1979 and subsequently revised in 1981, 1988 and 1999, provides guidelines for the conservation and management of places of cultural significance. The Burra Charter defines new stone elements such as those exemplified above as 'reconstructed elements'. Article 20.2 of the Burra Charter requires that reconstructed elements should only be 'identifiable on close inspection'. Unfortunately, this is far from the case in an increasing number of Sydney's important sandstone buildings, as the examples provided above demonstrate. The significance of the Burra Charter as the principal guiding document for conservation works in Australia cannot be underestimated, and such an apparent departure from one of its key articles carries a risk of undermining the document's relevance. This is a matter for the NSW Heritage Office to consider very carefully.

The most important question to ask right now is, where to from here?

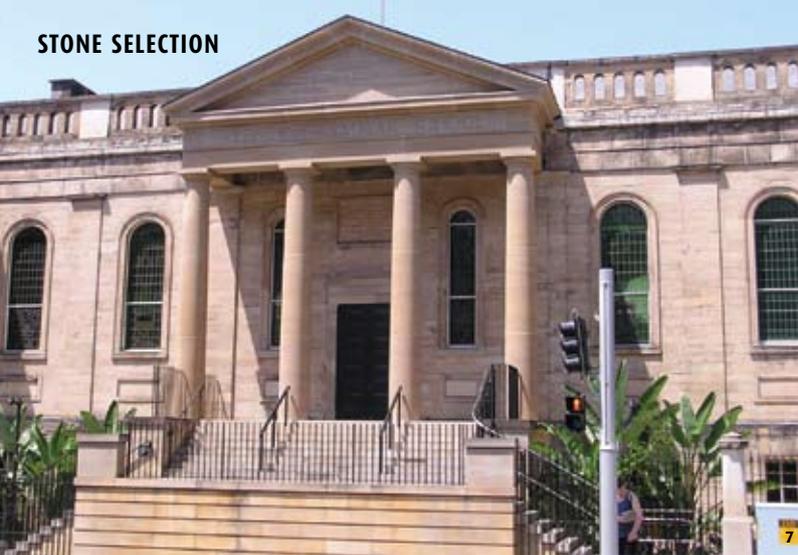
Perhaps the very first step might be that all parties involved in conserving these buildings accept that current practices are not producing the desired results. No one could fail to admire the warm, honey-coloured appearance of Sydney's yellowblock buildings, but it would be hard to argue that the McCaffrey's stone is developing the same appearance. There may have been an expectation that the stone would retain an ability to oxidise for several years once quarried, but there is enough evidence to suggest that this was misguided. Ultimately, it would seem desirable to all concerned that every attempt be made to ensure that each new stone that finds its way into any of these great buildings be a good match for the original.

There is a more important matter that precedes this, which concerns the principles under which any given stone in a heritage building be deemed to require replacement at all. My belief is that considerably more stone than is necessary or desirable from a conservationist's point of view is replaced, and that this, in itself, is a contributing factor in adversely affecting the architectural aesthetic and historic value of a number of buildings. This issue, which I believe needs to be discussed at some length, is beyond the scope of this article.

The next question, therefore, should be how to achieve a more appropriate colour match? There would appear to be a number of options available.

It is something of a widespread myth that no suitable active source of yellowblock stone exists. The Guinea Gold sandstone from the deeper lifts of the Piles Creek quarry near Gosford is in fact a very good quality oxidising sandstone, and the quarry is an active source with extensive reserves. Oxidisation of the Guinea Gold will reliably occur within days and weeks of being quarried.

In mid-2007, a piece of Guinea Gold sat alongside a piece of McCaffrey's yellowblock in my yard for several weeks. The two stones were indistinguishable in colour when first off the saw, but after eight weeks, the contrast was striking: the Guinea Gold had taken on its characteristic warm yellowing, whilst the McCaffrey's remained unchanged. But one face of the Guinea Gold developed an irregular brown staining, and this is one of the stone's inherent problems. The Guinea Gold often does not oxidise uniformly. It suffers from irregular concentrations of iron and manganese that can show up on oxidisation as a chocolate-brown and occasionally black discolouration. However, this can be controlled by the application of a weak hydrochloric acid solution, a practice carried out for decades but now actively precluded in almost every stonework specification. Application of the acid wash leads to a complete removal of the staining within a day or two. The effect is permanent and the



concentration of acid required so weak – it can be sponged on by an unprotected hand without causing anything more than mild irritation – that it does no harm to the stone.

It would appear to be another popular myth that the application of hydrochloric acid in this concentration is harmful to the stone. Extensive research has been carried out by respected practitioners (such as Alan Spry and Associates, 1997) to demonstrate that there is no substantive basis for such claims, and certainly after twenty years in the industry I have yet to see any harm caused to a stone in this way. So it would seem to be an acceptable and useful method to employ. At the very least, the research should be re-examined and extended if need be to either prove or disprove the nay-sayers, because the Guinea Gold can certainly provide an excellent match for yellowblock buildings.

The new portico built on the College Street façade of Sydney Grammar School in 2001 – immediately alongside the Australian Museum – provides a particularly useful example of just how good a match the Guinea Gold can be.

The one other difficulty that occasionally arises in the Guinea Gold is its failure to oxidise at all. This generally occurs when a block is quarried from a lift where the normally inherent siderite is absent and typically the stone remains very pale in colour. Significantly, this occurrence has given rise to another solution to dealing with stone of an unsuitable colour.

In 1983, Gosford Quarries and Amdel developed a method of simply and permanently colouring such stones to match their successfully oxidised counterparts. The method, which is commercially protected, has been used extensively on a large number of buildings over many years and appears to have no shortcomings. The penetration of the colouration is very similar to the depth of a naturally oxidised surface (1–3 mm); the effect is permanent; and the solution applied is harmless to the stone, producing by chemical reaction the same surface chemical compound as would naturally occur in the oxidisation of a yellowblock stone. Applied with a brush or sponge, it is also harmless to the person applying it. Most in the industry will be aware that the Wondabyne stone from which the new spires of St Mary’s Cathedral are built is naturally as grey as an elephant’s hide. The application of the Gosford Quarries’ colouring solution here has been overwhelmingly successful in a situation where the need for a good colour match was essential. The same method was also successfully used to colour Wondabyne stone in the restoration of the eastern façade of Sydney Town Hall in 1992.

Simple experiments that I conducted in 2007 have demonstrated that this same colouring solution is just as effective when applied to the McCaffrey’s stone as it is when applied to a recalcitrant piece of Guinea Gold. And it would be hard to argue that the resultant colour of the stone isn’t a better match for Sydney yellowblock.

In view of all the evidence, there would seem to be a number of worthwhile options to pursue in attempting to provide stone of a better match for the conservation of Sydney’s prominent sandstone buildings. And with much talk in the air of a A\$30 million restoration of the stonework of the Sydney Town Hall, now would be a good time to consider those options. A very large amount of stone has been scheduled for replacement in the Town Hall – more than may be necessary, in my opinion – and few would wish to see stone of an unsuitable colour find its way in such large quantities into one of Sydney’s iconic buildings.

There is no doubt that the McCaffrey’s stone is of a high quality, nor indeed that geologically it may be the closest available match for stone that came from the first Pyrmont quarries. And its use has been successful in a number of buildings where the existing stone tended toward a buff rather than a golden colour. What is doubtful, however, is the efficacy of stockpiling a yellowblock stone as a viable solution to the challenging issue of supply for yellowblock buildings.



Photo 7: Guinea Gold stone used for the new portico at Sydney Grammar School. Photo 8: A piece of McCaffrey’s (top) above a piece of Guinea Gold, eight weeks after sawing. Photo 9: Irregular manganese staining on a piece of Guinea Gold and (photo 10) its removal using a weak hydrochloric acid solution. (Photos: Jasper Swann, 2007)

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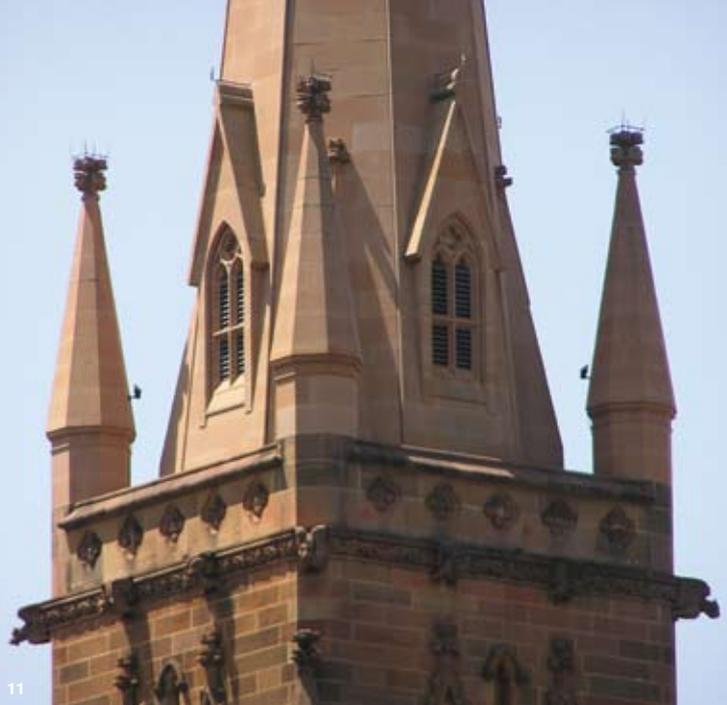


Photo 11: The new spires of St Mary's Cathedral, Sydney – Wondabyne stone.  
Photo 12: A piece of McCaffrey's stone artificially and permanently coloured.  
(Photos: Jasper Swann, 2007)

Recognising that the state government has invested a considerable amount of taxpayers' money in extracting and stockpiling the stone, the best option by way of an alternative approach may be consideration of a successfully proven artificial colouration process such as the one described above. To the man in the middle, with no vested interests, but rather a love of fine sandstone architecture, it would appear that a collaboration between those who have developed an artificial colouring system and those who now need it could be of benefit to Sydney's landmark buildings and to those in the community who appreciate them. In the absence of this, it may be time for the development of an alternative method of achieving the same end. Or perhaps even a return to a widespread use of Guinea Gold or coloured Wondabyne.

What is indisputable is this. The use of Sydney yellowblock has helped to establish the material as a quintessential determinant of the city's historic fabric and architectural character, and its use has played a critical role in the city's architectural and urban development. With this perspective – and with an eye to meeting the conservation requirements of the Burra Charter – the time to review the current practice is upon us. ©

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