A MODERN APPROACH TO OLDER BUILDINGS

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ABSTRACT

The development of lift systems has matched, in no small measure, that of the buildings themselves. As buildings have been replaced, the lift system has been part of the new development, with improved control systems, safety features and physical appearance. An increasing number of developers, however, are resisting the urge to replace older buildings, perhaps due to the effects of heritage group pressure, and also to the expense involved in, and restrictions placed upon demolition work. The lift system designer can be left in a quandary with these buildings, whether to offer a completely new system or to utilise, as far as possible, the existing equipment and building style. This paper considers the lift systems in several extensively restored, elderly buildings in Sydney, Australia.

INTRODUCTION

When one considers elderly buildings, one's mind invariably turns, these days, to the term "heritage buildings". This occurs because, regardless of the length of history of one's country of residence, a certain emotion arises regarding buildings that have existed for some considerable time. This emotion may engender desires to replace the horrible, outmoded thing by something up to date. On the other hand, an increasing number of people are keen to maintain some of the heritage that has been handed down to the current working generations.

It does not appear to matter whether the country or state has had many centuries of civilisation, as occurs in most of Europe and Asia, or whether this has been experienced in the recent past, as in Australia. What exists appears to many as their heritage, and they go to great lengths to retain it. If an old building is to be refurbished extensively, what is to be done with the lift system? Does one already exist, or is it considered to be a necessary addition to the building? How do current regulations fit in with the need to maintain a period appearance? These are issues being pondered by some of the more thoughtful developers and architects.

HERITAGE

In discussing heritage items, it may well be prudent to define the term. The Shorter Oxford Dictionary defines Heritage among other things, under "Attrib. & Comb." as:

> "In the senses 'forming part of a national or cultural heritage', as heritage highway, train, etc; 'concerned with the conservation and use of the national or cultural heritage', as heritage group, industry, etc."

In Australia, with an architectural history of approximately two hundred years only, buildings are considered as heritage items even if they were built in the mid twentieth century. The buildings under review in this paper, however, were first completed about one hundred years ago, when the

lift industry was in its infancy. They have had an interesting history during that period, and are now enjoying a new lease of life, in a manner not markedly different from their original intent.

THE QUEEN VICTORIA BUILDING

Were one to step out of the northern end of the Town Hall railway station in Sydney, on the left side would be seen the Town Hall, but immediately in front, a quite magnificent building of American Romanesque facade, behind a prominently displayed statue of Queen Victoria. It fills a complete city block, and has now been refurbished entirely as a boutique shopping centre.

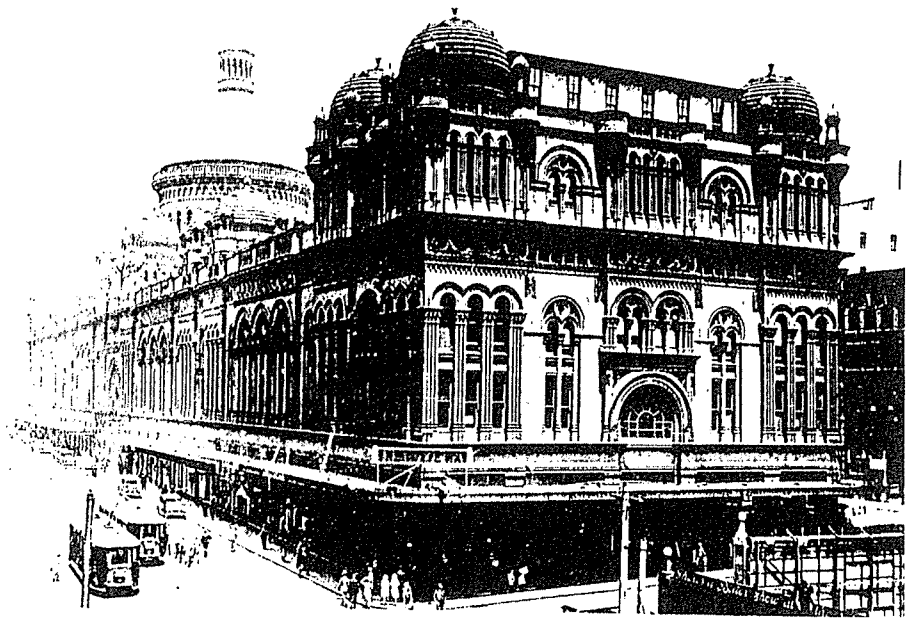

Figure 1 - A View of the Queen Victoria Building From the North Eastern Corner. The Photograph Was Taken About 25 Years After the Building Was First Opened. The Temporary Extension Between the Minor Domes Has Been Removed.

What of its history? The area was first set aside specifically as a market place in 1810, by Governor Macquarie. In 1820, a two storey building was constructed at the southern end to administer the market, and in 1829 the area was to be set aside as a Market Square. In 1893 the site work commenced with four individual designs for the facades of the building submitted by the Architect, George McRae. They were Gothic, Queen Anne, Renaissance and the accepted Romanesque style. In 1897 the City Council resolved to name the building Queen Victoria Markets Building, in order to mark fittingly "the unprecedented and glorious reign of Her Majesty, the Queen." The building was opened officially on 21st July 1898, and in 1918 had its name changed to the Queen Victoria Building.

In the years between 1934 and 1938, the building was remodelled substantially, with galleries floored over, and shop fronts rebuilt in the "Art Deco" style, to match current trends. A substantial part of the ground floor was refurbished in that style as the main office of the local electricity supply authority. During subsequent years, the building fell into a measure of disuse, and it was proposed in Council in 1959 that the building be demolished, to be replaced by a civic square and parkland.

This plan, fortunately, did not eventuate, and the council became committed to restoring the building in 1971. Works did not commence until 1979, with roof refurbishment, however the major restoration was completed between 1984 and 1987, and the building was first reopened to the public in November 1986.

THE EARLY LIFTS

A market, particularly one comprising a building of several stories plus a basement, even in 1898 required some means of moving goods vertically in the building. For this purpose, four water hydraulic devices were installed. It consisted of an open platform, sized to carry a horse and cart, with additional produce. As was expected in that era, the lifts were rather primitive affairs, the hydraulic pressure being derived from sea water in the Sydney Harbour. Although not used for many years, much of the original piping for the hydraulic power of not only lifts, but also much of the early factory machinery, still exists throughout the city.

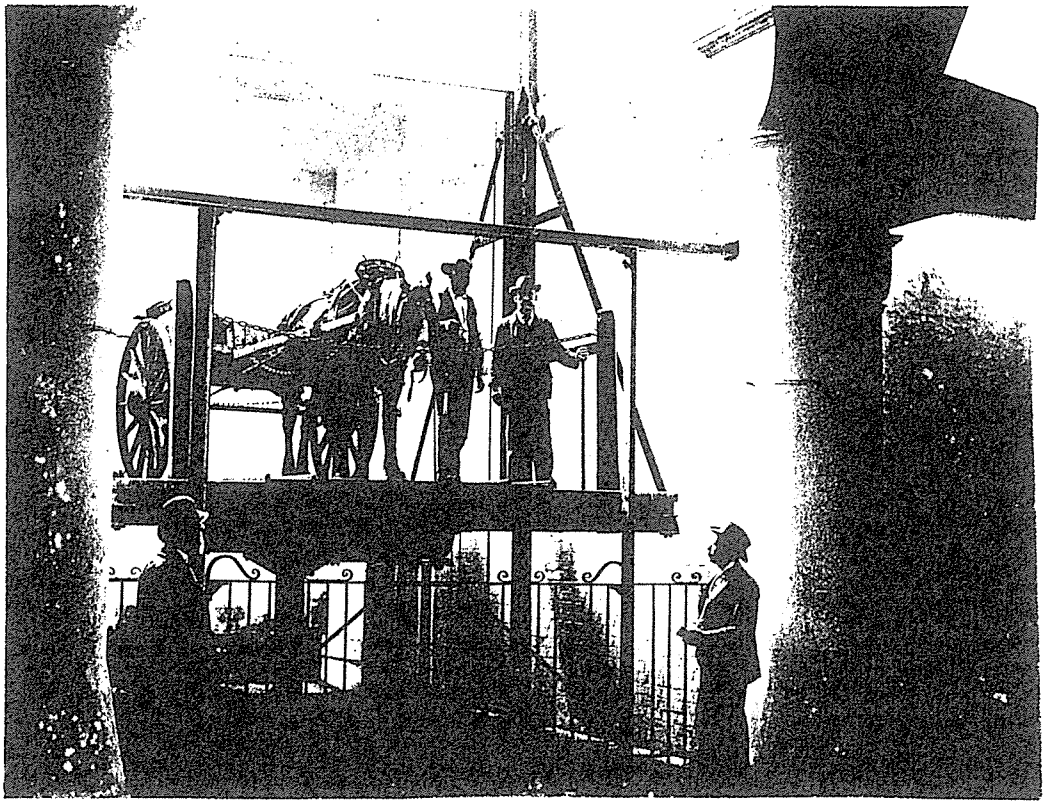

Figure 2 - One of the Original Water Hydraulic Lifts At the Basement Landing of the Queen Victoria Market Building

The Queen Victoria Building was a building with a small proportion lettable, due to very wide open light wells throughout the central section of the length of the structure, and little means of moving the public to upper levels. It never really turned out to be a paying venture for the City Council, however the internal modifications during the 1920s and 1930s endeavoured to improve the situation by filling in the light wells, and installing four passenger lifts, and one larger lift in the central dome area. Although these renovations provided a much larger retail area and improved means of access, the building became extremely dingy, and remained not only unpopular, but also uneconomical.

Figure 3 - One of the Passenger Lifts at an End of the Building

The four manually operated passenger lifts remained unchanged until until the final renovation of the building. They were considered to be unsuitable for modernisation when the building was restored, and the decision was made to replace them.

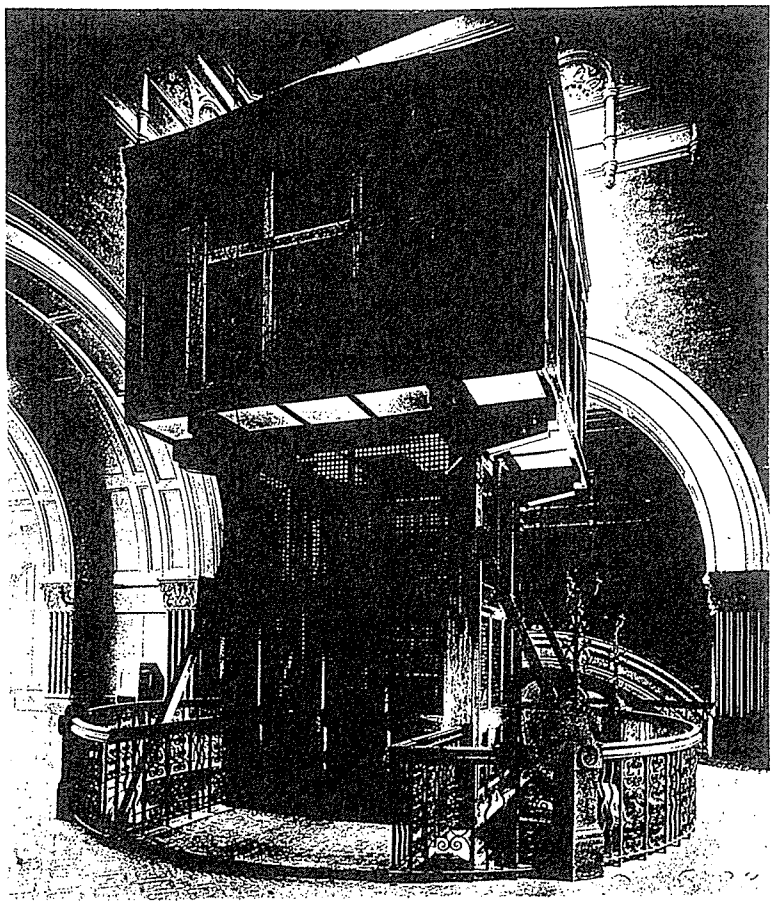

Figure 4 - The Centre Void Loss to Accommodate the Lift

One has only to look at the sight of the large lift in the once open central area under the dome to appreciate the lack of respect shown by the building developers to the beauty of the building. The dome and its glass ceiling were almost completely hidden, and the complex was given an appearance of cramped and dingy office and retail space. It can be argued well that the four small passenger lifts fitted in well with the building style, but the monstrosity shown in Figure 4, could not enhance any building. The lift machine room perched above the lift well is most ugly, and it would be difficult to find any such installation finding approval today. The access is not shown in the photograph, and it is assumed that it would have added further to the ugliness at the rear of the machine room.

The building fell into such a state of disrepair that there were many calls for its demolition, however conservation groups, led by leading architects, and supported strongly by the Builders Labourers Federation "green bans", caused serious reconsideration of the inability of state and local government bodies to prevent owners demolishing properties with some historical significance. The National Trust, also, became involved, and it was finally agreed that the building should be restored to what was considered to be its "original concept". The lifts, however, were considered to be inappropriate for use in a fully restored building.

THE NEW LIFTS

The proposal to install new lifts in a 19th Century building subjected it to what had become a common problem, that of the requirement of statutory authorities to install modern lifts, with all the associated contemporary surrounds and equipment. As the interior of the building was to be restored to, and shop fronts fitted out in, a reproduction of the original style, it was considered by the development team that up-to-date fittings and fitments in the lift system would clash noticeably with the intended appearance. In the final construction, five traction lifts, with machine rooms above the lift wells, were installed, four for public use, and one dedicated to use by the building management.

An 11 passenger (748 kg) lift is located at the Southern end of the building to serve the general public between the basement and second floor, which are the four public levels at that end of the building. A similar lift is located at the Northern end of the building, but it serves also the third floor at that end, which leads to the rebuilt grand ballroom. These lifts are both constructed in the old traditional manner, being wooden cars with mock old style push buttons, and a large expanse of glazed open mesh. Otherwise the cars comply fully with current standards. The lifts are located in the centre of non fire isolated public stairs, hence have open lift wells, with mesh protection at the bottom terminal.

As the house service floors extend at the Southern end between the third and fourth floors, and general public access is not encouraged to those levels, a 12 passenger (816 kg) enclosed lift is used to serve between the basement and those floors, having the capacity to stop at the intermediate floors. The lift is located in a blind passage, and would not be noticeable to the general public. Although this lift is enclosed within a panelled lift well at the lower floors, it has been fitted out in a similar manner to the public lifts.

Two additional 10 passenger (680 kg) lifts in a common lift well serve between the ground floor, basement and four car parking levels under the adjacent York Street roadway. The well originally enclosed one of the large hoists between the basement and ground floor, but was extended downwards to create access to the new car park during building refurbishment. These lifts also are arranged to match the appearance of the other public lifts, but at the lower car parking levels, the landing entrances are of a more conventional style, with fire isolation being a prime consideration.

ESCALATORS

Twelve escalators, all with glass balustrades, and 30° slope, have been provided in the public area of the building. They are all of modern appearance, complying fully with current code

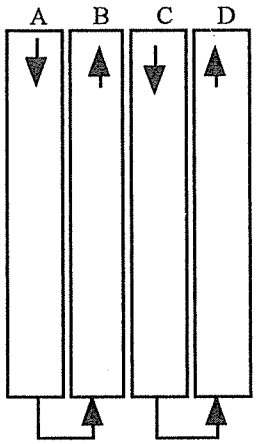

Figure 5. Escalators in Normal Arrangement at Western Entry. Landing B - C is at First Floor

requirements, and have a varying impact on the building, depending upon their location. Entering the building on the Western side from George Street, at the centre of the building, you walk between two escalators, the up one on your left and the down escalator on your right. Their upper landing is behind you, above the entry point, leading directly to two further escalators which connect with the floor immediately above the ground floor, denominated the Grand Walk, escalator landing. This arrangement, as shown in Figure 5, enables an uninterrupted flow of pedestrian traffic, as neither upward nor downward traffic cross at the intermediate landing.

The whole system appears to work in a satisfactory manner, and although of modern styling, the escalators do not conflict with the building appearance. There is some conflict for passengers at the uppermost and bottom landings of the system, but this cannot be avoided with normal pedestrian cross traffic.

A further set of four escalators are installed to join the lower level of a split basement to the upper level, and thence the ground floor. These too, are of similar appearance, and do not conflict greatly with the building decor, however have been made to operate in a strange arrangement.

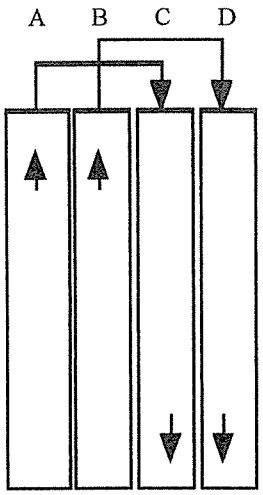

Figure 6. Escalators in the Odd Arrangement Within the Building, Causing Cross Traffic. Landings A to D are at the Upper Basement

As compared with the efficient traffic flow created by the four escalators at the Western entry, these units are oriented such that there is always conflict at the upper basement landing, denoted by A, B, C and D in Figure 6. Persons wishing to travel from the lower basement direct to the ground floor use Escalator A, and need to cross the exit point of Escalator B which descends from the ground floor to get to Escalator C, which rises to the ground floor. Likewise people using Escalator B from the ground floor, need to cross the entry point to Escalator C to go to the lower basement. Were either A and D, or B and C reversed, the pattern would be similar to that in Figure 5, and conflict would be avoided, or at least lessened considerably.

Two additional sets of two escalators, one set at each end of the building serve between the first floor, called the Albert Walk, and the second floor named the Victoria Walk. As the upper public levels of the building are constructed with an open central section, and the areas to the sides of the central section form quite tight passages between the shopping tenancies along each side wall and the open areas, there was little space available for escalators. The decision was made to cantilever each escalator over the void, one toward each corner of the building.

The system provides an effective service, however the modern style of escalator in an open environment within the restored building, is very noticeable, and arguably detracts seriously from what is an overall impression of modern equipment complementing the heritage building. One could not but consider that better planning may have enabled these escalators to be located preferably within the building structure. Of interest is the work commenced recently to reopen,

after 100 years, the southern section of the lower basement, which will enable an increase in the number of shopping tenancies in the building. This will involve the use of two additional escalators between the upper and the reopened lower basement of the building. All escalators used in, and proposed for the building, are standard manufactured units with a step width of 800 millimetres. The southern end of the upper basement, which is called "The Avenue", leads directly into the Town Hall railway station concourse, consequently the building is located well both as a shopping mecca, and a direct access from neighbouring offices and shops to the station.

A side arcade from the southern approach to the building basement includes two additional escalators with enclosed balustrades, but otherwise similar characteristics to the others in the building, provides an additional access to the street. The northern end of the basement leads directly into a department store basement, which in turn leads on to a further arcade, and the main shopping area of the city.

The building, after many years of neglect, has been reborn as a high quality shopping centre, and the vertical transportation, particularly the escalators, has played a large part in the success of the building. The lifts, although fitting in well with the building decor, have been considered by the building management to provide an inadequate service, particularly from the basement loading areas to the shops. Some consideration is being given to the installation of a goods lift between the basement and the ground floor to improve this service, however a place must be found for it in order that history is not allowed to repeat itself, and we are not left with an ugly appendage to the building.

THE STRAND ARCADE

In the late 19th Century, there were a large number of feature arcades built in Sydney to connect major commercial streets. Unfortunately most of these have disappeared in the wild days of replacement, between the years of 1950 - 80 which saw also the decimation of all bar one of the theatres in the city.

One arcade which survived against the odds is the Strand Arcade, which was built in 1892, however it had been subjected to such an unbelievable amount of internal "improvement" that there was not one shop front in its original state by 1970. This arcade is located between Pitt and George Streets, in the heart of the main shopping area of Sydney.

Figure 7. The Strand Arcade from Pitt Street

Figure 8. The Eastern End Lift Entry

It was served by two passenger lifts, one at each end of the arcade, serving between the basement, the ground floor, two upper commercial levels, and some administration levels above. Both lifts were manually operated, with a single outward swinging landing door, and no car door. They and the Arcade retained an air of old fashioned, almost elegance, without being quite "run down". In short, it was an ideal candidate for demolition and replacement, having been passed by amid modern structures which took the place of so many fine old arcades and buildings. The authorities too were anxious for the outmoded manual lift systems to be replaced by modern automatic devices.

Trading hour extensions throughout the weekends also made it difficult for building managements to justify the use of lift drivers, where penalty rates of pay made their employment uneconomical. In only few areas, such as exclusive department stores, were they retained, and still continue to this day. This, then was the dilemma facing the management of the Strand Arcade, despite the building having gained a National Trust "A" Classification in 1974.

At 3 am on 25th May 1976, a fire started in the western end of the building, and by the time it was under control, had completely destroyed that section, and subjected the eastern end to extensive water and smoke damage. On surveying the damage, the question was asked whether the arcade was worth anything other than demolition, but the concept gathered momentum that a real part of the heritage of Sydney would be lost forever, if this building were allowed to be destroyed. This resulted in a large amount of public donations, which forced the decision to be made to rebuild the arcade, despite the extensive damage caused by both the fire and the enormous quantities of water needed to control it. A Project Manager was appointed, who had a real belief in the integrity of the original building, and he searched through the past records, and stored items, to come up with an original shop front, the like of which had not been seen in the arcade for many years. He started from scratch, and hand built the entire arcade shop facades, with, as the Authorities understood, the exception of the lift at the eastern end, which they were satisfied, could not be refurbished, without removing the car from the lift well.

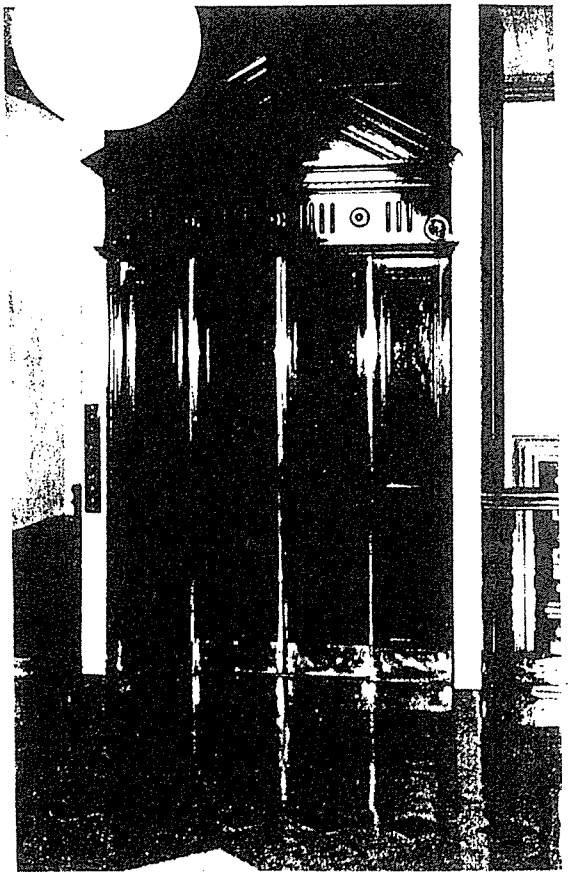

Figure 9. The New Western End Lift Entry

Fortunately the original design of the building was still held by the State Library, and the developer was able to access all of the drawings. The new arcade was built, as nearly as possible, to the original design, which had been created by an English Architect, John Spencer.

The Department of Labour and Industry, which was the controlling body of lift systems, had insisted that the lift be replaced, as it was outmoded, and was incapable of being upgraded to automatic operation. The lift car and lobby doors had suffered severe damage from smoke and the heat developed in the fire, and appeared to be irreplaceable.

Strong, and incessant representation to the Department resulted finally in the agreement that the lift could be retained, provided the car was not removed from the lift well at any time. Needless to say, the car and facings were refurbished, and allowed to be retained. It is still being operated manually, or rather "womanually", during normal weekday trading hours.

The lift at the western end, having been totally destroyed, was replaced by a modern, automatic lift system and car. This car and entrances were built to match the original lift, with the car controls designed to match the earlier period, and as indicated in Figure 9 above, the doors and surrounds were not too far removed from what had been installed originally.

An interesting sideline is that the project manager had been able to find a store of large lengths of seasoned Australian Cedar, which was the timber used in the original construction. This had been set aside for many years for a particular project which did not eventuate, and virtually fell into the hands of the project manager. As a result, the building was restored after the manner that it was erected, but with many new safety features.

The Strand Arcade was re-opened in 1977, and as a commercial venture, has not looked back. It has been re-established as a very select location of fashion shops on the ground floor, jewellers and speciality shops on the upper levels. During the 1920's, the basement had been turned into a rather "risque", and very successful night club. This, too, disappeared, to be replaced at the present time, by the new wonder of the jet set age, a city located duty free shop.

Both lifts started their lives as manually operated water hydraulic systems, with rope control. At some stage in their history, they were converted to electrical overhead traction systems, and this is the state that the eastern lift enjoys still. The western lift is what was a new, for 1976, automatic traction system, with manual override. The control gear is of the then current electro-mechanical type, with relays, large contactors, and hard wiring, and the machine is an AC geared drive. On occasions, the Arcade management have that lift controlled by an operator, but it does provide a continuous out of hours service.

CONCLUSIONS

Australia is not a country with a long history. "Heritage" to the average Australian, revolves around Bill Haley, the Beetles, and in many cases, the last premiership win of their favourite football team.

For two very fortunate buildings in Sydney, heritage has come to mean a lot more than a cheap facade. Serious minds have seen the need to keep something of value from our very short past, and

not only make it work, but also make it available to all to see what our forefathers had in mind when these buildings were first erected. Of course the vertical transportation installed originally, and in a subsequent past in these buildings, has fallen by the wayside, to be replaced in its turn by modern equipment. It is pleasing to see that the designers of this equipment have retained the spirit of the buildings in their efforts.

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The illustrations forming Figures 1-4 in this paper were reproduced from "The Queen Victoria Building 1898-1986", with the consent of the Queen Victoria Building Centre Management. All other illustrations were produced by the author.

ACKNOWLEDGEMENTS

Grateful thanks is extended toward Mair Stark-Bryant from the Queen Victoria Building Centre Management; Freda Carr from the Strand Arcade Centre Management; and Ken Ewen, who was the Construction Manager on the reconstruction of the Strand Arcade, for their ready enthusiasm in assisting the author to discover such interesting pasts of these two wonderful buildings.

BIOGRAPHICAL DETAILS

The author, Craig Pearce, obtained the Diploma in Electrical Engineering from what is now the Caulfield campus of Monash University, Melbourne, Australia, in 1961, and Master of Design Science (Building Services) at the University of Sydney, Australia, in 1992. He spent over 30 years in Consulting Engineering in several countries, much of which was involved with lift system design. In November 1991, he joined the staff of the University of Sydney as a lecturer, developing and co-ordinating the vertical transportation, communications, and electrical services courses, in the Building Services post graduate stream of the Faculty of Architecture.

Following the completion of his university contract at the end of 1996, he returned to Consulting Engineering with Elevert Pty Limited, and has been seconded to Ove Arup & Partners in Sydney, where he is involved in establishing vertical transportation expertise within their Building Services Division. He is a National Vice President of the Society for Building Services Engineering in the Institution of Engineers, Australia, and Secretary of the Twentieth Century Heritage Society of New South Wales.