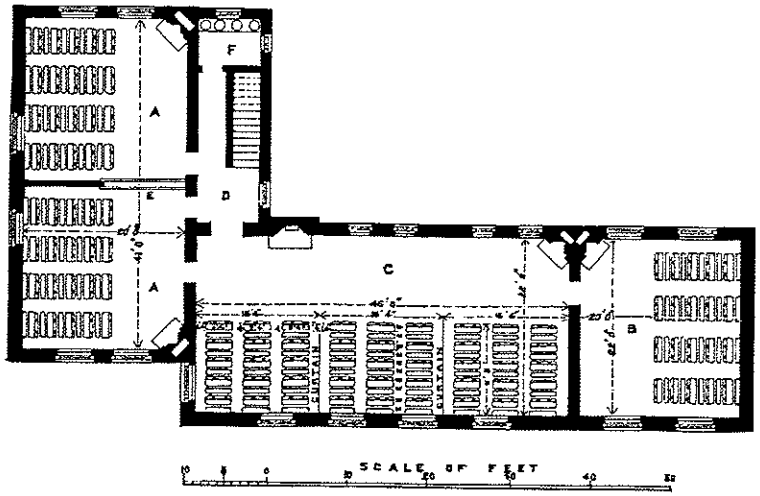


Figure 1: Suggested plan for graded school of 210 children. Room 'C' is a large, multifunctional room that can be converted to an assembly hall.
From Edward R. Robson, *School Architecture*, 1874.

W. E. Kemp's School Buildings, 1880-1896

"Seed-Germ of the Australian architecture of the future"?

Kirsten Orr

The newly formed Parkes Government of 1878 inaugurated four years of stable government in New South Wales, during which a national system of free, compulsory and secular primary school education was introduced. Its Public Instruction Act of 1880 created a demand for new school buildings and the refurbishment of existing structures to house the ever-increasing number of students. The work of erecting schools, which in previous years had been carried out by George A. Mansfield under an arrangement with the Council of Education, was transferred to the Department of Public Instruction and William Edmund Kemp was placed in charge of the office of "Architect for Public Schools."

This paper examines Kemp's school buildings within the context of late-nineteenth-century school building practice and the British-Australian system of pupil-teacher primary education. Kemp broke with the Gothic tradition to introduce new architectural styles, incorporated natural lighting and ventilation systems, and used affordable, local materials. These innovations were noticed individually by his contemporaries, but have yet to be investigated collectively with regard to their effectiveness and functionality in the context of late-nineteenth century and early twentieth-century standards for school buildings. The editor of the *Australasian Builder and Contractor's News* in 1893 suggested that Kemp's schools might be considered as the "seed-germ of the Australian architecture of the future"; and their contribution to the formation of an Australian style will be discussed.

Educating the Populace for a New Era

Rising men of the colonial urban bourgeoisie, who were small in number, usually chose to send their sons back to England to receive a classical education or else pursued a classical education in the colony. The influential educator, Thomas Arnold, headmaster of Rugby School, firmly believed that the Greek and Roman languages were the instruments by which young minds should be formed. His aim was to produce inner self-perfection in Christian gentlemen. In contrast, in the rapidly expanding industrial cities of England, manufacturers, merchants, financiers, and urban workers generally believed in the doctrine of

material progress based on utilitarianism, positivism and popular democracy. They became increasingly critical of the English public schools and demanded enquiries and reforms, arguing strongly for access by a wider cross-section of society and a more practical curriculum.[1]

Similarly, in the Australian colonies, a conflict was growing between the ideologies of traditional classicism and progressive utilitarianism and there was a strong movement in favour of the establishment of a general system of education that would benefit all members of society. Henry Parkes and Dunmore Lang had long held the dream of a democratic, egalitarian society and believed that education was a foundation for nation building. Whereas a universal elementary education system was developing in England even though democracy was still decades away (1880s and later), the eastern colonies of Australia were without a system of education to furnish literate and informed voters despite having achieved democracy earlier (late 1850s). In 1862 Victoria introduced the Common Schools Act, which aimed to unify the administration of schools and in 1866 the New South Wales Public Schools Act established a Council of Education to control state schools, with Parkes the first President. Both acts were concerned with the administration of two streams of primary schooling, one secular and the other denominational. Energetic resistance to secularism in both colonies resulted in a prolonged battle for the control of education. The sectarian discord was particularly strong in New South Wales, partly because of the political instability of the colonial government and partly because of the higher proportion of Catholics (29% in 1871). In 1872 and 1880 Victoria and New South Wales respectively introduced the Education Act and Public Instruction Act to make education free, compulsory and secular. The economic boom of the 1870s had provided an encouraging environment for educational reform and the benefits quickly became apparent, so that in the last two decades of the Nineteenth Century a higher proportion of children were receiving a basic education than their British counterparts. The government schools provided a practical primary education in reading, writing and arithmetic, as well as aiming at the formation of good habits of respect, morality and obedience.[2]

The interest in public education was accompanied by a broader interest in all aspects of education, including technical education, the establishment of educational institutions such as museums and art galleries, and international exhibitions. Education was an important objective of the international exhibition movement and one of the motivations for staging international exhibitions in Sydney (1879) and Melbourne (1880, 1888) which brought to the Australian Colonies the best artistic products and latest technological inventions from around the world. Alongside fine arts exhibits in 1879 and 1880 was a display of architectural drawings sent by the RIBA, of which one quarter

related to education – including new university buildings for Cambridge and Oxford, libraries, museums and primary schools. The two recent drawings of the Natural History Museum at South Kensington presented by Alfred Waterhouse excited local interest and later had a major influence on the design of the Sydney Technical College (1891) and Technological Museum (1892).[3]

In Sydney, a Technological Education Conference was organised for October 1879 to coincide with the international exhibition and addresses by Professor Rouleaux of Germany, Dr Cox of America and Edward Combes were reported at length in the newspapers for the benefit of the public. Combes had just returned to Australia from his duties as Executive Commissioner for the Paris Exposition Universelle of 1878 and was finalising his report for the New South Wales Government on educational developments in Europe and England including kindergarten and technical training.[4] His colleague, Professor Archibald Liversidge, who had joined him at the Paris Exposition, had also been asked by the Government to investigate technical education from the perspective of technological museums and furnished his report in the same year.

Clearly, the temper of colonial society was rapidly changing from a classical, conservative outlook to a more utilitarian one that welcomed technology, industry and material progress.[5]

International Models and Standards

The New South Wales method of conducting primary school education, like that that of Victoria, was based upon the English pupil-teacher system for elementary schools and a training college program for secondary schools. In England it was held that for primary school teaching, the ability to impart knowledge was of the utmost importance and that this skill was best achieved through long practice in an apprenticeship scheme. Hence the pupil-teacher system under which fourteen year old pupils could be apprenticed for five years to engage in teaching while themselves receiving further instruction and qualifying for various positions through successive examinations. A teacher and a pupil-teacher worked together in double classes of (in England) not more than 80 pupils. The educational system within the German speaking countries of Europe was different, requiring each class to be taught in a separate room by a separate and fully qualified college trained master.

Edward R. Robson, the first architect of the London School Board from 1871 to 1889, toured Europe and America in search of the best schools and concluded that the German-style school, planned to consist entirely of small classrooms, separate from each other and approached from a general corridor, could not provide a model for English schools. English schools required a large schoolroom or assembly hall and an arrangement to enable the head teacher to supervise the whole department, while also actively teaching.

American school architecture showed a preference for German school plans, although sliding partitions (which slid into hollow walls provided) were regularly used so that the rooms could be converted into one large room. Robson was of the opinion that the entire arrangement was compromised by the desire for sliding partitions. He found "the proper lighting of the rooms is utterly ruined."[6] He was also not convinced that the partitions would thoroughly exclude the transfer of noise between the classrooms.

Robson advocated that the planning of primary school buildings needed to be connected to the system of teaching in those schools.

> The new buildings for school purposes should be planned solely with a view to convenient and effective teaching, and to proper sanitary arrangements. Thus, the widths of the school and classrooms will be decided in relation to the number of benches and desks to be used. Both will be carefully proportioned as to length and height. The class-rooms will be placed in connection with the schoolroom as to be economical in plan and easy of supervision on the part of the master or mistress. The windows will be ample, and so disposed as to throw light in the right places, as well as to be useful for summer or occasional ventilation. The doors will be so arranged as to afford easy means for the dispersion of the school, and for access to the yards and play-grounds, without sacrifice of desk-room or other conveniences. The fireplaces (or other method of warming) will be contrived so as to avoid roasting or rendering uncomfortable either teacher or children during the progress of a lesson; and the furniture and fittings will be suited to their respective purposes.[7]

The schoolroom that Robson refers to above was a large, multifunctional room that could be converted to an assembly hall. It is room "C" in Robson's plan and could be sub-divided with curtains (Fig 1).

Out with the Gothic, in with the New

When the acts providing for free, compulsory and secular education came into force, the governments of Victoria and New South Wales assumed full responsibility for accommodating thousands of children in new school buildings. Many large schools had to be built in a short time and there was no established typology. Victoria sought plans and specifications from England and received the plans for eight schools about to be built in London from Robson, who also offered to send one of his own architects to assist. This was declined and none of Robson's ideas or plans were incorporated in the new Victorian schools.[8] Henry Robert Bastow was appointed Chief Architect to the Education Department and was assisted by local architects who were invited to submit competitive designs for large schools. Many of the schools were therefore not designed by Bastow, although some of their details inspired later schools for which Bastow himself was responsible. Frequently the new schools were of brick laid on bluestone foundations. Windows and doors were generally spanned by round or, more commonly, segmental heads disguised by the addition of pointed voussoirs in contrasting cream brick to create a Gothic effect. The addition of bell towers with spires became popular to complete the picturesque composition.[9]

The Gothic style encapsulated the spirit of Marvellous Melbourne, and, no longer confined to religious edifices, was freely used to elevate the status of secular buildings. For example, the new English Scottish and Australian Chartered Bank (ES & AC Bank) building (1883) was designed in the Gothic style to symbolise the importance of banking and to create a building "worthy of the City."[10] Likewise the new school buildings aspired to be more than functional school rooms and were handsome buildings signifying the importance of education in a rapidly maturing colony.[11] Burchell observes that "what really mattered was that the local bourgeoisie would have their neighbourhood flattered by an imposing building."[12]

The Gothic Revival style also predominated in New South Wales school buildings of the 1860s and 70s and reflected a preoccupation with classical and religious values as the foundation for education. The public schools in Balmain (1862), Crown Street (1869) and Darlington (1878) are typical – with ecclesiastical proportions, tall, narrow pointed windows, and sandstone detailing around windows and sills, cornices and parapet cappings. Their style can be attributed to the influence of George A. Mansfield, who had been appointed by the Council of Education to design the new "national" schools demanded by the Public Schools Act of 1866.

As education moved away from its classical and religious foundations towards a more practical, skills-based curriculum, school architecture was expected to follow suit. An examination of Kemp's school buildings in New South Wales reveals tensions between the influence of educational pedagogy on plans, responses to issues of health and sanitation, and the external appearance and style.

In attempting to define a new typology, practical considerations of sanitation, light, ventilation and layout were widely discussed. Dr Richard Bowker, a vocal advocate of sanitation, observed that "I am quite sure that it is (a question) of very vital importance and that here we are all wrong in our buildings."[13] Combes, in his investigation of educational developments in Europe and England, reported to the Government in great detail on the design of school buildings. His brief was to inquire into "the amount of cubic space for each pupil; the general style of building; the size and number of outlets and inlets as windows and other openings; the mode of ventilation; whether one or two stories are advisable; the kind of roof, and openings in roof; if the school should be built on the ground floor, or on arches, or other raised foundations; the size of school ie. the number of pupils in each, generally thought most advantageous; and the size of the school reserve most advisable in planning new townships."[14] Combes reported

that forty-four schools were examined, with an average of 143 cubic feet per pupil.[15] The style of building was found to be inseparable from the method of tuition employed there and Combes recommended that "the plan of the school must be made subservient to the method of teaching."[16] He concluded that the area of inlets for fresh air must be made as large as practicable, with window space at least one-sixth of the floor area, and that flues should be installed in existing schools where ventilation was inadequate.[17] Windows in Australian schools should face the east and south "to ensure a steady light, without the glare of the sun's rays" and come "as near as possible to the ceiling" to throw the light deep into the interior.[18]

The ink was still wet on the pages of Combes's report when William Edmund Kemp was appointed in June 1880 as architect in charge of the office of "Architect for Public Schools" within the NSW Department of Public Instruction.[19] He immediately dispensed with the Gothic style and set about addressing issues of natural light, ventilation and layout, in the process introducing his own eclectic style to school architecture. In a later address to the Sydney Architectural Association in 1893 he reflected that

> It will be within the memory of most of you that the schools built before 1880 were mostly of a Gothic character – some of them no doubt very fair representatives of the style, others rather poor attempts to give a Gothic character to buildings having no other claim to the title than a steep roof and an occasional pointed arch. Finding that I must build, in almost all cases, brick buildings, and that certain proportions of height of wall and position of windows were essential to realising the conditions of light and ventilation I deemed necessary for school buildings, I was led to consider whether these could not be more satisfactorily attained by the use of low-pitched roofs and square-headed window openings than by the style then in use. ... A pointed arch of ordinary brick is to my eye not at any time satisfactory, and there are few other Gothic details which can be produced except by purposely made bricks.[20]

An editorial the following week supported his approach, saying that while most hold an "enthusiastic admiration for Gothic architecture as architecture, we nevertheless are of the opinion that, unless under exceptional conditions, the Gothic style is not entirely suitable for secular edifices in this country."[21] Kemp argued against the Gothic style for utilitarian reasons, and although he does not mention the sectarian divisions that dominated the education debate in New South Wales, there may also have been ideological grounds for his stance. Barcan observes, that "the struggle was longer, but the outcome more decisive" in New South Wales than in the other colonies and this probably contributed to Kemp's reluctance to taint new secular schools with a style long associated with religion. There is not a pointed arch or spire to be seen in his designs for schools.

One of the first schools to be completed by Kemp was Surry Hills South Public School (1881-83) (now known as Bourke Street Public School). It is

Figure 2: Croydon Public School is an asymmetrical building that features polychrome brick and sandstone dressings, a bell tower with low-pitched pyramidal roof and colonnaded verandah with paired circular columns and glass skylights.
Photographs by Kirsten Orr.

Figure 3: Pyrmont Public School is a symmetrical two storey building that features polychrome brick and sandstone dressings, an imposing central bell tower with low-pitched pyramidal roof and a pair of colonnaded verandahs with square brick columns.
Photographs by Kirsten Orr.

a symmetrical, brick and stone structure with low pitched corrugated iron roof, and features a large, central, stone bell tower surmounted by a stone dome. Window openings are arched and rectangular and there is no verandah. The budget was generous for a small school – the successful tender from Thomas Birk was £13,997/0/0, but the final cost including the site blew out to £23,999/5/2.[22]

Interesting schools of Kemp's "middle" phase include Croydon Public School (1883) and Kirribilli Public School (1887). In both cases, the budget was significantly less generous and Croydon cost a modest £5,463. Croydon is an attractive brick building in pale brown and red brick with stone dressings and a low pitched corrugated iron roof. It has an L-shaped plan, asymmetrical massing and a bell tower with a low-pitched pyramidal roof. Windows are tall and rectangular and there is a colonnaded verandah with paired circular columns and glass skylights (Fig 2). Kirribilli is rather different, being a two storey structure with blank walls of cream brick pierced only by the tall, narrow window openings. It has a low-pitched terracotta tiled roof. Again it has an L-shaped plan, asymmetrical massing and a bell tower of squat proportions with a low-pitched pyramidal roof.

Pyrmont Public School (1891-92), one of Kemp's later major school projects (before his retirement in 1896), was completed around the same time as his Sydney Technical College and Technological Museum, in nearby Ultimo. The school is a symmetrical, two storey cream brick structure with bands of red brick and simple stone trimmings. It features an imposing three storey, central bell tower with a low-pitched pyramidal roof. Windows are tall and rectangular and there is a pair of colonnaded verandahs with square, brick columns. The decoration is very restrained but stately (Fig 3). In contrast, the Sydney

Technical College and Technological Museum abound in decorative features, such as polychrome brickwork, panels of terracotta relief, and frieze-like bands of stonework detailed with carvings of Australian flora and fauna.[23]

After eradicating all traces of the Gothic, Kemp explored new designs for public school architecture.[24] They were more functional in terms of natural lighting, ventilation and layout, their appearance was dignified by a restrained approach to architectural detailing and they gave public education the desired physical presence through the regular inclusion of imposing bell towers. In addition to substantial buildings for large schools in the city and country towns, Kemp was responsible for eight high schools, hundreds of small country school buildings usually in timber, temporary buildings, additions to existing buildings, weather-sheds for the playground, and accommodation for teachers.

Health and Hygiene

During the late-Nineteenth Century, epidemic diseases, such as whooping cough, scarlet fever, diphtheria and tuberculosis, caused many deaths among young children, especially those living in overcrowded conditions with polluted water supplies and an inadequate diet.[25] Consequently, the design of schools reflected the double project of education and public health. This was taken to an extreme in the late-nineteenth-century program of open-air schools for children suffering from chronic conditions.[26]

Compulsory school attendance raised issues of health and hygiene in what were frequently overcrowded, unventilated and unsanitary buildings. In earlier times, the health of children had been completely left "to chance and ... to the ignorance and prejudice of parents."[27] G. H. Knibbs observed that "It will be conceded that compulsory attendance at schools carries with it a serious responsibility"[28] for the health of children and the wider community. In New South Wales, a Board was established in 1883 to advise on the best means of improving the sanitary conditions in schools. Dr Charles Dagnall Clark used his nose to test the freshness of the air in schoolrooms, arguing that a bad or "close" smell was symptomatic of inadequate ventilation or overcrowding. He visited seventy-three schools, of which only a few were new and designed by Kemp. The Board's reports were damning of the overcrowding in most schools. For example, some classrooms at Cleveland Street Public School, designed in 1867 by Mansfield, allowed only 26.33 cubic feet of space for each child, well below the American standard of 150 cubic feet per occupant. Clark found the infants' classroom in the basement to be one of the worst rooms inspected. The atmosphere was "very close indeed" and the light so bad that "the children's faces could hardly be distinguished one from another." The average number of children present was 90 to 100 in a room twenty feet by fourteen feet by eight-and-a-half feet high.[29]

In almost all the rooms he visited, Clark found the atmosphere "close" when windows and doors were closed, even in those where Tobin tubes and other ventilation inlets were provided. Nevertheless, in conjunction with open windows, the best-ventilated rooms had Tobin tubes and gratings near the ceiling. The efficiency of Tobin tubes was diminished by lids on the apertures which reduced the air flow. At Bondi Public School he suggested that the lids be removed, subject to the tubes being inspected regularly "lest the children block them with paper, &c."[30] For William Street and Waverley Public Schools he recommended some roof ventilation for the infants' sheds, in combination with either Sheringham valves, Tobin tubes or a couple of Mackinnel tubes.[31]

Although Clark found the health of the children in the schools he inspected to be "exceedingly good," he reported that in 1882 the head teacher and twelve of the children at Botany Public School had suffered from typhoid fever and five of the children had died. He found the likely cause was that the school well was too close to the cesspit and possibly contaminated.[32] In general the old-fashioned cesspits were described as "a relic of a bygone and barbarous age."[33] He reported other cases of disease and listed a range of health conditions related to the overcrowded and unsuitable rooms, particularly in inner-city schools.

Ten years later, the movement for improved health and hygiene in schools had gathered momentum and *The Australasian Builder & Contractors' News* published a paper read before the Architectural Association of London by Mr Percival Gordon Smith on the subject of hygiene in its application to the arrangement of buildings. He spoke of the dangers of the crowding of large numbers of children together in single or even intimately connected buildings or schoolrooms and categorised the diseases he called "sanitary defects" into three classes: those such as diarrhoea and cholera produced by excrement-poisoned air and water, those such as pneumonia resulting from insufficient protection from extremes of temperature and dampness, and those such as typhus fever, opthalmia and scarlet fever resulting from insufficient airspace, deficient light and overcrowding. An example was given of how a large existing school was retrospectively broken down into five smaller blocks allowing children to be subdivided into comparatively small groups, similar to the principles used in hospitals.[34]

Practical Considerations of Natural Light and Ventilation

Large numbers of children attending school exposed the prevalence of defective eyesight in the young. Robson reported the opinion of a prominent, nineteenth-century opthalmic surgeon of St Thomas's Hospital, London, that during school life changes to vision such as myopia, amblyopia and asthenopia occur and could be caused by improper methods of lighting and the improper shape of school-desks. The relationship of lighting to eyesight had been

scientifically studied in Germany and German schools always admitted natural light from the left side of the children. Likewise German desk design was the outcome of long anatomical study. Yet, as Robson commented, "in no country is *myopia* so common" as Germany![35] He also admitted that "in England we have, in the past, always neglected the question of lighting our school-rooms scientifically."[36] He recommended that lighting from the left side and suitably sized and arranged desks should influence school architectural plans, both in terms of the orientation of school buildings and the arrangement and sizes of their rooms. In practice, however, left hand lighting was difficult to achieve.

Like Robson, Kemp found that the invariable left hand lighting to which so much else was sacrificed in German schools, was often impossible to achieve because of the elongated plan of the Australian schoolroom and the constraints of school sites:

> Let anyone try to plan a room for, say, one hundred children, so as to meet this demand and I think he will soon satisfy himself, as I did long ago, that this thing, being impossible, cannot be necessary.[37]

Kemp often provided windows at the back of the room so that the light came from behind the students. Light was also supplemented by clerestory windows. He was very particular about the height above floor and style of the windows. "To get satisfactory light, the window sills must be six feet from the floor," and be proportionally tall, reaching almost to ceiling height. For this reason the minimum height of wall, even in his smallest schools, was twelve feet. With regard to the area of glazing, he applied the rule of "one foot of window per child and one seventh or one eight of the floor space," similar to that provided in England and the North of Europe, which must be "ample in our brighter climate." Kemp's considered approach was in stark contrast to the arbitrary provision of lighting in most Victorian schools, where lighting levels varied widely from room to room. As Burchell comments, school architects in Victoria "cannot be allowed to escape all censure" for inadequate lighting because English advice was readily available.[38]

Kemp devised a system of fixed glass partitions to subdivide the long schoolrooms deemed necessary in New South Wales. The glass allowed for the supervision of pupil-teachers by the head teacher and also the passage of natural light, while providing good acoustic separation. Movable partitions, such as those used in America, would have been more desirable to allow greater flexibility, but the necessity of glass made them "difficult and expensive, if not impossible."[39] In terms of acoustics and lighting, Kemp's partition system was a significant improvement on the heavy curtains specified to divide the long classrooms in Victoria.[40]

Unfortunately, the only school drawings of Kemp's that have survived are for Surry Hills South and Young (1883) Public Schools.[41] Those for Surry Hills

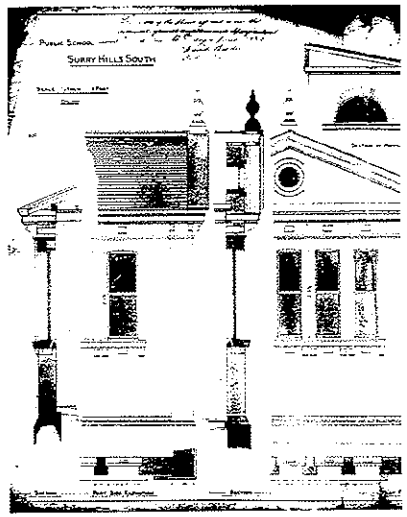


Figure 4: One of Kemp's few surviving drawings for Surry Hills South Public School. Windows are 7'6 5/8" by 2' or 2'6" wide and sills are 7' above the floor with heads at ceiling height
From Ian R. Sansom, *The Life & Work of William Edmund Kemp*, 1968

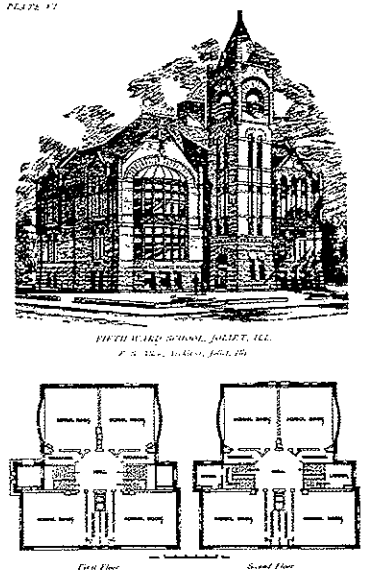


Figure 5: Fifth Ward School, Joliet, Ill.
From Nicholas Murray Butler, *Monographs on Education in the United States*, 1900.

South specify window sills seven feet above the floor and heads at ceiling height. The tall, narrow rectangular double-hung windows are seven feet six-and-five-eighths inches high by two feet or two feet six inches wide (Fig 4).

In the Australian climate, as Clark had pointed out in his 1883 report, windows were essential for ventilation, as well as light, and the question of ventilation was "a very different one here to what it is in England," where, for much of the year, windows had to be shut.[42] In both England and Australia, the opening of windows had to be balanced against a concern for cold draughts. In England, Robson tried to ensure that incoming air would be fresh and sufficiently warm that it would not cause draughts and maintained the desirability of properly flued fireplaces for heating and ventilation purposes rather than central heating. Germans knew how to warm their schools, often using flued stoves, but admitted little fresh air and ignored the impurity of the atmosphere. Vitiated air was extracted to a central shaft which exited about five feet above the roof, but with no mechanical assistance, the air extraction was feeble. American climatic extremes necessitated attention to heating and ventilation and an extensive scientific account was included in *Monographs on*

Education in the United States, presented to the Paris Exposition Universelle of 1900. The difficulty of the task was illustrated by the Fifth Ward School at Joliet, Illinois, a fine example of the prevailing type of school to be found throughout the United States, but one in which heating and ventilation were still not satisfactory (Fig 5).

In New South Wales, fireplaces were the only form of heating in even the coldest districts.[43] Ventilation was achieved by the installation of various devices, in addition to the windows. Kemp commented in 1893 that:

> Ventilation is one of the subjects on which more has probably been written and more contradictory theories advanced than in almost any other, if we except, perhaps, theology – and the 'odium theologicum' is certainly not more bitter than the hostility of the opponents of the conflicting theories of ventilation.[44]

As Clark's report had suggested, there were many ventilation devices on the market and it is difficult to know the full range or configuration of what Kemp might have been using in his school buildings. Neither the drawings for Surry Hills South nor those for Young Public School show the locations of ventilation devices. There may not have been any at Surry Hills South, given its early date, but ventilation cowls are clearly visible in photos of the roof at Young taken by Ian Sansom in the late-1960s and his photo of one of the classroom ceilings shows a large, square ceiling vent which probably exhausted air into the roof space. The science of ventilation was difficult, and in some cases, as Clark noticed at Crown Street Public School (pre-Kemp), the system did not work as intended. In this case, the iron gratings in the ceiling, which were intended to function as outlets, acted as inlets for cold air and created draughts.

Following Clark's report, which stressed the need for ventilation systems in conjunction with open windows, it would be surprising if any new school did not incorporate one. Certainly, roof-mounted ventilation cowls are visible on most of Kemp's public schools from 1883 onwards in the photographs taken by Sansom. Some of his schools, such as Camdenville (1883), Croydon, Young, Carcoar (1884), Goulburn North (1886) and St Marys (1889) have a cylindrical flue broadening out to a flange, to deflect the air upwards and outwards. A flat conical cap is supported above to keep out the weather. Koorawatha (1884) and Hurstville (1891) have a similar arrangement but with a sharply pointed cap above. Other schools such as Summer Hill (1884), Mortdale (1886), St Peters (1886), Balmain West (1887), Bexley (1887), Concord (1893), Darlington (1897) and Greenwich have a cylindrical flue broadening out to a flange surmounted by a (possibly modern) squat, cylindrical cowl with a flat roof. Further research could be undertaken to gather more detailed information on these ventilating systems – it is possible that some roof cowls visible in Sansom's photographs are not original and that others may have been removed when roofs were replaced. Kemp also used ventilating grates in gable ends, such as at Darlington and

Greenwich, where grilles are set flat into the brickwork. In other schools, such as Croydon and Summer Hill (1884), ventilating roof monitors are located at each end of the roof, above the girls' and boys' classrooms. Kemp may also have incorporated ventilating shafts in his frequent bell towers, but again, further research is required.

Kemp's consistent use of roof-mounted ventilation cowls was ahead of its time in the eastern colonies of Australia. School architects in Victoria were reluctant to adopt them, lest they produce a "discordant note into the stylism of the building" and only in 1899 did they become standard design practice.[45] State School 1270 at Buninyong (1873) had included a successful system of large ventilation funnels through the roof space to the outside, but this was not generally adopted for another twenty years. Tobin tubes first made their appearance in Victoria at Wandiligong (1877) but only some new schools were fitted with these.

Kemp was very fond of Tobin tubes but had his own "rather free interpretation of the Tobin system."[46] Usually, the Tobin tube was a rectangular tube that admitted air from the outside near floor level, brought it up the inside face of the wall to at least one and a half metres high and then dispersed it into the room. The advantage of the system was that it produced much less of a draught than direct ventilation and the airflow could be controlled by a damper in the tube. The tubes often became architectural features, appearing as "rectangular ducts rising up the inside face of the wall, with a moulded cap at the top and with the skirting wrapped around the base, so that they look like truncated pilasters."[47]

Kemp explained that he did not introduce the air by vertical tubes from the ground level, but by horizontal pipes through the wall at about five feet above the floor, with shields to give the air current an upward direction.[48]

The ventilation systems employed at Croydon and Pyrmont have been inspected by the author.[49] At Croydon (Fig 6), the openings of the Tobin tubes are mounted at mid-window height above the floor and occur at regular intervals along the external walls, usually centred between window openings. Internally, the openings are decorative features, appearing as little stepped corbels of moulded plaster, with their openings pointed upwards towards the ceiling. The openings are covered with metal lids pierced with tiny holes, which, as Clark reported, would have impeded their operation. (Today they are blocked with dust and paint.) There is no evidence of a knob that could be turned to open and close a damper inside the duct. The actual ducts, being horizontal, are concealed within the wall. The external inlet is covered by an ornamental cast iron grille with a face size equal to that of two bricks. The Tobin tubes are no longer in use at Croydon, instead providing plinths for vases and the display of student work. A number of provisions have been made for exhausting vitiated air from the classrooms. Circular vents are located in all of the ceilings, usually one

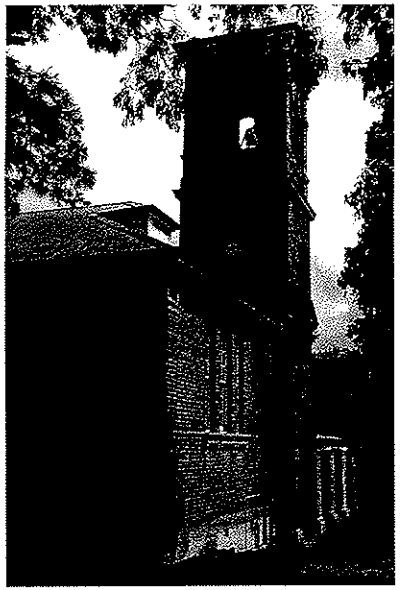


Figure 6: Croydon Public School. The proportions of window openings vary in response to orientation, with floor-to-ceiling windows on the southern elevation to maximise natural light.
Photographs by Kirsten Orr.

Figure 7: Pyrmont Public School. The top half of a glass partition can be seen towards the northern-end of one of the former classrooms.
Photographs by Kirsten Orr.

per structural bay. They comprise a perforated grille with decorative moulded surround and probably exhaust into the roof space, which is ventilated by roof monitors located at each end of the roof, above the girls' and boys' classrooms. The roof monitors are rectangular openings with a timber flap that can be opened or closed. Unfortunately, over the years the flaps have been painted shut. Educt vents appear in some rooms, being simply an ornamental cast iron grille that vents directly through the external wall with another grille on the outer face. They are typically located just below ceiling height, directly above the Tobin tube inlet/outlets. In other rooms, opening fly windows and fanlights are provided. The fly windows are rectangular openings with a timber flap that can be opened or closed, located just below ceiling height and usually centred above a window opening. Again, over the years the flaps have been painted shut. The fanlights are semi-circular along the street frontage and rectangular in other places.

In a break with uniform treatment to all facades, Kemp has varied the detailing of window openings and ventilation devices at Croydon in response

to orientation. The southern elevation on Boundary Street provides the most striking example of this, maximising natural light to the interior through a series of floor-to-ceiling window openings that comprise two double-hung window units stacked vertically, separated by a slim, horizontal decorative band of sandstone. All windows are glazed with small, clear rectangular panes of glass to minimise the cost of repairing breakages. Verandahs are provided to north and east elevations. The toilet block is located to the west and there are few window openings in the west-facing walls. Kemp's close attention to the orientation of his buildings was quite different to the usual practice in Victoria, where orientation was usually left to the discretion of the building inspectors, who clung to the unquestioned law that buildings be built parallel to the boundary line.[50] Verandahs were included and deleted at the whim of the architect.

Pyrmont Public School, built towards the end of Kemp's career, incorporates similar ventilation systems with a respect for climatic orientation (Fig 7). Again, Tobin tubes occur at regular intervals along the external walls. In this case, the external inlets are located roughly at sill height and the internal openings are mounted about three feet higher, just below the picture rail. There must be a vertical duct concealed in the wall. They are no longer in use and the openings have been closed over. Provisions for exhausting vitiated air from the classrooms include circular vents located in all of the ceilings, usually one per structural bay; and educt vents in all rooms, just below ceiling height, and centred between the decorative corbels under the eaves. Windows are rectangular with elongated proportions and all have opening fanlights above. As at Croydon, Kemp has varied the detailing of the facades in response to orientation. To minimise glare, the east and west-facing walls are blank, punctuated by small opening clerestory windows for light and ventilation. The north façade, fronting John Street, has a deep, stately verandah with Doric-revival square brick columns that provides protection from the hot summer sun, while allowing the winter sun to penetrate the interior. The building on the corner of Mount Street currently accommodates a one-room gymnasium and provides a good sense of the scale of the long schoolrooms of Kemp's day. The top half of a glass partition can be seen towards the northern-end of the room and may be a remnant of one the fixed glass partitions that Kemp used to subdivide the space.

The approach to ventilation taken by Kemp appears to have remained substantially unchanged within the Department of Education until 1931. A copy of the 1925 *Procedure in connection with Architect's Branch (No. 5)* held in the Mitchell Library shows proposed amendments in red ink for a future publication. The requirement for ventilation tubes, having apparently been the standard until that time, is crossed out leaving windows and cross-currents as the only means of ventilation.[51]

The Bottom Line: Cost and Time

The sheer number and expense of providing the buildings required by the Public Instruction Act made economy in cost and time important considerations in Kemp's school designs. The table below shows the extraordinary number of

Public Schools Completed 1882-89[52]								
	1882	1883	1884	1885	1886	1887	1888	1889
Number of schools completed by Kemp's office	67	90	78	78	32	23	14	33
Number of schools completed under Inspectors' supervision (small country schools)					140	109	107	107

schools completed on a year-by-year basis between 1882 and 1889.

Kemp was the only architect employed by the Department of Public Instruction and was responsible for the design of all of the above schools. He was supported by a substantial staff of draftsmen, clerks of works, clerical staff and inspectors. By 1889, when work was slowing, his staff had been reduced to three draftsmen, three junior draftsmen, three clerks and eight clerks of works. Two temporary draftsmen and one cadet were appointed to meet the extra work associated with plans for the Technical College and Museum.[53] Kemp's situation was quite different to that of his Victorian counterpart, Bastow, who was frequently assisted by other architects and whose involvement in particular schools is not always clear.

Kemp tried to implement the use of standardised plans and by 1881 they were in use for small country schools. However, his report to the Minister in 1883 stated that for the larger schools "In almost every case there are special circumstances of site and local difference of material, which necessitate alterations of both plan and specifications from any stereotyped design, alterations which minimise the advantages to be gained" from standardisation.[54] His idealistic pursuit of the best plan for each site was momentarily shared by the current Minister, W. J. Trickett, in 1884, who elaborated on the current philosophy:

> In the erection of the larger and costlier buildings no fixed or uniform plan has been followed, but whilst a proper economy has not been overlooked, the plan has been varied as often as circumstances would seem to suggest or require. The modifications have been mainly in the direction of dividing the schoolrooms and of multiplying the classrooms. These changes in the form of classrooms have necessitated corresponding changes in school organization. The aim in view is to give every well recommended type of schoolroom a trial, and to approve only of that found to yield the best results: these are, ample space for each pupil, good ventilation and lighting, cheapness of construction, and that kind of organization which is conducive to effective teaching.[55]

Many of the small country school buildings, built from standardised plans, were cheap timber structures, erected under the supervision of School Inspectors or committees.

Probably for reasons of cost and time, debate arose at the end of the 1880s about the respective merits of designing schools exclusively within a government department or engaging the services of private architects. In 1887 a list was tabled in the Legislative Assembly of 52 public schools designed and erected under the supervision of private architects, but dates are not included on the list, which goes back well before Kemp's time. Again in 1893, the editor of the *Australasian Builder & Contractor's News* expressed his opinion that too much government building work was centralised in the Civil Service, and this had had a deadening effect upon the talented professionals appointed, "crushing out individuality and personal ambition." For houses of parliament, law courts, lunatic asylums, or museums, which are infrequent commissions, he could not see what special advantages a government Architect's Department might possess over a private practitioner. However, it was desirable that school building be undertaken by a small professional department with special expertise because "children, like the poor, we have always with us, and in ever-increasing numbers too, so that provision for their education, in a country where that education is undertaken by the State, is an ever-recurring necessity."[56]

After 1890, an economic depression affected New South Wales and between 1893 and 1894 expenditure on school buildings and their maintenance fell from £113,000 to £74,000. Total expenditure on education reached its lowest point in 1894 and expenditure did not recover until the end of the decade.[57]

After Federation of the Australian colonies in 1901, there was a new spirit of optimism that led to reform in education. In 1902, a New South Wales Royal Commission comprising G. H. Knibbs, a young lecturer in surveying at the University of Sydney, and J. W. Turner, principal of the Fort Street Training College, was established to study education abroad. It duly submitted three comprehensive reports on primary education (1903), secondary education (1904) and technical and other education (1904). Knibbs was extremely critical of the state of New South Wales public schools, finding that:

> In regard to airiness, convenience, lighting, sanitary fitting, playgrounds, general appearance, internal arrangement, ventilation, and in means for moderating or increasing temperature, our schools are hopelessly behind; and, in fact, such schools as we here have are, class for class, very poor indeed compared with the schools of Switzerland, or with those of the United States, which are recently constructed.[58]

Contribution of Kemp's School Architecture to the Formation of an Australian Style

Kemp was challenged by the pressure to quickly and economically accommodate increasing numbers of young pupils but was fortunate to commence his employment as Architect for Public Schools at a time when the economy was booming and architects and builders were experimenting with new styles and materials better-suited to Australian conditions. Other countries were moving away from historical classicism and embracing eclecticism in an effort to develop styles that glorified their unique past or projected a modern image. For instance, the Queen Anne style and Arts & Crafts Movement incorporated medieval revivalism to celebrate the glories of England's past and project a national profile. The American Shingle style, free from the dogma of earlier styles, projected a modern image of American national identity.[59] Australia had always been derivative of British culture, yet it was a young country in a different climate, far removed from Europe, in which there was a growing desire for a recognisable national identity, both political and cultural.[60]

The Illustrated Sydney News (1883) boasted about the rapid rate of development in Sydney and filled its pages with illustrations of new city buildings. Individual facades borrowed freely from a palette of architectural styles, often blending different stylistic devices in a single composition. Their distinctive quality was their eclecticism.[61] John Sulman, recently arrived in Sydney, published his thoughts on the need for an Australian style in the *Australasian Builder & Contractor's News* of 1887. He suggested a style borrowed from the "stucco covered buildings of Italy," but with a smoother use of cement, and a greater use of verandahs that were integrated, not just stuck on.[62] The debate was continued by James Green, under the pseudonym of "De Libra", who in 1890 wrote a four-part treatise calling for an Australian style of architecture. He advocated a civic architecture derived from the Doric as being most suitable for a sunny land.[63] Another voice calling for an Australian style of architecture to represent the character of the people, the country and its advances in 1891 was E. Wilson Dobbs.[64] Given the on-going nature of the discussion, it is not surprising that the success of Kemp's school architecture was measured in terms of the quest for an Australian style.

An editorial by James Green in the *Australasian Builder & Contractor's News* in 1893 praised Kemp for his development of a style derived from the Doric and suggested that the architecture he had adopted for his schools might be the "seed-germ of the Australian architecture of the future."[65]

The editorial's claim is a bold one and deserves detailed consideration. Firstly, Kemp's school buildings should be assessed in the context of contemporary schools in England, America, Europe and other Australian colonies to see if what he was doing was merely derivative, or an attempt to strike out in a new direction.

Secondly, the style he developed must be compared to the Federation style that matured after his death and which Bernard Smith retrospectively labelled "an Australian style if ever there was one."[66]

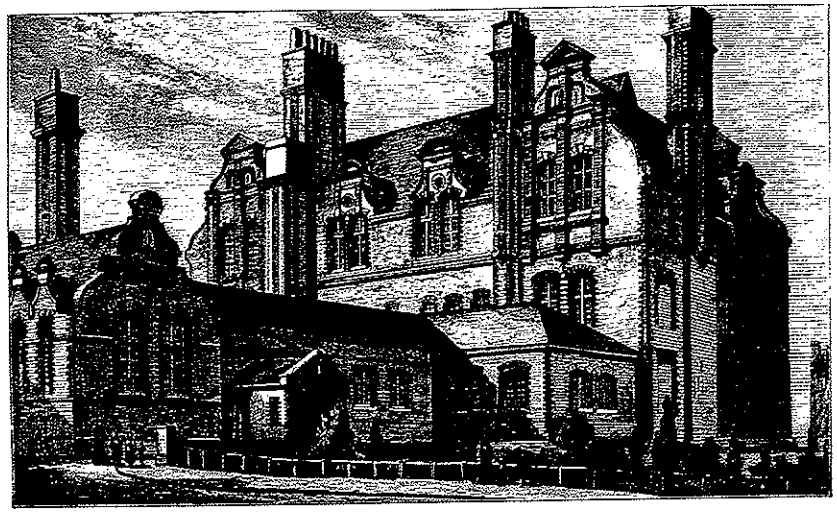
Kemp's first priority was the overthrow of the Gothic style for school building in New South Wales. This was in step with other countries where there was a widespread feeling that ecclesiastic styles, such as the Gothic, were no longer appropriate for national systems of education. Robson was of the opinion that new schools in London "should strive to express *civil* rather than ecclesiastical character" because the semi-ecclesiastical style is "inappropriate and lacking in anything to mark the great change which is coming over the education of the country."[67] Likewise the Americans criticised the use of the Gothic style for schools, with Edmon M. Wheelwright, city architect for Boston, commenting in 1900 that the Gothic did not meet functional requirements. Fellow American, Gilbert Morrison, went so far as to say that "the high pitched roof, the pinnacles and the pointed dormers are not the most appropriate form of decoration."[68] In contrast, the Education Department of the Colony of Victoria remained committed to the Gothic style until "after a final extravagant flowering at City Road" school (1884) when Gothic references declined to token decorative gestures.[69]

The revolution raised the question of what a modern school should look like. A general feature of much school building in the late nineteenth century is a return to the use of brick in place of stone. With so many schools being built for an increasing number of students, factors such as availability of materials, construction time and cost made brick more desirable than stone. Robson sought a return to "the old brick architecture of London" which he thought would "form the nucleus of a good modern style" and be less expensive to build.[70] He used a light yellow stock brick, with red brick for dressings and provided external ornament in the form of carved title panels and cartouches cut in the brick or stone. In America, Wheelwright contended that the practical requirement for wide and high window openings should lead the architect to "abandon picturesque treatments in school house design and to adopt those suggested by the brick architecture of the Italian renaissance and by the Georgian work of England and this country."[71] In Victoria, brick was used for economic reasons and because it was more appropriate than rough stone. Moreover, it provided the opportunity for constructional colour and decorative features. In New South Wales, Kemp was probably forced by expediency to turn to brick. It would also appear that he was guided by Robson's influential publication, *School Architecture*, which appeared in 1874.[72] One of his first schools, Surry Hills South, featured a large amount of stone but was extremely expensive compared to his later brick schools. Furthermore, the huge number of schools requiring construction in his first few years in the job necessitated

quick construction techniques. Like Robson and many American architects of the period, Kemp exploited the decorative opportunities afforded by polychrome brickwork and the judicious use of stone trimmings. He favoured warm yellows and browns for the walls, with bands of red brick or sandstone to break up the wall plane and create features around windows and doors. Sandstone was also used sparingly for foundations and special decorative flourishes, such as the carved title panels above main entries. His decorative brickwork was in no way derivative of the designs found in the school buildings of Victoria.

All nations appear to have been united in a utilitarian approach to school design, seeking to plan schools with appropriate arrangements for natural light, ventilation and hygiene and layouts better suited to function. Kemp's preference for tall, rectangular windows was common and the proportion of glass to floor space was consistent with accepted practice overseas. Ventilation was a hot topic of debate amongst school designers and Kemp was clearly doing his best with his use of passive systems. America led the way in mechanical systems, but even there the new schools of comparable size to Kemp's, such as the much admired Joliet School in Illinois, did not have satisfactory heating and ventilation. Robson's schools were notable for closely relating the plan to the educational requirements of the English teaching system and the necessity of accommodating large numbers of students on small plots of land. This appears to have been the primary concern of all school architects of the period, whose school layouts varied in accordance with differing national requirements and teaching systems. Kemp himself acknowledged that the local teaching system was the crucial starting point for school design. Problems that arose with Kemp's school designs were not of his own making. For example, the requirement for long subdivided classrooms interfered with lighting and ventilation and overcrowding compromised hygiene. Knibbs in 1903 was very critical of local schools in this regard when compared to those of Switzerland and America.[73]

The question of style was important for school buildings because, like all public buildings, they fulfilled a symbolic role as well as a utilitarian one. Robson thought that schools should look like schools and criticised American school designs of the 1870s for being extremely plain and "not particularly school-like in character."[74] Although Morrison considered the school house to be "an infallible index of the educational status of the community in which it is located,"[75] small American schools tended to look like generous houses and large city schools like commercial buildings. In contrast, Robson's schools drew attention to themselves because of their decorative facades featuring an architectural cocktail of various styles drawn from Britain and the Continent, including Queen Anne, Flemish, and François Ier style (Fig 8). In the Germanic countries, the schools were very grand, but with palatial proportions much larger than might be contemplated for schools in a young colony.



228.—WORNINGTON ROAD SCHOOL.

Figure 8: Wornington Road School.
From Edward R. Robson, *School Architecture*, 1874

Knibbs believed that school buildings should symbolise the cultural advancement of a society and be "noble in ... architectural character," beautifying the city or town in which they are found. He acknowledged that Australia was only a young nation but felt that more money should be spent on schools, inferring that they were lacking in this regard.[76] In criticising New South Wales schools he was undoubtedly considering the whole spectrum, from the pre-Kemp schools that had been found inadequate even in 1883,[77] to the more recent schools that had been constructed after Kemp's retirement during a period of economic recession. It is hard to believe that he could have been critical of Kemp's schools, which have an architectural character that clearly distinguishes them as schools and confers nobility. But Kemp's schools were not like those in Switzerland or America, nor was he merely borrowing a school typology from elsewhere. He was creating his own designs in response to Australian conditions.

Kemp gave his schools a dignified "school-like" character. From the main approach, they appear well proportioned and balanced. Generally, the main block is flanked by two asymmetrical secondary wings that contribute picturesque massing. Most of the larger schools incorporate a belfry or elegant bell tower, ranging from the small belfries at Manly (1880-82) and Carcoar,

to handsome bell towers at Surry Hills South, Croydon, Young and Pyrmont. Carefully placed windows, integrated verandahs featuring colonnades of Doric columns, and repetitive low pyramidal roof lines with corbelled eaves, create pleasing, yet restrained, compositions that are referred to by contemporaries and historians as being Italianate in style.

Kemp's adoption of the Italianate style accorded with the general sentiment of the time that an Australian style of architecture should suit the climate, which was similar to that of the Mediterranean. There is a clear link between Kemp's early schools, especially Croydon, and the Bathurst Courthouse (1880) on which he had worked under Colonial Architect, James Barnet, shortly before his appointment as architect to the Department of Public Instruction. James Green ("De Libra") wrote in 1890 that in the Bathurst Courthouse,

> The Attic spirit seems to have been translated from Greek into Australian with singular felicity. The lightly-capped square piers grow in the most natural manner out of the substitution of tooled stone for timber; the employment of the brickwork is both practical and tasteful; such simple ornament as is used is applied with admirable judgment; the composition with its deeply shadowed colonnades is particularly artistic; and the low pitch of the roofs is not only appropriate both to the classic style and to its local and particular employment, but lends by contrast an especial value to the soaring curve lines of the dome...[78]

When Pyrmont Public School was published in the *Australasian Builder & Contractors' News* five months later, it was applauded for its "Doric feeling" that De Libra had previously proposed as the starting point for an Australian style of architecture. Kemp's use of the Doric style was an important feature of his architecture because it arose from his desire to create civic buildings suitable for the Australian climate. However, it is not the "Doric feeling" that most closely links his school architecture to the Australian Federation style that eventuated. Rather, I argue that it is his use of brick and, later, terracotta, together with his sensitive orientation of buildings and his incorporation of climatically-appropriate verandahs, larger rectangular window openings and ventilation systems that served as a significant influence. In the absence of surviving plans and other documentation, Kemp's school buildings warrant further research. A detailed study including measured drawings and the investigation of roof spaces, sub-floor areas and other structural components is required to allow closer comparison of his schools and to reveal the true extent of his architectural contribution.

The warm colours of Kemp's brickwork and later terracotta are a foretaste of the red brick houses with picturesque terracotta Marseilles-tiled roofs that characterise Federation suburbs. Terracotta relief panels are incorporated in the facades of Kogarah (1891), Dulwich Hill (1893) and Concord, and the roofs of Kogarah, Kirribilli feature Marseilles tiles. Sansom calls this period of Kemp's

work the "Age of Terracotta."[79] Ornament is restrained, Kemp's facades being enriched with some polychrome brick detailing and small amounts of carved sandstone, which, on the Sydney Technical College, include a foretaste of the Australian flora and fauna that dominates the decorative imagery of Federation houses. The integrated, colonnaded verandahs and weather-sheds anticipate the development of the Federation verandah as an open-air room, providing shade and shelter from sun and rain and allowing the occupants to partake in a more outdoor lifestyle. Kemp's use of local materials and response to climate made the most important contributions to the development of a Federation style. Perhaps these buildings influenced the impressionable minds of those educated therein and who later became the homebuilders of the Federation era.

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22. Ian R. Sansom, "The Life and Work of William Edmund Kemp," undergraduate thesis, University of New South Wales, 1968, Part 2, 26; "Education (Cost of Constructing Certain School Buildings)," *New South Wales Legislative Assembly Votes & Proceedings* (1883-84) 7, 1131.

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Nicole Sully, SAHANZ Secretary
School of Architecture
University of Queensland
Brisbane Qld 4072 Australia

Email: n.sully@uq.edu.au

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Correspondence:
Paul Walker
Faculty of Architecture, Building & Planning
University of Melbourne, VIC 3010 Australia

Email: walkp@unimelb.edu.au

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