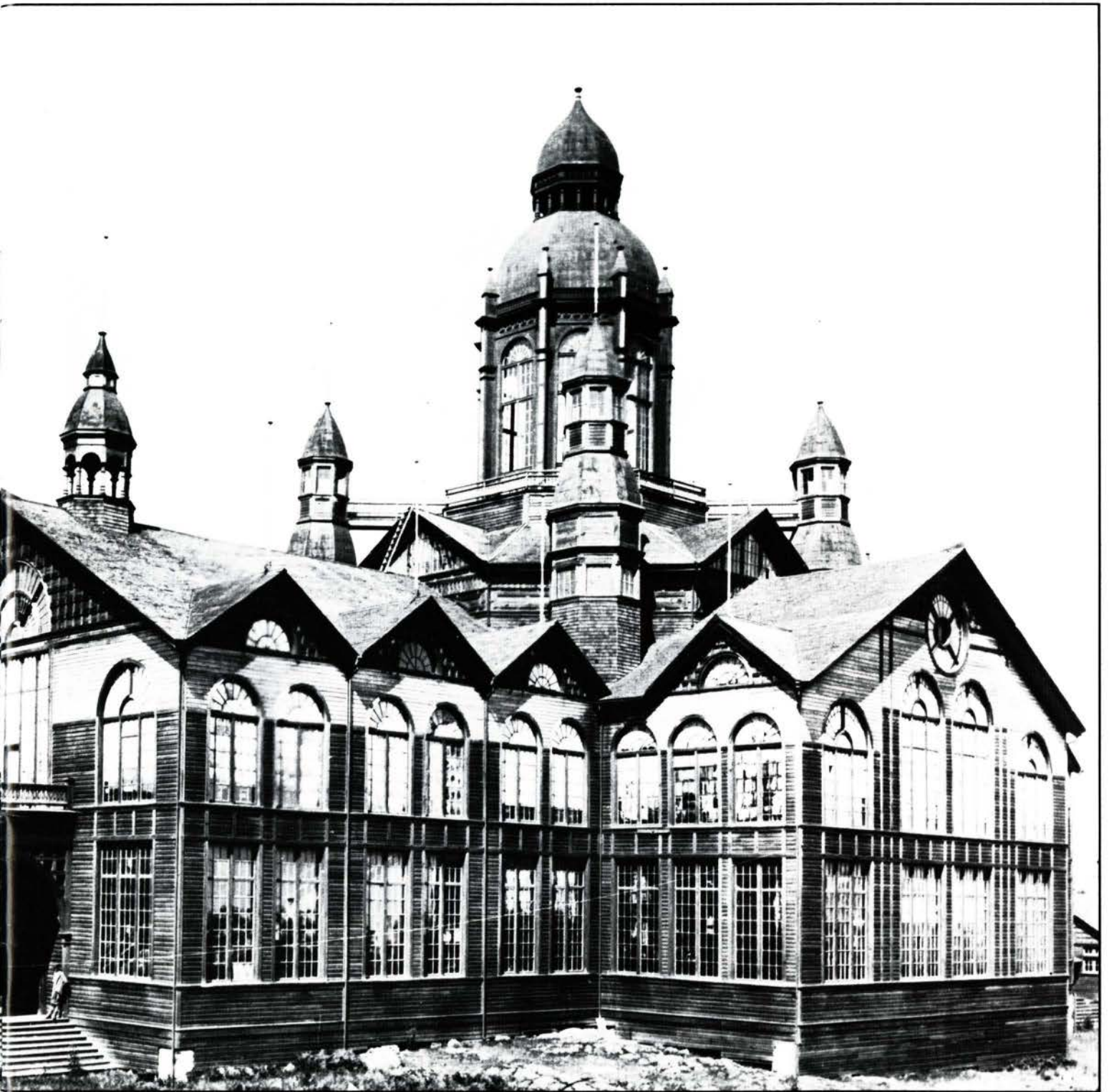


THE CRYSTAL PALACE IN CANADA

BY FERN E. M. GRAHAM

In the first months of 1851, the *Illustrated London News* devoted a number of pages in every issue to preparations for the upcoming Great Exhibition. Through these pages the Empire watched with gathering excitement as the Crystal Palace, the technological marvel that would stand as the industrial exhibition's centrepiece, rose in Hyde Park (*figure 1*). Every step of the process was illustrated – occasionally with a disregard for scale that rivalled Piranesi – and its architect, Joseph Paxton, was lionized. The exhibition opened in May, and very quickly the exhibition's illustrated catalogue spread the story of its wonders world-wide. In Kingston, Ontario, the City Book Store announced the arrival of the *London Art Journal ... with Illustrated Catalogue of the Exhibition* in September of 1851.¹





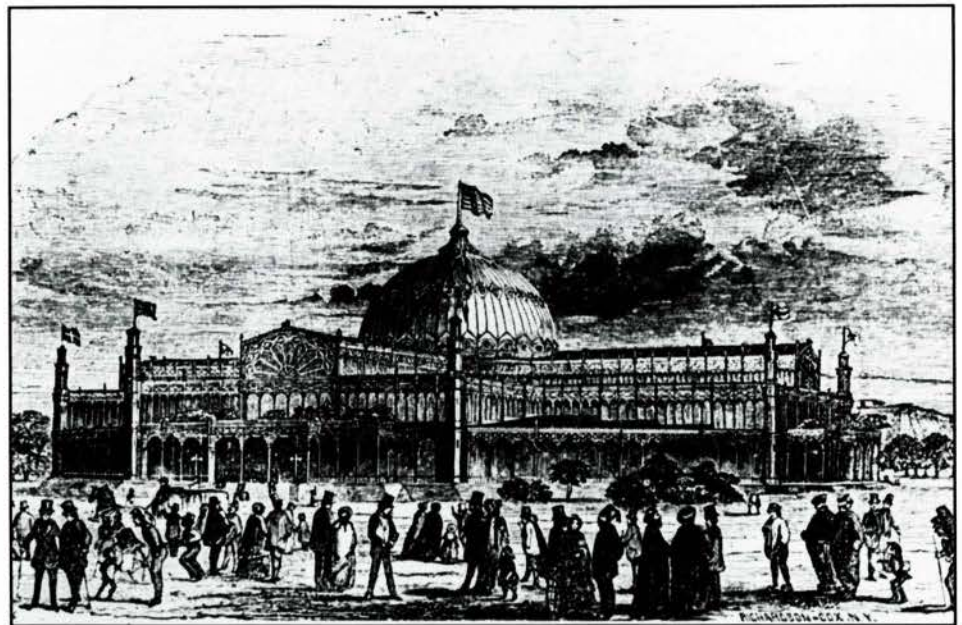
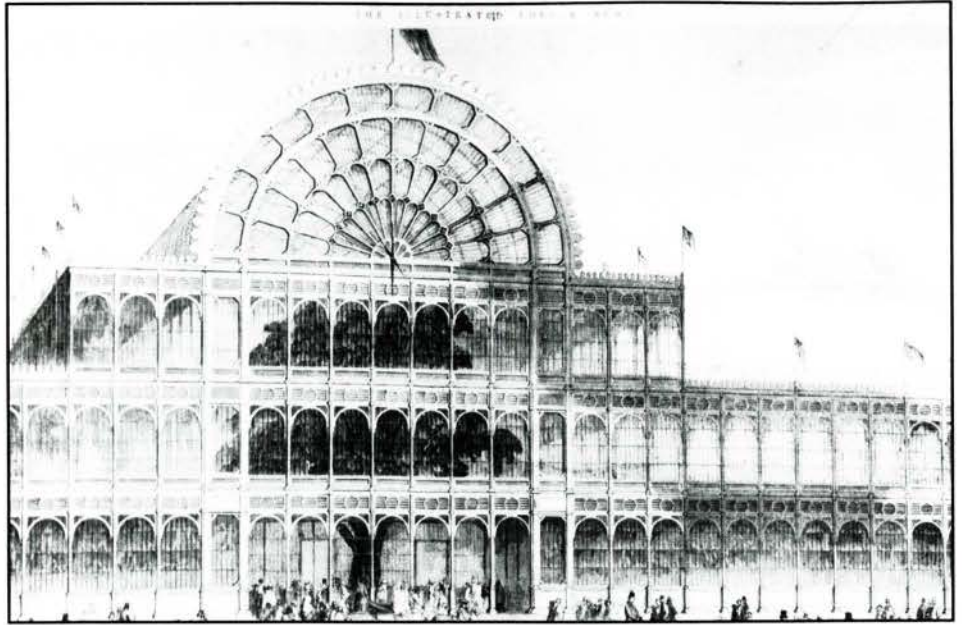
“Unfortunately, when fair buildings have been called crystal palaces, whether properly or colloquially, they have been marginalized as architectural imposters.”

Figure 11. Crystal Palace, Victoria, 1891, Cornelius J. Soule, architect. (Provincial Archives of British Columbia, C-9021)

1 “City Book Store,” *Daily British Whig*, 24 September 1851, 3.

Figure 1 (above). The south front of the Crystal Palace, 1851, Joseph Paxton, architect. (Illustrated London News, 1851, 366)

Figure 2 (below). Crystal Palace, New York, 1852-53, Carstensen & Gildemeister, architects. (Canadian Journal of Science, 1852)



In the years following the exhibition there were several palaces built for international fairs, including Dublin (1853), New York (1853) (figure 2), Munich (1854), and, much later, Philadelphia (1876). By 1860 there were no fewer than four crystal palaces (so-called) in Canada, and by 1891 there were more than a dozen.

Canadians have been too quick to dismiss their buildings as curiosities: they could not be *real* crystal palaces because they were generally framed in wood, rather than iron, and were “lilliputian”² in scale. In fact, there were very few real crystal palaces, perhaps half a dozen in the world, if the structural and functional criteria are scrupulously applied. Often, Canada’s crystal palaces were properly called something else, such as the Manufacturers’ Building or the Main Exhibition Building. It is notable that the press and the public insisted on calling these buildings crystal palaces whether or not the term was strictly appropriate. This popular pretence has led to some very unflattering comparisons with the original. But when viewed for what they *are*, rather than what they are not, these exhibition halls emerge as more than poor colonial cousins. They were the glittering centrepieces for the annual regional and provincial fairs that held a significant place in the social history and economic development of this country.

2 Jennifer McKendry, “Kingston’s ‘Lilliputian’ Crystal Palace: Canada’s First Permanent Exhibition Hall,” *SSAC Bulletin* 16, no. 3 (September 1991): 72-78.

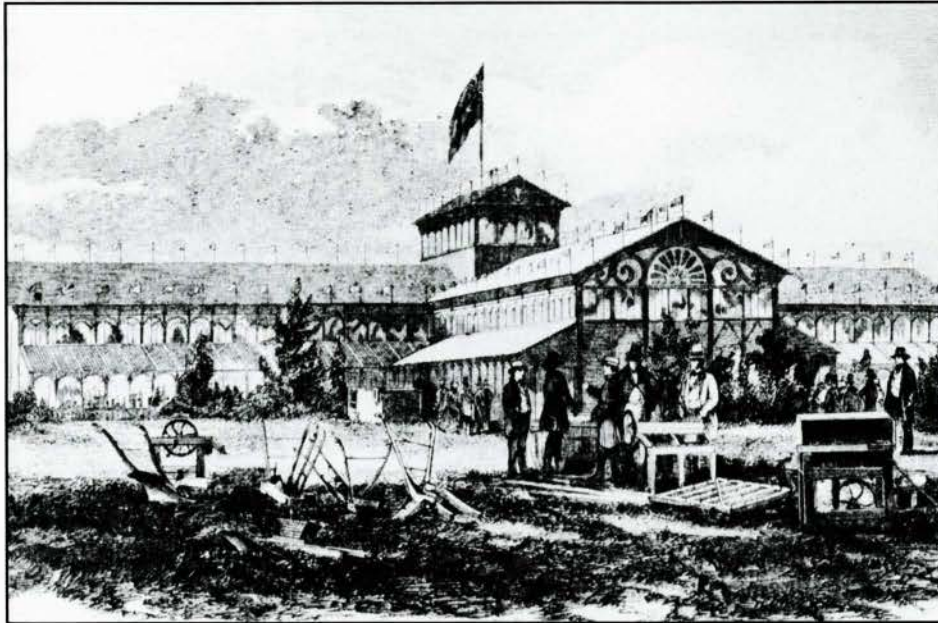


Figure 3. Crystal Palace, Kingston, 1856, Henry Horsey, architect. (Frank Leslie's Illustrated Newspaper 3 [New York, 20 December 1856], 33)

Because the Crystal Palace of 1851 had such a far-reaching influence, it would be useful to examine it briefly before turning to its Canadian progeny. Paxton described his structural system as a rigid table with a light tablecloth draped over it.³ The framework of the Palace, the table, was made of iron comprising pre-fabricated stock pieces based on a 24-foot modular unit. For the tablecloth, Paxton developed a system of mass-produced wooden glazing bars and a patented ridge-and-furrow roofing system. The great glass barrel vault was carried on curved wooden trusses which were assembled on the ground and hoisted into position.

The exterior walls of the Palace were pinned to the iron framework. At the ground level the cladding was composed of vertical wooden boards with horizontal louvres. Each 24-foot-wide structural bay was divided into three smaller bays with ornamental wooden columns matching the iron ones. The upper levels were completely filled with glazed lights in wooden sashes. The hollow iron columns doubled as rain conduits, part of a sophisticated system to shed water. Moisture was a major concern, and Paxton preferred to use wood on the exteriors of his buildings because wood, properly painted and guttered, would last longer than iron when exposed to the elements.⁴ Four thousand five hundred tons of iron, 900,000 square feet of glass, and 600,000 cubic feet of timber were used in the construction of the Palace.

In Canada, the building type took on a life of its own. Agricultural and industrial arts associations across the country recognized the Crystal Palace as an appropriate symbol of their goals for the improvement of agriculture through technology, and the perfect focal point for their annual regional or provincial exhibitions. Their new exhibition halls were tiny in comparison to the original palace. In their materials they rarely followed the technological lead of Paxton's building. Most were of timber frame, and none had a glass roof. There were also important functional differences. Unlike the "Exhibition of the Works of Industry of All Nations," which was entirely contained within the Crystal Palace, the nature of an agricultural fair required diverse interior and exterior spaces, including buildings for livestock and other displays, show rings, grandstands, and frequently a track. The crystal palace in Canada was used to display the more refined products of the arts and industry, including agriculture, but this was only one aspect of the exhibition.

The first crystal palace in Canada was built in Kingston, designed by Henry Horsey and built in 1856 (figure 3).⁵ Vaguely based on the New York palace of 1853, the plan was a Greek cross. Four equal wings converging on a central rotunda provided a more compact space than the axial plan of Paxton's palace. A building equally accessible from four sides could be a focal point or centrepiece on the grounds, with other buildings disposed around it. In Horsey's Kingston palace, precedents for the round-headed windows, cupola, and the fan in the transept gables can be found in the palaces erected in New York and Hyde Park. The structure of the Kingston building is still not known with absolute certainty, but when it was dismantled and reassembled in 1888, the framework was made of pine timbers fastened and braced with iron rods, including 12-inch posts supporting the tower.⁶

3 G.F. Chadwick, *The Works of Sir Joseph Paxton* (London: Architectural Press, 1961), 76.

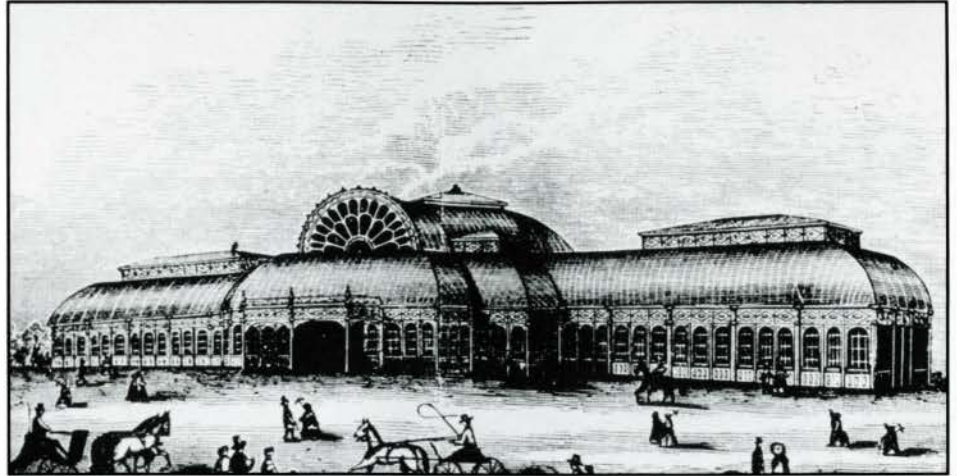
4 *Ibid.*, 96.

5 McKendry, 74-75.

6 "The New Fair Grounds, The Buildings That are Now Being Erected," *Daily British Whig*, 5 May 1888.

Figure 4 (above). *Palace of Industry, Toronto, 1858*, Sir Sanford Fleming and Sir Collingwood Schreiber, architects. (G.P. Ure, *Handbook of Toronto*)

Figure 5 (below). *Crystal Palace, Hamilton, 1860*, Albert H. Hill, architect. (National Archives of Canada, PA-117438)



In 1858, Sir Sanford Fleming and Sir Collingwood Schreiber collaborated to design the Palace of Industry in iron and glass at Toronto (**figure 4**). *The Globe* conceded that it followed the design of the Crystal Palace of London in a considerably modified sense;⁷ nevertheless, it had more in common with London than with Kingston. In plan it was not centralized, but formed a long nave of 256 x 96 feet, with short transepts extending north and south for a width of 144 feet at the extreme. It was based on a modular bay of 16 rather than Paxton's 24 feet, and the structural iron members came in standard units from the St. Lawrence foundry.⁸ Although the wooden roof was built on the American ridge-and-furrow system, and tinned, there were skylights made of tapering lights to illuminate the hall from above. The glass was supplied by Chance Brothers of Birmingham, England, who had also done the London and Kingston palaces. The bays formed by the iron structure were subdivided on the exterior into three round-headed windows above wooden cladding to a height of five feet.⁹ Although it has been criticized as frumpy and squat,¹⁰ the building had a rigid frame covered with a light membrane, two of the fundamental requirements for a true crystal palace.

It is popularly believed that the visit of the Prince of Wales in 1860 prompted the construction of the next pair of crystal palaces, in Hamilton and Montréal. While the Prince presided at the openings of both buildings, there is evidence that they were planned before his visit was confirmed.

These two palaces could not be more different. In Hamilton (**figure 5**), an octagonal plan at ground level surmounted by a Greek cross, the whole crowned with a cupola, is easily identified as being based on the New York model. The plan adopted by architect Albert H. Hill for the Hamilton building was adapted to timber frame construction. The width of the octagon was 171 feet. An interesting feature mentioned in the *Spectator* is the

7 *The Globe*, 29 September 1858, 2.

8 Eric Arthur and Thomas Ritchie, *Iron: Cast and Wrought Iron in Canada from the Seventeenth Century to the Present* (Toronto: University of Toronto Press, 1982), 153.

9 *The Globe*, 29 September 1858, 2.

10 William Dendy, *Lost Toronto* (Toronto: Oxford University Press, 1978), 42.

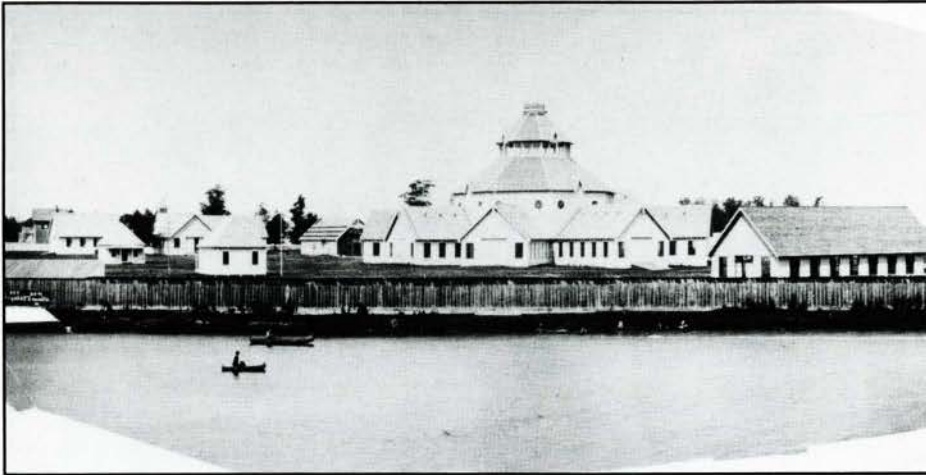
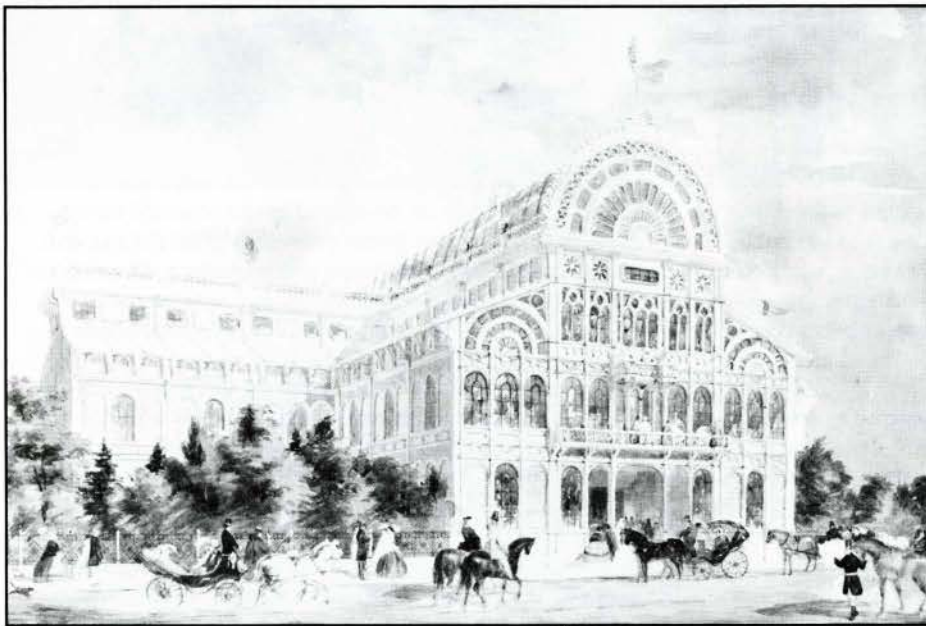


Figure 6 (above). Exhibition Building, Ottawa, c.1860. (National Archives of Canada, C-20534)

Figure 7 (below). Montreal Exhibition Building and Museum, 1860, John William Hopkins, architect. (Royal Ontario Museum)



arched wooden roof, which had a very light appearance.¹¹ The roofs of the single storey sections were observation decks with a fine view of the harbour. The exterior was painted a “warm light colour or stone tint,” and the glass was obscured or frosted, as it had been at Toronto and apparently at Dublin. In colour the interior was painted blue, relieved by drab. Although reduced to their essential elements, round-headed windows and reference to a fan light were present. Unlike Kingston and Toronto, however, its form was vertical and truly centralized. This type of plan and massing may derive from a domestic tradition for fair buildings quite distinct from the 1851 Crystal Palace, reflected in two examples: one at London, Ontario, built in 1861 by William Robinson, and another at Ottawa (figure 6).

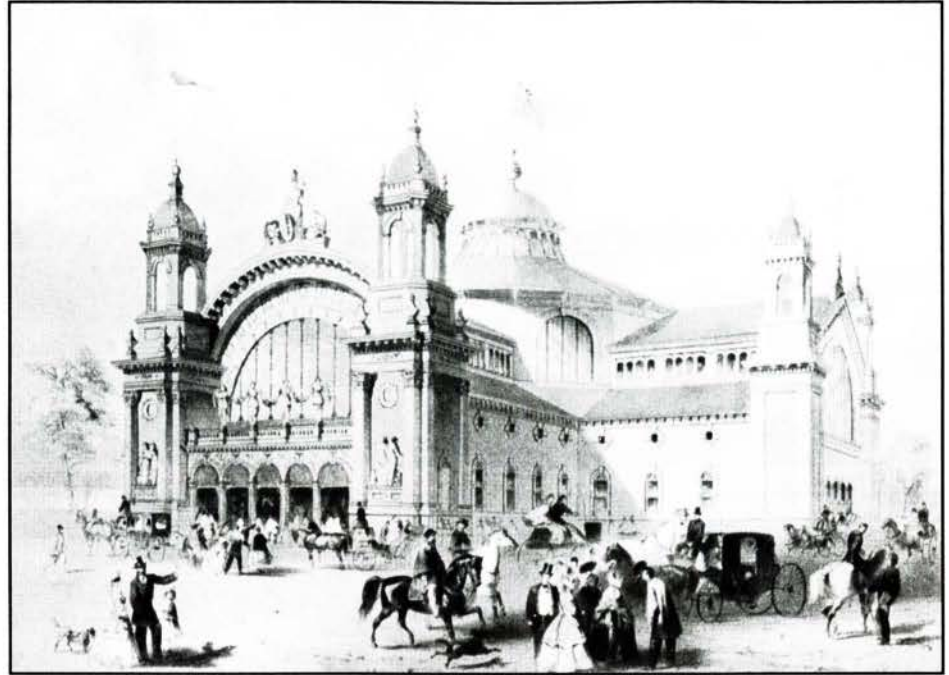
The crystal palace at Montréal, designed by John William Hopkins, was unique in this country. While the main facades were of iron and glass, the side walls were constructed of white brick with rose-coloured contrast, the iron and wood elements painted to match the brick (figure 7).¹² Each of the structural bays was subdivided into three arches, but only the centre of each of these was glazed. The barrel vault of the nave was tinned. Built on a 20-foot modular plan, the building was intended to be 180 x 200 feet, but was constructed with truncated transepts, reducing its dimensions to 180 x 120 feet. The substitution of masonry for iron did not prevent anyone from referring to the Montréal building as a crystal palace.

The Montréal Board of Arts and Manufacture had examined the buildings in Kingston and Toronto and found them to be fine for seasonal use, but not for permanent displays. They planned to use their building as a museum as well as an exhibition hall, and therefore preferred the more permanent material of brick. The choice of a site also reflected the proposed year-round use of the building. The Kingston and Toronto palaces were both located in exhibition parks or fair grounds some distance from built-up areas. The Montréal

11 *The Daily Spectator and Journal of Commerce*, 24 August 1860, 3.

12 Giles Nicholas Chessel Hawkins, “The Montreal Exhibition Building and Museum, 1860: A Monument to Pre-Confederation Canadian Economic Nationalism,” M.A. thesis, Department of Fine Arts, Concordia University, Montréal, 1986, 58ff.

Figure 8. Provincial Exhibition Palace, Fredericton, N.B., 1864, Matthew Stead, architect. (National Archives of Canada, C-40815)



building was deliberately built in an area soon to be developed so that it would be convenient to the public. The site was on St. Catherine Street between McGill College and University, across from the present Eaton store. The Board had misjudged the needs of the community, and the palace was seldom used. During the 1870s it was moved to a more conventional and practical location at the Dominion Exhibition Grounds (now Jeanne Mance Park).

Another substantial hall, properly called the Provincial Exhibition Palace, was designed by Matthew Stead and built in Fredericton in 1864 (figure 8). It was distinctly reminiscent of a railway station. Once again, the plan was a Greek cross, but the glass was relegated to more traditional locations in the clerestories and the ends of the wings. Nevertheless, it was described in the press in terms of “grand yet airy proportions,” its “interior as light and gay as colours can make it” (although the colours were not specified), “brilliant and fairylike,” and so on.¹³ Once again, the popular press began to refer to the building as a crystal palace, linked in the public imagination, if nowhere else, to London’s great industrial exhibition. It was no accident that one of New Brunswick’s most prominent industrialists, Boss Gibson, chose to be photographed beside his state-of-the-art locomotive with the Fredericton palace in the background: however traditional its construction, the building form represented progress.

There followed a period during which no new large-scale halls were needed, but many smaller, vernacular versions sprang up in towns such as Napanee, Ontario. They had many of the features of the larger ones, but were stripped to their essentials. The fair itself as a phenomenon was going through changes, and from the early 1870s there were attempts first to limit the rotation of the fair in Ontario to three cities, and then to settle on a single permanent location. Over the years this prompted keen competition among regional centres, who renovated and enlarged their fairgrounds in the hope of securing a permanent place in the rotation.

Then, in 1878, Toronto established its own annual fair, now the Canadian National Exhibition. A new site was chosen, and the 20-year-old iron Palace of Industry was dismantled and moved to the waterfront. As reconstructed by Strickland & Symons, the building gained an extra storey, dormers, and a crossing tower (figure 9). The effect was somewhat bizarre, but the criticism of squatness was certainly diminished. At this time, the colloquial name Crystal Palace was made official, and the original name was forgotten.

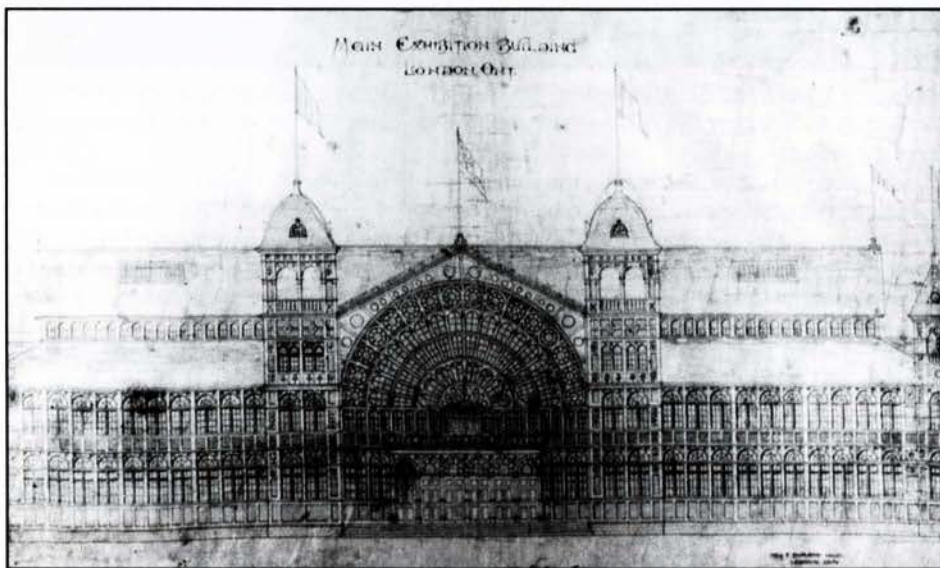
A similar transformation was wrought on the Kingston Crystal Palace ten years later. The provincial fair association had decided not to rotate the fair that year—Kingston’s turn—and the lobbying began. In an attempt to change the minds of the board, the grounds were moved and enlarged, and Horsey’s palace was dismantled and reconstructed by William Newlands and James B. Reid. The length of the wings was modified and a tower was added, but otherwise the hall was rebuilt much as it had been.

¹³ *The Colonial Farmer*, 3 October 1864, and *The Head Quarters*, 28 September 1864.



Figure 9 (above). *Crystal Palace, Toronto, 1878, Strickland & Symons, architects. (National Archives of Canada, John Boyd Collection)*

Figure 10 (below). *Main Exhibition Building, London, Ontario, 1887, George F. Durand, architect. (D.B. Weldon Library, University of Western Ontario)*



London, Ontario, also established a permanent event, and in 1887 the Western Fair was moved to a new site, prompting the construction of a new central building, designed by George F. Durand (figure 10). The main entrance in the transept with a fan window, as well as the axial plan with slightly projecting transepts, were features which recalled Paxton's building. Each major bay was subdivided into three smaller units by round-headed windows. The addition of the flanking towers suggested the Fredericton palace. The building was entirely of wood and glass. Paxton's "tablecloth," in this case, was one of the lightest in appearance of the Canadian examples, due to the complex surface treatment, whereas the "table," the structural timber frame within, including the arches supporting the roof, was heavy and massive. The main colour was terracotta, with sage green, brown, and Indian red trim,¹⁴ deliberately calling attention to the structural system.

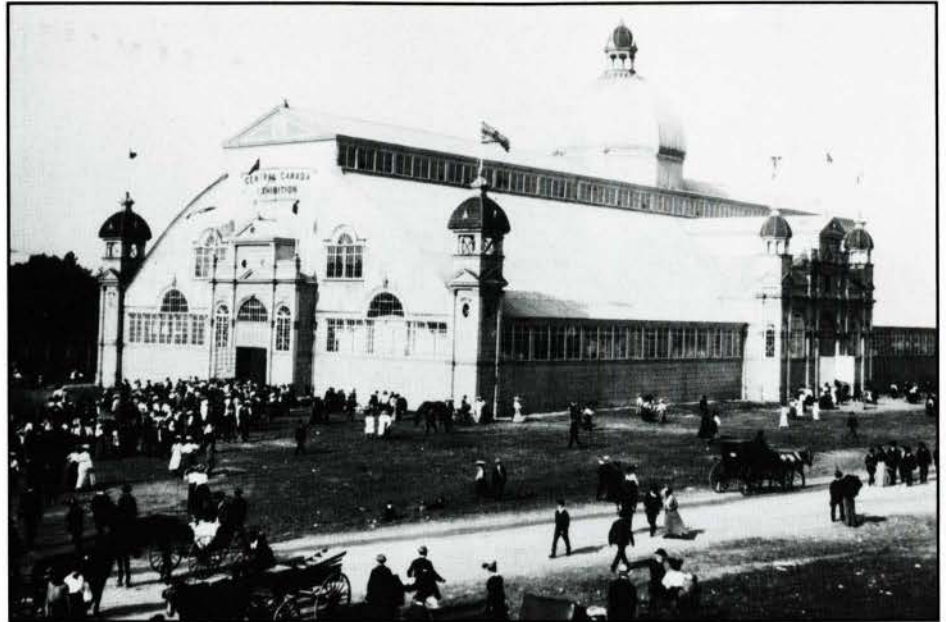
The trend by the late 1880s in Ontario was away from the rotating provincial fair toward permanent regional exhibitions. In addition to fairs at Toronto and London, Ottawa's Central Canada Exhibition was established in 1887, and Kingston had high hopes for a permanent fair as well. At the same time, local and county fairs were thriving, and some even had their own small palaces. A good example which survives in Picton, Ontario, built in 1887, is distinctly reminiscent of Henry Horsey's building in Kingston.

In 1891 a remarkable building, blatantly called a Crystal Palace from the beginning, arose near Victoria B.C., designed by Cornelius J. Soule (figure 11 [see p. 5]).¹⁵ Its massing recalled the centralized vertical stacking of the buildings in Hamilton, Ottawa, and London. Although the plan was a Latin rather than a Greek cross, the effect was similar. Vertical lines were established by the fenestration—the round-headed windows appeared to rise through both storeys and push the roof up into secondary gables. Ventilators, radiating cupolas, and

14 Nancy Tausky and Lynne DiStefano, *Victorian Architecture in London and Southwestern Ontario* (Toronto: University of Toronto Press, 1986), 331-33.

15 *British Columbia Agricultural Association: review of its history, what it has accomplished, the new grounds and Crystal Palace* (Victoria, B.C.: s.n., c.1891).

Figure 12. Aberdeen Pavilion, Ottawa, 1898, Moses C. Edey, architect. (National Archives of Canada, PA-9125)



the crossing tower all added to the effect. The surface treatment carried the Stick Style articulation of the Western Fair building at London even farther, with its rectilinear gridwork, latticing, and shingles.

Two years later, in Chicago, the architecture of the World's Columbian Exhibition set a new standard for exhibition architecture, finally displacing the Crystal Palace after more than 40 years. The influence of the "White City" at Chicago, combined with a shift to permanent exhibition facilities, had a lasting impact on the character of fairgrounds in Canada. At Toronto, where the Canadian National Exhibition had taken root and was developing into the largest event of its kind in the world, this trend was especially evident.

The last of the line of Canadian palaces which can trace its roots to Paxton is an odd building which straddled the stylistic line between London and Chicago, while breaking new ground in technology. The Aberdeen Pavilion (**figure 12**), built in Ottawa in 1898 to a design by Moses C. Edey, consists of a pressed metal, wood, and glass "tablecloth" over a "table" made of steel trusses spanning 130 feet. Its stylistic references drew on the classical tradition, the pressed metal mimicking masonry. The building aspired simultaneously to monumentality and to crystalline lightness.

THESE BUILDINGS FORM A SUBSET within a larger building type, the Canadian exhibition hall. Many have been recognized on their own merit, such as several CNE structures and the Aberdeen Pavilion, which are National Historic Sites. Unfortunately, when fair buildings have been called crystal palaces, whether properly or colloquially, they have been marginalized as architectural imposters. This happens in spite of the fact that several of them meet Paxton's criteria: a rigid frame covered with a light membrane. That the rigid frame was more often wood than iron is the most criticized feature of these Canadian buildings. Perhaps we should consider the position of Paxton himself, who admitted that iron construction allowed a higher glass-to-wall ratio, but that the extra expense was not always justified. He had perfected the tablecloth; the structure of the table for him was a secondary issue.

Rather than trying to force-fit Canada's crystal palaces into the same category as the great international exhibition buildings, it would be more productive to recognize them for what they are—a body of buildings of a common function with similar design features—and to place them in their proper context in the development of exhibition architecture in Canada.

In September 1991, we reported that Ottawa's Aberdeen Pavilion, the last large-scale exhibition hall of this type in Canada, was in imminent threat of demolition. We are happy to report that Ottawa City Council reversed its decision and committed to preserving and restoring the building. The official re-opening of the Aberdeen Pavilion will take place in June 1994.

Fern Graham is an Ottawa-based private consultant in the history of architecture. This article is from a larger study on the development of the exhibition hall in Canada.