

Modernism and Medicine

The Hospitals of Stevens and Lee, 1916–1932

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The operating department should, where possible, be isolated,” advised hospital architect Edward Fletcher Stevens (Figure 1) in 1928. “The separate building is the ideal arrangement. Where this is not possible, the upper story (if there is elevator service) should be used and the department well separated from other rooms.”¹ Stevens’s six-story Hôpital Notre-Dame of 1923 (Figures 2, 3) was a good illustration of his counsel.² Four operating rooms occupied a special corridor on the top floor of the new building in Montreal, arranged at 90 degrees to a hallway of patients’ rooms and wards and clearly separated by a doorway. The two largest rooms for surgery punctuated the northern end of this corridor of other highly specialized service rooms, rationalized by Stevens in his popular book.

The practice of surgery, much celebrated in the 1920s, was a particularly “scientific” feature of hospitals constructed between the wars, and in many ways it justified the hiring of specialists, like Stevens, whose extensive experience and high level of technical knowledge were unmatched in North America in the interwar period. The rise of surgery marked a major change in hospital architecture: the transformation of the old-fashioned operating theater into the operating suite.³ While older buildings typically featured a rather grand space in which medical students and colleagues could watch surgery performed from tiered seating, surgery in the state-of-the-art interwar hospital took place in a much more modest setting.⁴ An area of about 300 square feet, according to Stevens, allowed the student to observe surgery from much closer up, and thus “to gain an intimate knowledge of live tissue.”⁵ This reduction in area also meant that more operations could be performed in the same total amount of space, which was an important parameter in a time when surgery was in greater demand.

This increased visibility of surgery in hospital planning was also perceptible from the street, as surgical suites built from about 1910 to 1940 were commonly illuminated by large skylights. Skylights are, as such, a signature feature of interwar medicine. Generally speaking, after World War II, electric



FIGURE 1: Portrait of Edward F. Stevens (*National Cyclopaedia of American Biography*, 244)

operating lights and mechanical ventilation meant that operating rooms became invisible from the exterior of the hospital.⁶

This direct link between form and function, however, was not the driving force behind Stevens’s choice of architectural imagery in the development of the modern hospital. Notre-Dame’s exterior was “hard burned rough textured buff brick.”⁷ The hospital’s main entrance featured double-height Corinthian columns of Stanstead granite and a segmented arch. The building had a pronounced base and cornice and quoins of Montreal limestone, and its windows had keystones. These



FIGURE 2: Stevens and Lee, Hôpital Notre-Dame, Montreal, 1923, general view of west wing

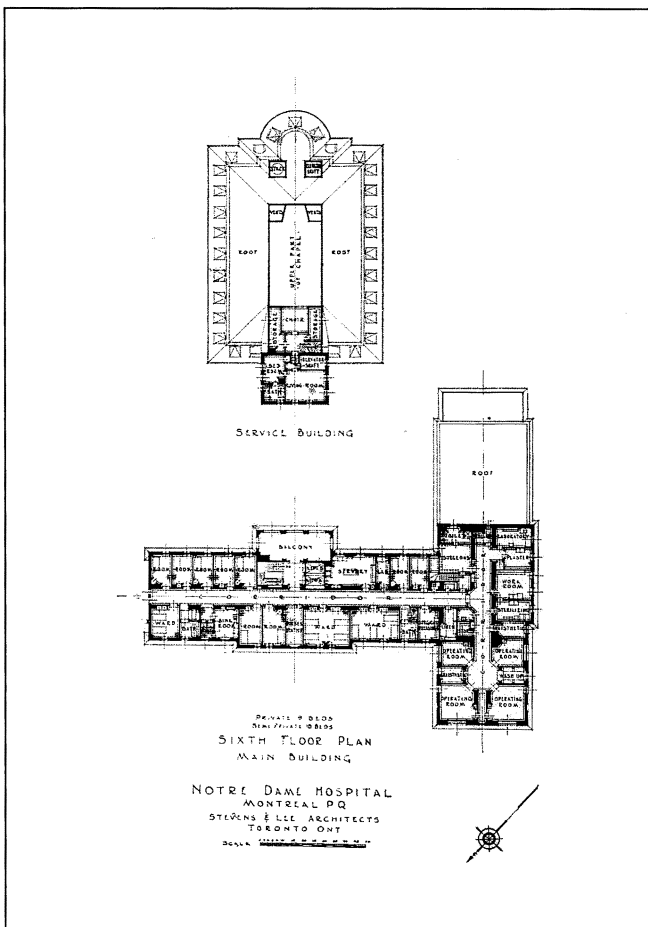


FIGURE 3: Stevens and Lee, Hôpital Notre-Dame, Montreal, plan of sixth floor (Stevens, *American Hospital*, 94)

classical details—“all trim and special architectural features”—ensured that Hôpital Notre-Dame was far from the crisp, white images commonly associated with European Modern buildings of the 1920s. Visitors may have found it surprising, for example, that behind the romantic arcade on the ground floor of Hôpital Notre-Dame was the department for otolaryn-

gology (ear, nose, and throat), which even included a dark-room. Stevens’s beloved surgery department was prominently featured in this same elevation, resting firmly on the cornice of the fifth floor and accorded the building’s largest windows. Indeed, state-of-the-art North American hospitals of the inter-war period were far more likely to resemble a Georgian mansion, or in the case of Hôpital Notre-Dame, a Renaissance palazzo than the undecorated, ahistorical buildings pioneered by the Chicago skyscraper architects more than three decades earlier, or even the slick white villas popularized by Le Corbusier and Richard Neutra in the 1920s.⁸

This paper explores the work of Stevens and his partner, Frederick Clare Lee, during this critical period in North American hospital expansion. Without exception, their buildings represented current ideas in planning, consciously dressed in conservative exteriors. Why does the so-called modern hospital look so *unmodern* to us? How did the hospital’s rather overt historicist references communicate ideas about scientific medicine? What were the spatial relationships between hospitals and other residential building types, especially hotels, another institution slow to accept International Style modernism?

The implications of this study go far beyond an examination of one firm’s work. The oeuvre of Stevens and Lee is a good case study of the entire building type, since the partnership designed over 100 prominent institutions in their practice, which ran from 1912 to 1933.⁹ Their work is, in this way, an accurate gauge of trends in hospital design during an important time in hospital reform. With offices in both Boston and Toronto, Stevens and Lee operated at an international scale, defining a North American hospital type.

The Canada–United States border, in fact, made no difference to their practice. Stevens and Lee’s monopoly on Canadian hospitals was uncontested. In 1935 one Canadian intern in five would have trained in a Stevens-and-Lee–designed

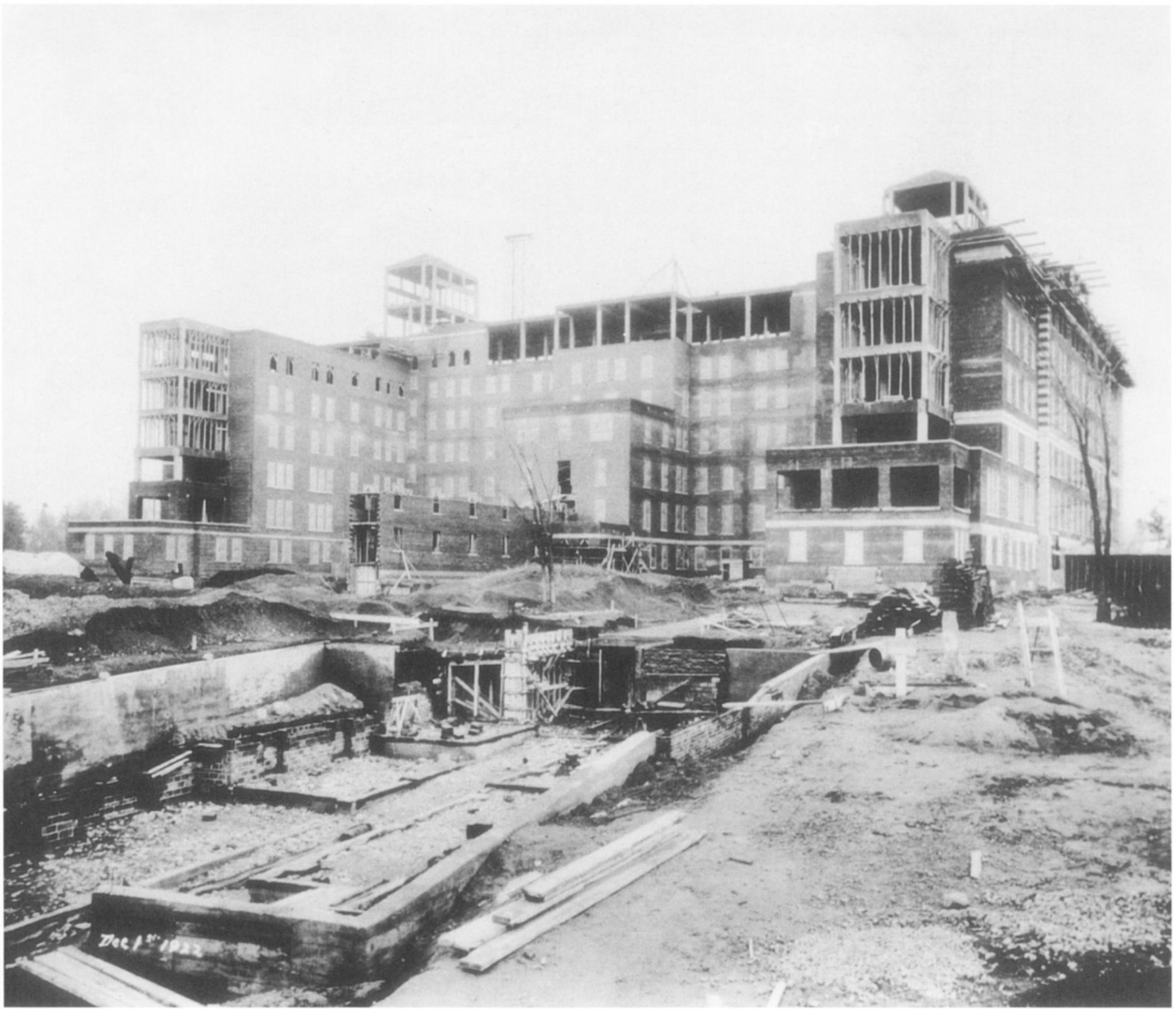


FIGURE 4: Stevens and Lee, Ottawa Civic Hospital, Ottawa, 1922–1923, during construction

building. Stevens and Lee were also responsible for many well-known American hospitals, such as the City Hospital in Springfield, Mass., the Ohio Valley General Hospital, in Wheeling, West Va., and the U.S. Overseas Army Hospitals during World War I.¹⁰

Relatively little is known about either partner. Born in 1860 in Dunstable, Massachusetts, Stevens enrolled at Massachusetts Institute of Technology as a special student in architecture for at least three academic terms from 1881 to 1883.¹¹ He subsequently worked for firms in both Boston and New York: Allen & Kenway and McKim, Mead & White on the Boston Public Library. In 1890, he formed a partnership with Henry H. Kendall in Boston. The beginning of Stevens's career as a hospital specialist, however, was about eight years later. From 1898 to 1907, when Stevens was a partner in the Boston firm of Kendall, Stevens, & Taylor, the firm was responsible for a number of significant hospitals in Boston and New England.¹²

In 1911, Stevens embarked on a European tour that would cement his hospital expertise, traveling to Amsterdam, The Hague, Utrecht, Hamburg, Berlin, Dresden, Vienna, Paris, and London with Dr. John Nelson Elliot Brown, Superintendent of the Toronto General Hospital from 1905 to 1911.¹³ During that summer, Stevens collected documentation of buildings, which he used throughout his career to make presentations to hospitals. In 1920, for example, Stevens was prepared to show lantern slides of “numerous large hospitals throughout the world” to “a large body of people.”¹⁴ The 1911 trip was also the basis of his lifelong interest in hydrotherapy.¹⁵

Stevens's opportunity to gain Canadian commissions was no doubt considerably augmented through the partnership he formed with Lee in 1912 and the opening of an office in Toronto.¹⁶ Lee had been born in Chicago in 1874 and was educated at Yale University and the Ecole des Beaux-Arts

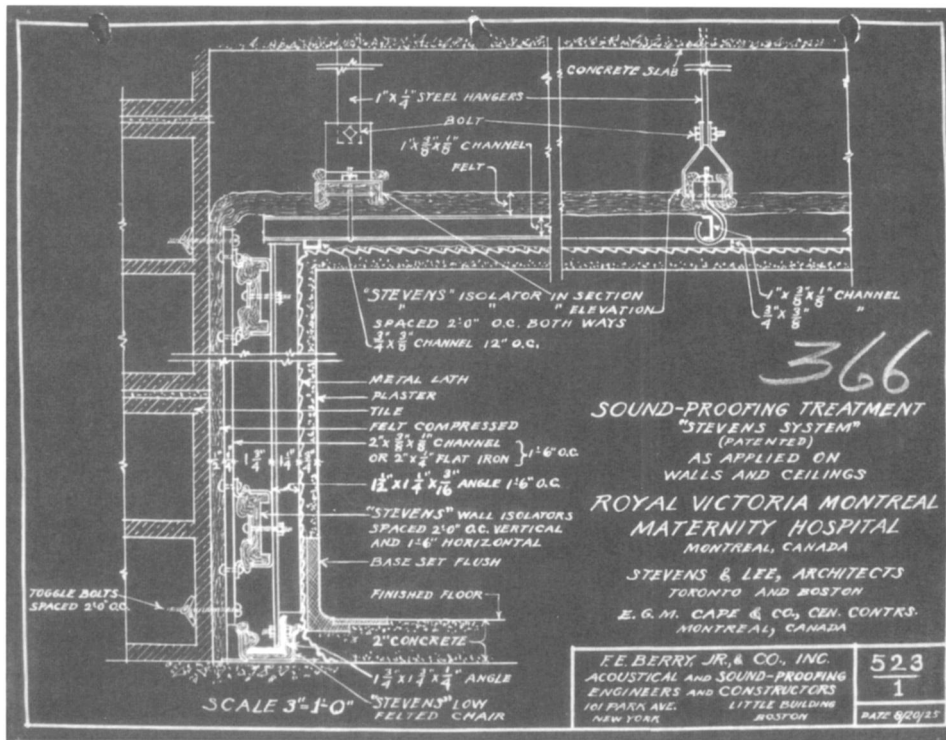


FIGURE 5: Stevens and Lee, Royal Victoria Montreal Maternity Hospital, 1925, wall section showing soundproofing

(1897–1902). He had moved to Canada in 1907 and then joined the Toronto firm of Darling & Pearson.¹⁷ Presumably he gained considerable hospital experience with them, since he was responsible for the Toronto General Hospital (1907–1913). In 1911–1912, he practiced independently and was the architect for the Wellesley Hospital in Toronto.¹⁸

The work of Stevens and Lee is a particularly enlightening case study, from which we can draw larger conclusions, because it affords the opportunity to compare what was built to the architect's own words. Stevens's *The American Hospital of the Twentieth Century* of 1918 (and its multiple revised editions) is a classic in the field of hospital architecture, and he published extensively in the architectural and medical professional presses. The five hospitals that comprise the focus of the paper are the Hôpital Notre-Dame, the Ottawa Civic Hospital, two additions to the Royal Victoria Hospital (Ross Memorial Pavilion and Royal Victoria Montreal Maternity Hospital), also in Montreal, and the Kingston General Hospital, all designed by the firm between 1916 and 1932 and the focus of a larger research project on the intersection of modernism and medicine in Canada.¹⁹

The argument is that generic hospital architecture of the interwar years *was* modern in its spatial attitudes, not necessarily its look but rather in its structure, its endorsement of aseptic medical practice, its sanctioning of expert knowledge, its appeal to new patrons, its encouragement of new ways of working, its response to urbanization, its use of zoning, its acceptance of modern social structures, its resemblance to other modern building types, its embrace of internationalism,

and its endorsement of standardization. This study focuses on social and architectural factors that guided the development of the modern building type to demonstrate this claim, rather than the relationship of medical technology to architecture. It also attempts to explain the danger in regarding historicist designs as merely conventional (or even reactionary). Because architectural historians have tended to read the elevations rather than the plans of interwar hospitals, these buildings have generally been omitted from studies of the building type and have been seen, mistakenly, as simple reverberations of the nineteenth-century model.²⁰

Behind its historicist guise, the modern hospital was a thoroughly modern structure, both physically and socially. Both Hôpital Notre-Dame and Stevens's Ottawa Civic Hospital (Figure 4) were reinforced concrete frames with combination brick-and-tile curtain walls. In addition, the arrangement of girders and columns in the reinforced concrete structure of the Stevens-and-Lee hospitals meant that it could also carry the pipes and ducts for the gravity-exhaust ventilation system. Stevens's structural system supported the mechanical design, which was integrated with functional zoning; at Hôpital Notre-Dame, a specific department could be ventilated independently by pushing a button from within the department.²¹

Hospitals of the 1920s were also designed as thoroughly fireproof, and older buildings were modernized for fire protection at this time. In Stevens's buildings, this meant using incombustible materials (concrete floors) separated by hollow terra-cotta tiles. Brick and stone cladding, partitions of terra-cotta tile, gypsum tile, or plaster on metal lath also prevented

the spread of fire in the hospitals.²² In his book he admitted that the doors, windows, furnishings, and linen might be combustible, for as “to have them otherwise would make them so ugly and impractical as to more than offset the slight menace of fire.”²³

The effects of modernity in other domains were explicitly addressed in Stevens’s architecture. Stevens, for example, took special care to buffer the loud noises produced outside the hospital—especially those of automobiles (he noted the honking and starting of cars), airplanes, trains, and streetcars, the new noisy machinery of urban transportation—which also helped hospitals to perform better. His projects that were built from scratch, such as the Ottawa Civic Hospital, were frequently located at some distance from the city center for precisely these reasons.

For Stevens, soundproofing was a way to tolerate rather than resist urban crowding, which was necessary to the economic health of hospitals. He claimed to have patented the soundproofing treatment he devised for the Royal Victoria Montreal Maternity Hospital in 1925 (Figure 5).²⁴ It was called

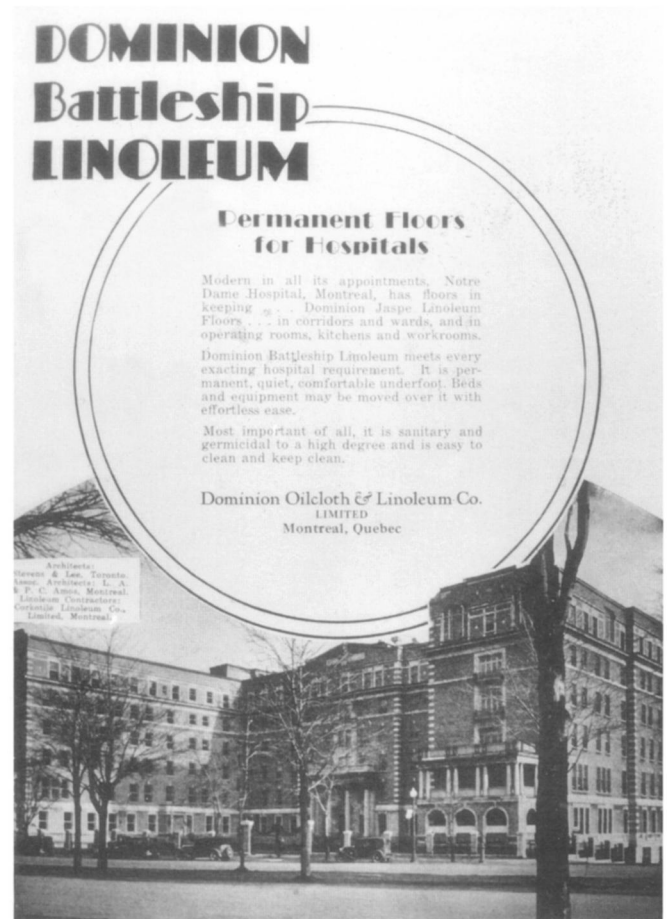


FIGURE 7: Advertisement for linoleum, featuring Stevens and Lee’s Hôpital Notre-Dame, Montreal (*The Canadian Hospital* 9 [June 1932], 5)

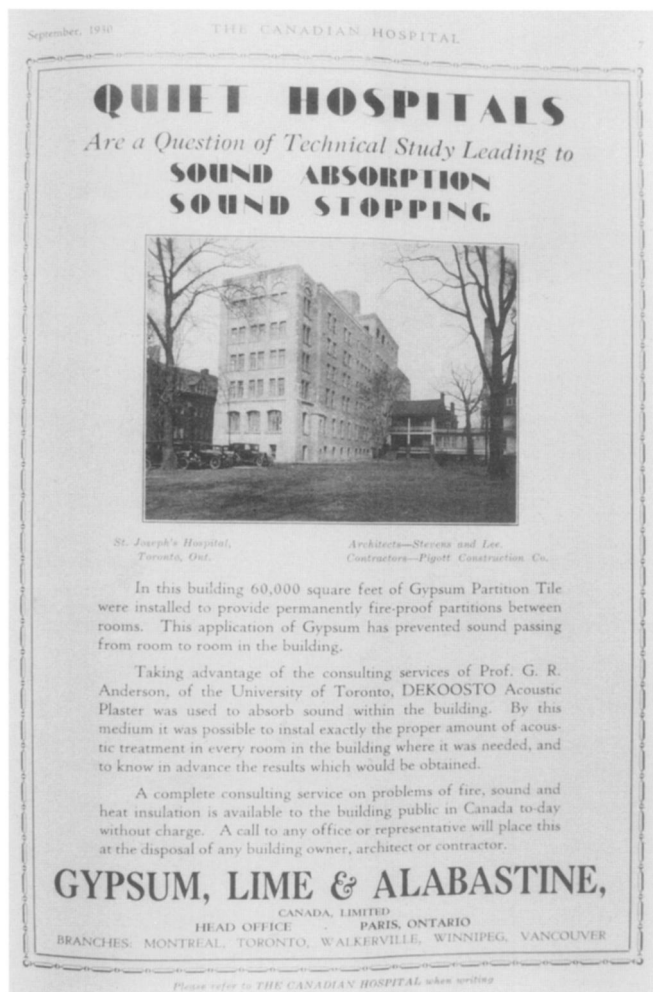


FIGURE 6: Advertisement for fireproof and soundproof materials, featuring Stevens and Lee’s St. Joseph’s Hospital, Toronto (*The Canadian Hospital* 7 [September 1930], 7)

the “Stevens System” and featured what he called “Stevens isolators” and “Stevens low felted chairs” in walls and ceilings. Stevens suggested in an article of 1925 that the time might soon come for the hospital to put a sign up on its chimney “for the aeronaut to read as he passes by—‘Hospital Zone! Shut off the motor while passing!’”²⁵

Noisy hallways were a new problem created by the double-loaded corridor combined with fireproof construction. To muffle sounds produced within the hospital—plumbing, signal bells, doors and windows slamming, and patients talking—he recommended doors “with special gaskets,” “pipes and vent ducts wrapped with heavy felt,” acoustic plaster in corridors and service rooms, and sound-absorbing Celotex ceilings in especially noisy spaces: serveries, utility rooms, and the delivery suite.²⁶ Stevens and Lee’s St. Joseph’s Hospital in Toronto (Figure 6), featured “sound stopping” gypsum partition tiles.

Noise control was also a major factor in the planning of hospitals. Stevens recommended locating serving kitchens in cross-corridors, rather than corridors leading to the patients’ rooms, in order to minimize noise transmission.²⁷ Such noise, as well as unpleasant smells, were particularly unacceptable to

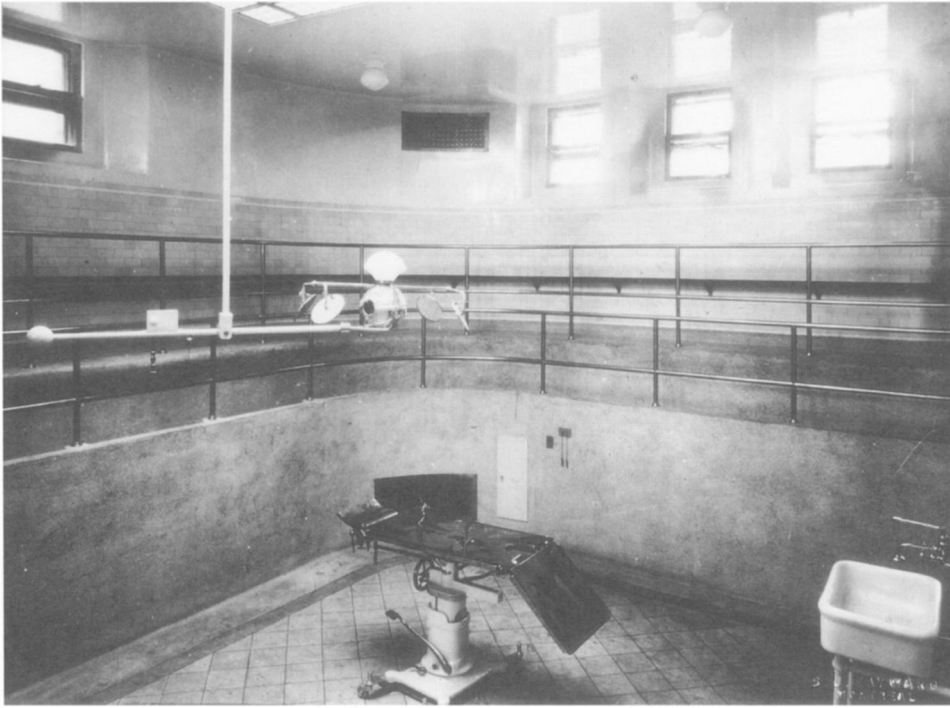


FIGURE 8: Stevens and Lee, Royal Victoria Montreal Maternity Hospital, operating room

FIGURE 9: Stevens and Lee, Ross Memorial Pavilion at the Royal Victoria Hospital, Montreal, lobby with historicist decoration (Stevens, *American Hospital*, 32)

middle-class patients, who were willing to pay for private (and thus quieter) rooms.

In a version of modernism based largely on functionalism, Stevens's choice of flooring materials expressed the spatial separation of functions. The interwar hospital was planned in functional zones, very much like the modern city, and the hospital's flooring materials were carefully matched to the

various functions of spaces, reflecting then current notions in acoustics and cleaning, but also denoting the social hierarchy of certain spaces. Wards and patients' rooms typically had sound-absorbing floors, such as linoleum (Figure 7), cork, or rubber.²⁸ The latter was also recommended for the floors and ceilings of X-ray departments.²⁹ The floors of balconies, waiting rooms, and kitchens were quarry tile; vitreous tile was

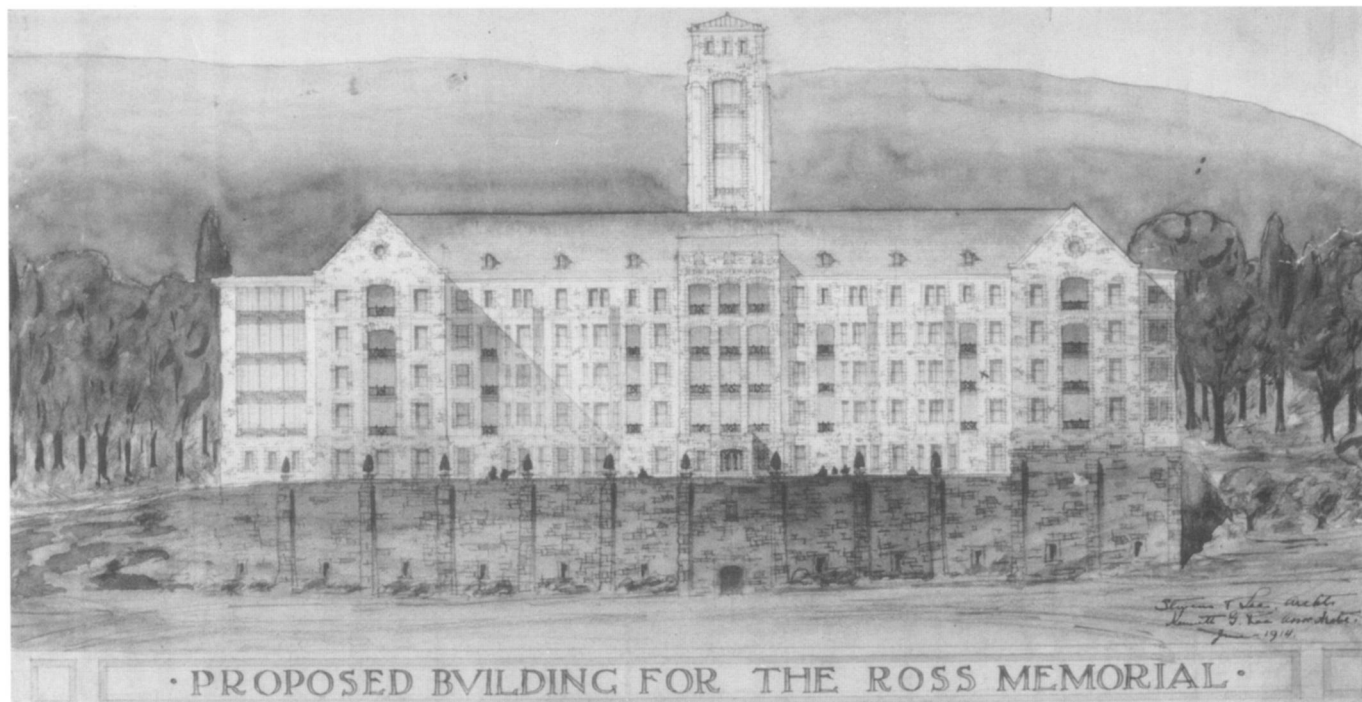


FIGURE 10: Stevens and Lee, Ross Memorial Pavilion at the Royal Victoria Hospital, Montreal, proposed elevation of 1914

found on the floors of operating rooms (Figure 8). Terrazzo was used throughout the hospital, due to its cheapness and durability, while marble was often reserved for use in the hospital lobby.³⁰

Indeed, the lobbies in the Ottawa Civic Hospital, Hôpital Notre-Dame, and the additions at the Royal Victoria Hospital resembled hotel lobbies, due to their ostentatious materials and historicist decoration. The lobby at the Ross Memorial Pavilion (Figure 9), illustrated in *The American Hospital of the Twentieth Century*, was intended as a memorial vestibule to the building's benefactors. John Kenneth Leveson Ross erected it in memory of his parents, James Ross and Annie Kerr Ross. A bronze bust was positioned on axis with the entry, perched on a grand oak and marble pedestal, which also functioned to conceal the radiators. Perhaps this rather solemn memorial function of the room persuaded Stevens and Lee to use Caen stone on the walls and groined ceiling of the Ross Memorial Pavilion lobby, "depart[ing] from the hospital type of finish."³¹ The 26-by-32-foot entrance to the Ross Memorial Pavilion also had five bronze chandeliers, fine oak paneling, and Belgian black and Italian white tile flooring, illustrating Stevens's counsel that the entrance furniture should be both "dignified and decorative."³²

At the same time, many hospital lobbies, including the Ross Memorial Pavilion's, were actually quite modern in that their design anticipated the delivery of patients by automobile (Figure 10). As early as 1916, the Ross Memorial Pavilion entry sequence comprised heavy wrought-iron gates at the street (Figure 11), a curvilinear driveway rising about 1,000 feet,



FIGURE 11: Stevens and Lee, Ross Memorial Pavilion at the Royal Victoria Hospital, Montreal, entrance gate for automobiles (Stevens, *American Hospital*, 29)

"sufficiently broad to allow the turning of automobiles and carriages," and a porte cochere. The hospital thus not only accommodated new modes of transportation, but by doing so it reinforced those changes.

The parking of automobiles was also an important feature of the modern hospital. Photographs of the Ottawa Civic Hospital taken about 1924 (Figure 12) show Model T Fords parked along the driveway and in designated parking lots (Stevens wanted them located "at some distance" from the patients' rooms). The Ottawa Civic Hospital added a luxurious fourteen-car parking garage for doctors in 1930, which heated the vehicles to a toasty 90 degrees F using excess boiler heat.³³ As early as 1911 the Royal Victoria Hospital had added parking

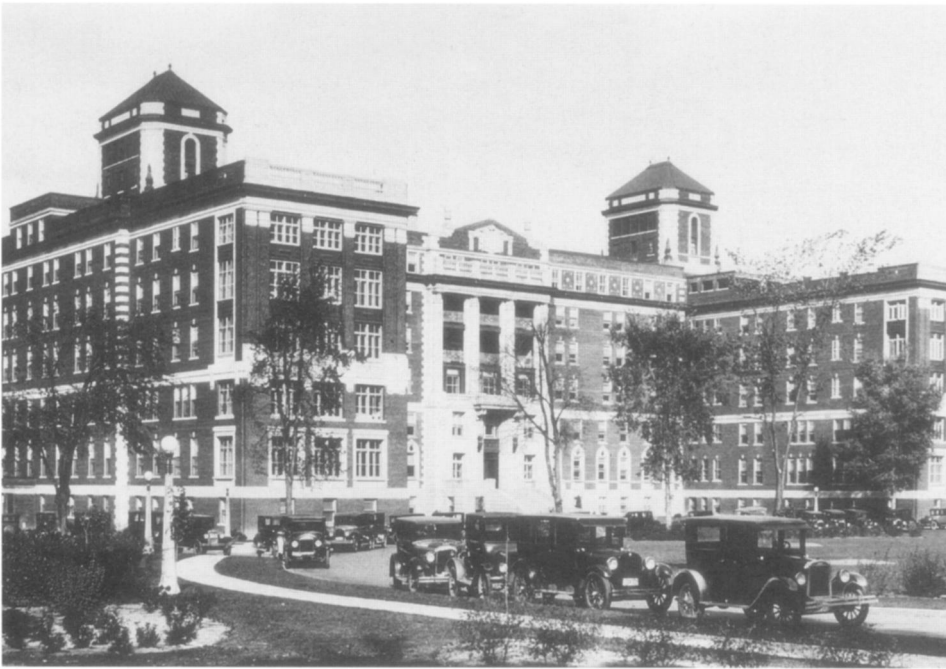


FIGURE 12: Stevens and Lee, Ottawa Civic Hospital, Ottawa, about 1924, automobiles parked in driveway

lots for doctors and private patients and a special entrance and garage for its ambulances. This was only a year after Ford's advanced plant at Highland Park was opened.

Modernism, to Stevens, also meant built-in technology. The private patients' rooms in the maternity hospital at the Royal Victoria (Figure 13) were wired for telephone and each floor had receptacles for electrocardiograph machines. Patients' rooms had special night-lights, allowing nurses to illuminate the rooms at night without using ceiling lights, in addition to a call system similar to those found in many hospitals today. This comprised a system of lights over the doors of rooms indicating the location of doctors and nurses. Instrument cabinets, refrigerators, blanket warmers, and drying closets were built right into the hospital walls.

These technologies were largely standardized during



FIGURE 13: Stevens and Lee, Royal Victoria Montreal Maternity Hospital, 1926, private room

June, 1927

THE CANADIAN HOSPITAL

Royal Victoria Hospital Montreal

OTIS FENSOM

Royal Victoria Hospital
Montreal

ALBERT W. W. BENTON

Dear Sirs, We have very much pleasure in stating that after about three years operation we find the Micro-Levelling type of elevator with the Otis-Fensom drive and control to be the most reliable and practical in use. We are very glad to hear that you are planning to install one in your hospital and we are sure that it will be a most successful one.

Yours very truly,
R. W. Bent

Asst. Superintendent.

The Otis-Fensom Elevator Co. Limited,
215 St. James Street,
Montreal, P. Q.

Micro-Levelling Elevators for patients and passengers are now the accepted standard for hospitals.

OTIS-FENSOM ELEVATOR COMPANY LIMITED

Head Office and Works HAMILTON, CANADA
OFFICES IN ALL PRINCIPAL CITIES

Please refer to THE CANADIAN HOSPITAL when writing

FIGURE 14: Advertisement for smooth elevators, featuring the Royal Victoria Hospital, Montreal (*The Canadian Hospital* 4 [June 1927], 11)

Stevens's lifetime, like the procedures required to operate them, a process accelerated by the American experience during World War I. In 1918 the American College of Surgeons (ACS) developed standards and encouraged hospitals across North America to apply for approval. The ACS published annual lists of hospitals that met its minimum standards, with more and more hospitals satisfying its criteria each year. In 1918, eighty-nine of 697 eligible 100+-bed hospitals met ACS approval; by 1921, this number had increased to 576.³⁴

The arguments for the standardization of hospitals were well worn: public safety, cost efficiency, and hospital evaluation. However, as highly educated professionals responsible for custom-designed healthcare facilities, architects occupied an ambivalent position vis-à-vis the standardization of hospital design. Would not the eventual adoption of a standard hospital plan make specialists like Stevens and Lee obsolete? In the 1920s and 1930s it was not unusual for specialized journals to publish "checklists" of hospital equipment in order to avoid errors of omission.³⁵ The lists organized in 1934 for *The Hospital Yearbook* by Sigismund Schulz Goldwater, physician and Commissioner of New York City's hospitals from 1934 to 1940, considered the planning of wards, private rooms, and various departments of the hospital.³⁶ Stevens's book was in some ways the same sort of thing: a checklist of points to consider and standards to uphold in the design of a hospital. Stevens himself advocated the standardization of hospital equip-

ment, pointing to the wartime experience with plumbing as a case in point, but he was completely opposed to the standardization of hospital plans, noting the complexities of site and circumstances. His book and articles made the same argument by underlining his unique authority (the book showcased his own buildings), offering only the most general guidelines, and implying that each commission demanded a unique solution.³⁷

Stevens might also have noted how designing for built-in technology and standardization was an impulse contradictory to allowing for both expansion and change. Much of the firm's work was adding to older buildings, or designing hospitals to be constructed in stages, such as Hôpital Notre-Dame. Only three of the firm's twenty or so Canadian commissions, in fact, were for completely new buildings. Planning for expansion was thus a fundamental aspect of hospital specialization; it was particularly important in the choice of a site, which had to provide ample space for the hospital's growth while also anticipating the way the surrounding city might develop. "In selecting a site it was necessary to have enough land available for future expansion and, at the same time, a location easily accessible to the medical men and patients, as well as one that would be in the path of the city's normal growth," Stevens recounted about the Ottawa Civic Hospital.³⁸

He was equally concerned about designing flexible space in his hospitals. In *The American Hospital of the Twentieth Century*,

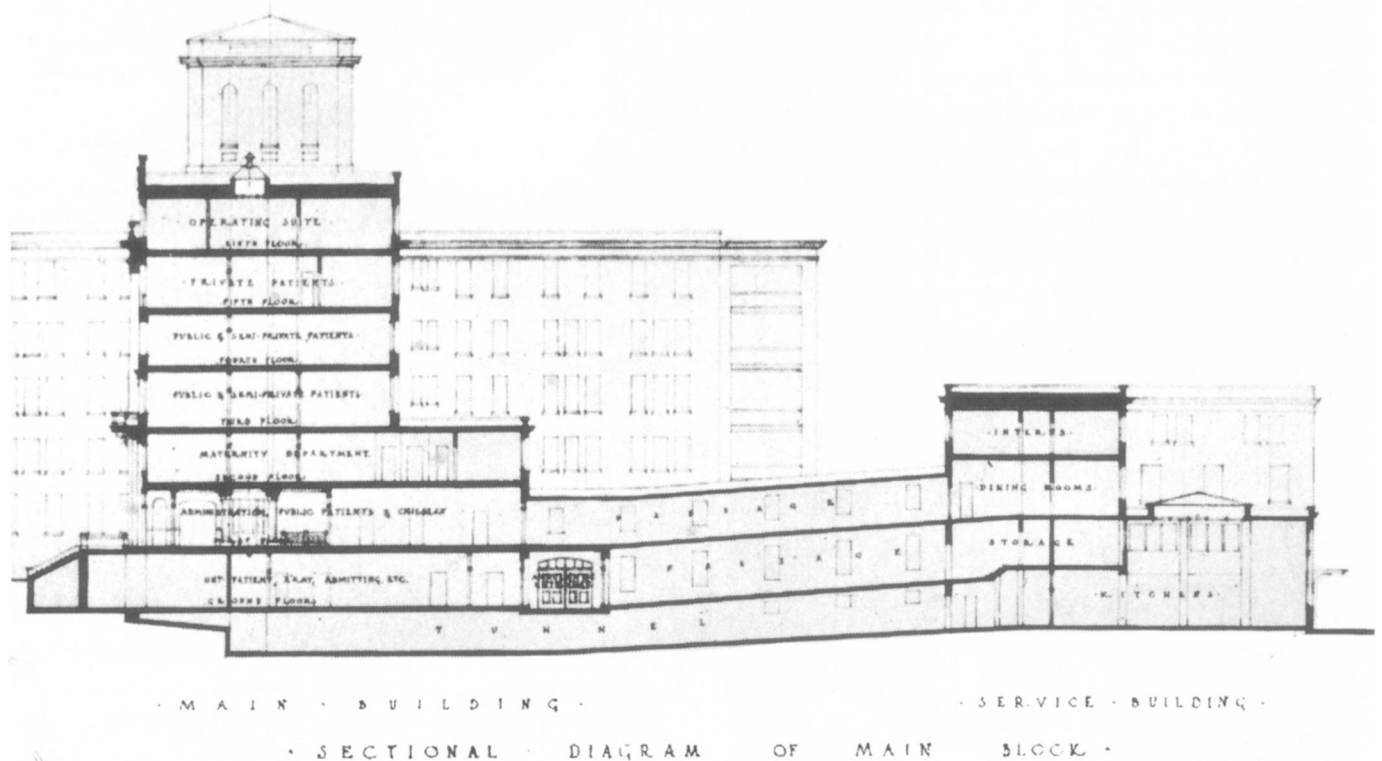


FIGURE 15: Stevens and Lee, Ottawa Civic Hospital, section through main floor showing connection of hospital kitchen to patients' rooms by tunnel (Stevens, *American Hospital*, 89)



FIGURE 16: Stevens and Lee, Ottawa Civic Hospital, main kitchen (Stevens, *American Hospital*, 456)

he quoted from Goldwater's report of the Committee on Hospital Planning of 1924 to the American Hospital Association, whose fourth principle was "flexibility." By this Stevens meant far more than simple alterations, but rather the potential of a building to adapt to a total change in function. He imagined, for example, "a plan so flexible that the medical department of yesterday may be the surgical department of to-morrow."³⁹

Although the plans of interwar hospitals comprised mostly smaller rooms off long, double-loaded corridors, aspects of the earlier pavilion-plan buildings also survived in the newer buildings, a fact rarely noted by hospital historians, who tend to describe the shift from pavilion to block plans as immediate. However, nearly all new hospitals of the 1920s included features of both types. For example, Stevens's hospitals nearly always had some sort of ward accommodation for poorer patients, often called "public wards." These were typically smaller than their nineteenth-century precedents; at Hôpital Notre-Dame, for example, the second floor featured wards that were 43 feet square and contained twenty beds. These spaces were further subdivided into smaller sections containing five beds, each section separated by partitions that did not quite reach the ceiling.⁴⁰

True pavilion-plan hospitals, the type constructed all over the world from about 1850 to 1914, had featured "private" accommodation for only the most contagious of patients. The signature feature of such buildings was the enormous, open wards (sometimes called Nightingale wards) that typically housed eighteen to forty patients separated only by a few feet of floor space and open windows. As Jeremy Taylor has con-

vincingly argued in his recent study of the British-based type, pavilion-plan hospitals continued to be popular long after the dismissal of the miasma theory of disease transmission, as late as the 1930s.⁴¹ Taylor's study thus says something very different from other, albeit briefer, looks at the same subject. In both the classic surveys of hospital architecture and the handful of articles on the development of the pavilion plan, many architectural historians have insisted on a direct relationship between various theories of disease transmission and the plan itself.⁴²

The debate on the health benefits of the so-called block plan, comprising smaller rooms along double-loaded corridors, over the older pavilion plan type raged during the first two decades of Stevens and Lee's practice, focusing on the question of how to balance the efficiency and economy of the ward with the comfort and protection of the private room.⁴³ Some physicians claimed that the total spatial separation of patients would curb the spread of contagious diseases, while other social commentators, even Henry Ford, argued that private rooms were more democratic.⁴⁴ To some extent, the same sociomedical debates continue today. Stevens walked a thin line between the two sides of the debate, professing a middle-ground solution for the middle-class patient (the poor continued to occupy wards, while the rich paid for private space) and pointing to the subdivided wards of two Danish hospitals as models. He called the wards he typically provided for sixteen to eighteen patients, in groups of three or four, "alcove" wards, recommending that each patient be allotted from 83 to 100 square feet of floor area and a floor-to-ceiling height of 12 feet.⁴⁵ This smallish ward, Stevens believed, would

satisfy “the great intermediate class of patients who, with the ‘ward pocketbook,’ are acquiring the ‘private room appetite.’”⁴⁶ Hospitals boasted that the thin metal partitions that separated patients in such wards served to even out differences in social class, while also separating potentially dangerous patients. The Montreal Jewish General Hospital, for example, featured four-bed public wards and boasted that the food and furniture were identical for public and private patients.⁴⁷

The hospital as a modern social structure also meant accommodating modern ways of working. Within his (apparent) Renaissance palazzo or Scottish castle hospitals, Stevens’s planning facilitated the working methods of highly specialized physicians, nurses, teams of orderlies and other aids, administrators, and janitorial and laundry staffs, all trained to work as efficiently and productively as possible. In addition to the overall arrangement of the building, which grouped patients by the general treatment they required, the influence of Taylorism was also illustrated by the inclusion of nonmedical technology like time clocks, call systems, and adding machines, as in other modern corporations.⁴⁸

It also meant improving the performance of existing technologies, like elevators. An advertisement of 1927 for Otis-Fensom elevators (Figure 14) featured the Royal Victoria Hospital and boasted that following three years of microleveling elevator operation, “nasty jolting and jarring” had been done away with, making the movement of patients and passengers considerably smoother. Stevens made the same point in *The American Hospital of the Twentieth Century*: “An automatic levelling device is a most important adjunct to a hospital elevator.”⁴⁹ Elevators only became important in hospital design when they ran smoothly, which coincided with the time that hospitals became multistory blocks rather than pavilions and patients had to be moved to specialists, rather than waiting for physicians to come to the wards. Stevens even went so far as to compare a good elevator to a Rolls-Royce, insisting that “service should be considered before price.”⁵⁰ In the 1927 annual report of the Montreal General Hospital, L. J. Rhea, the director of the Pathological Laboratory, made a direct link between elevator technology and medical progress:

An elevator, a long hoped-for improvement, has recently been approved by our Board of Management. When this is built it will release some much needed space in the main building, as well as add greatly to the comfort of the patients, who must now climb three flights of stairs, in order that certain tests be properly made upon them. It will, in fact, make possible certain tests that we have been unable to carry out in the past.⁵¹

The factory aesthetic usually associated with Taylorism, with its emphasis on machine-like efficiency (no jolting and jarring), was most obvious in the more industrial sectors of the hospital, such as the service building, or in the myriad of

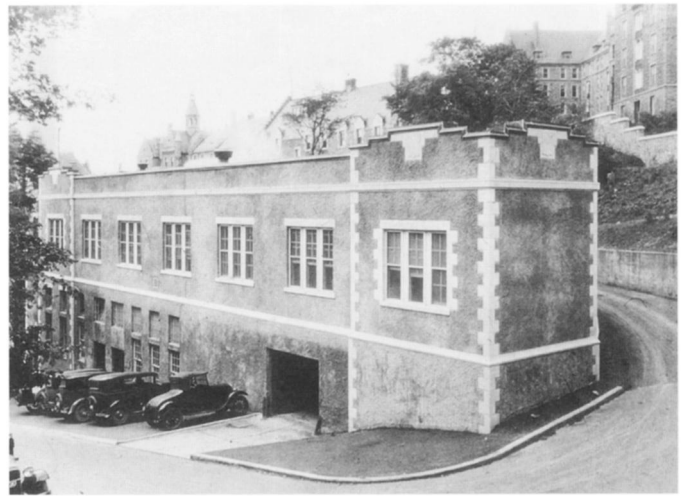


FIGURE 17: Ross and Macdonald, Royal Victoria Hospital, Montreal, laundry building of 1931

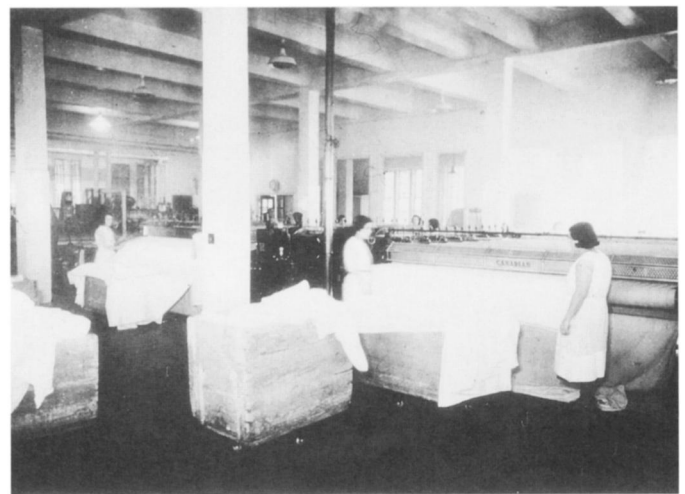


FIGURE 18: Ross and Macdonald, Royal Victoria Hospital, Montreal, interior of laundry building of 1931

tunnels constructed during the 1920s to connect the service sector to the patients’ rooms. The integration and coordination of vast and mechanized support services was also a thoroughly modern development. Like the industrial zone of the emerging modern city, the hospital service building typically accommodated the kitchen and laundry, as well as housing the hospital’s male and female help. “The hospital kitchen should be planned like a modern factory—that is, to receive the raw material and to deliver the finished product (which is palatable food) with as few lost motions and delays as would be expected by a modern manufacturer in his factory,” recommended Stevens.⁵² At the Ottawa Civic Hospital, the section (Figure 15) illustrates how food carts were sent through tunnels to elevators in the main building and the food was then served from ward kitchens. The ranges, steamers, deep sinks, and refrigerators were carefully arranged in the spacious main kitchen (Figure 16) according to studies aimed at reducing wasted steps. These recommended a single focal point, with

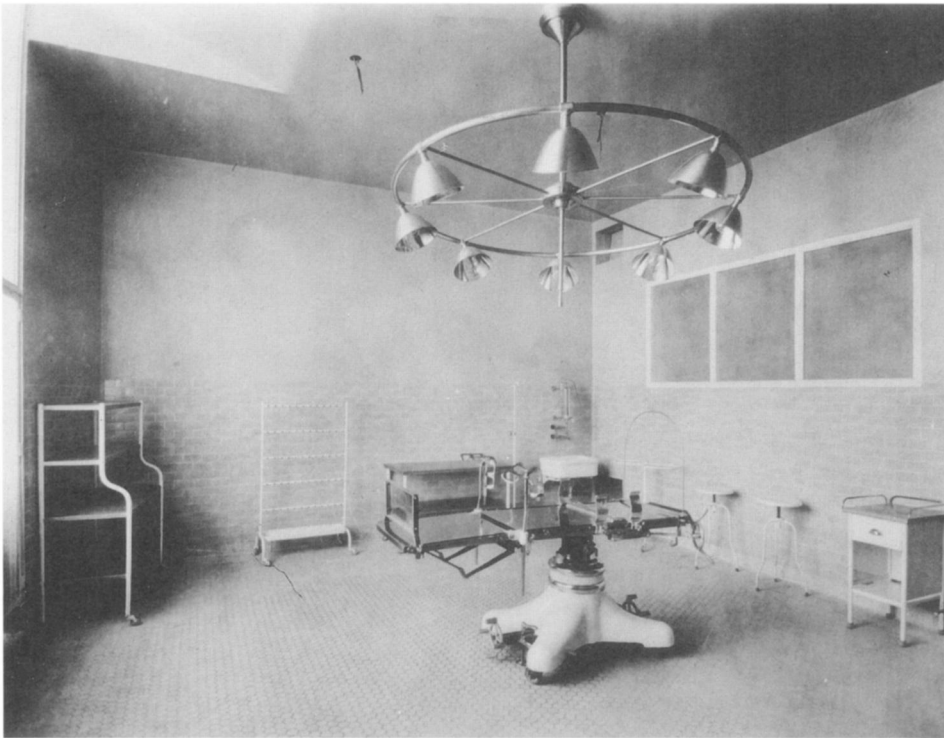


FIGURE 19: Stevens and Lee, Ottawa Civic Hospital, 1926, delivery room

FIGURE 20: Ross and McFarlane, Chateau Laurier Hotel, 1909–1912, Ottawa; 1927–1930 addition by John S. Archibald and John Schofield included extensive health facilities (*Journal of the Royal Architectural Institute of Canada* 7 [November 1930], 393)

carts traveling a minimum distance and equipment accessible from all four sides.

The new laundry (Figures 17, 18) at the Royal Victoria Hospital, designed by Ross and Macdonald in 1931, is evidence that Stevens and Lee were not the only hospital architects concerned with isolating the more industrial functions from the patients and encouraging factory-style production. The stark, undecorated spaces of the hospital laundry meant that soiled linen could go from the sorting room, through the laundering process (washer, extractor, flatwork ironer, drying

tumbler, and steam press), to the clean linen room. The challenge for architects of the hospital laundry was related to the design of other institutional building types, like hotels, which likewise tried to handle soiled materials discreetly and give (at least) the appearance of antiseptic linen.⁵³ Stevens's preference was for strictly linear movement: "An effort should be made to avoid lines of crossing and re-crossing; one process should follow the other until the work is complete."⁵⁴

While the planning of the hospital kitchen and laundry was rational and scientific, only an "image" of progress informed

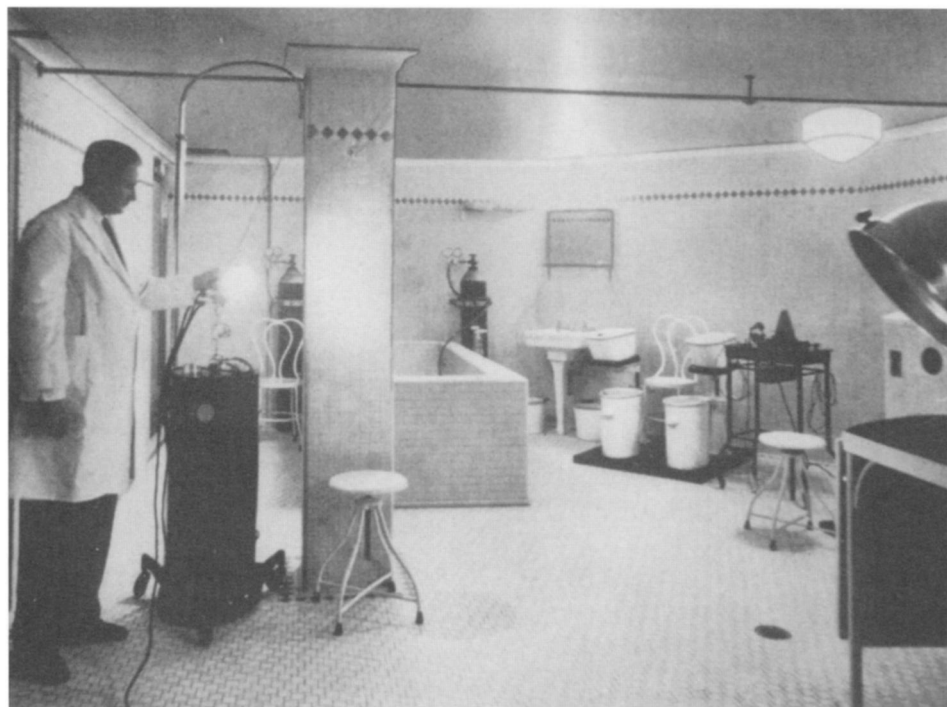


FIGURE 21: Interior view of health facilities added to the Chateau Laurier Hotel, Ottawa, 1927–1930, by John S. Archibald and John Schofield (*The Hydro and Electro Therapeutic Department Turkish Baths & Swimming Pool of the Chateau Laurier Ottawa Canada*, 12)

the design of patients' rooms, most obviously those that were contrived to appear clean and thus germfree, whether they actually were or not. This emphasis on aseptic surfaces had scientific and medical implications, but also economic and ideological ones. Sterilization developed to discourage contact (as opposed to air-borne) infections. But in the interwar period it is difficult to distinguish between an overall desire for cleanliness and an attempt to stop the spread of infection. In addition, elaborate, labor-intensive procedures marked a major difference between the hotel environment and the hospital. Thus, even though the Pasteur Institute in France had undermined the scientific justification for the fumigation of operating and patient rooms by 1900, and C. V. Chapin's experiments in Rhode Island in 1905 to 1908 had shown that there was no greater incidence of diphtheria and scarlet fever without fumigation, the practice continued into the later 1910s.⁵⁵ The hospital had to be arranged so that such time-consuming procedures could be done as efficiently as possible and, most importantly, could appear to have been done.

The architectural counterpart to the "modern" cleaning products commonly used by hospitals at this time (germicide, sterilizing fluid, disposable water cups, paper towels, in addition to various specialized soaps) was the detail that illustrated how all doors, windows, wall bases, medicine cabinets, closets, and even vents were to be located flush with the wall.⁵⁶ The floors, walls, and ceiling of the 1926 delivery room at the Ottawa Civic Hospital (Figure 19), for example, which appear as a continuous surface without any projecting base or trim, is typical of this trend. All the metal furniture in the room was on wheels, so that the seamless whole could be cleaned (and

viewed) in a single instance. Stevens insisted on the inclusion of a covered flushing floor drain, too, in operating units, so that the entire space could be hosed down.⁵⁷

Water, in fact, was central to Stevens's design philosophy. As previously mentioned, Stevens was an avid supporter of hydrotherapy following his careful study of European hospitals. In 1914 he presented his rather controversial ideas on this and other paramedical therapies in a paper at the annual conference of the American Hospital Association, in St. Paul, Minnesota. In "The Need of Better Hospital Equipment for the Medical Man," Stevens illustrated how American hospitals provided state-of-the-art facilities for the surgeon, while ignoring the needs of medical experts. German hospitals, Stevens argued, provided a better balance, giving ample space to electro-, hydro-, mechano-, dry heat, and light therapies.⁵⁸

More than a decade later, in 1926, Stevens stated that "the careful student of hospital architecture will not dare to plan his buildings without providing facilities for these medical treatments."⁵⁹ By then, however, the tremendous casualties during World War I had increased both public and professional confidence in such treatments.⁶⁰ By this time, too, Stevens could hold up his own designs for the Ross Memorial Pavilion at the Royal Victoria Hospital and the Ottawa Civic Hospital as model buildings in this regard.

Hospitals were not the only building type that featured hydrotherapy departments during the period. In 1930, the Chateau Laurier (Figures 20, 21), a grand railway hotel of 1909–1912 in Ottawa, added a hydro- and electrotherapeutic department that was "the most modern and complete installa-

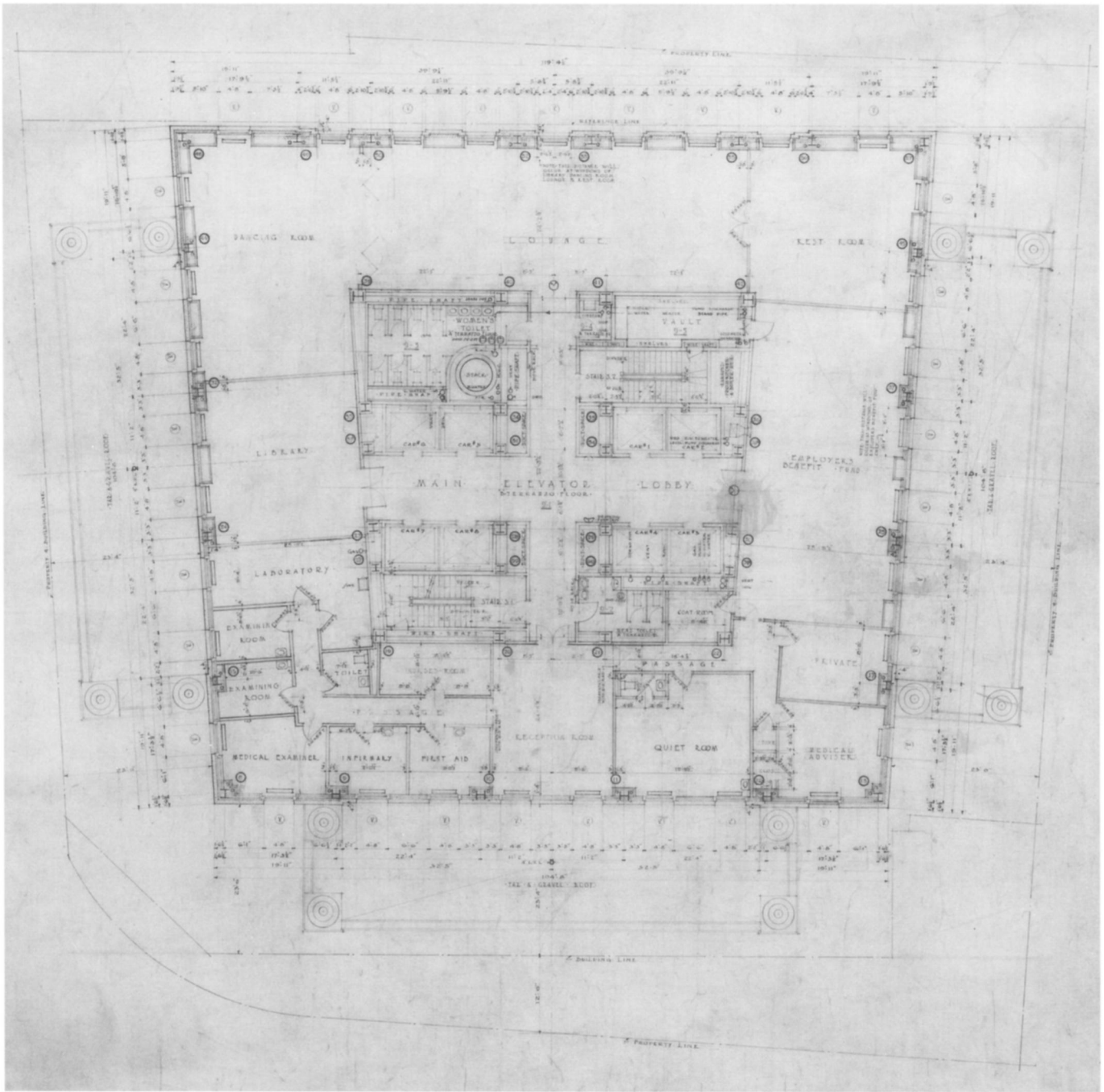


FIGURE 22: Barott and Blackader, Beaver Hall Building, 1928–1929, Montreal, ninth-floor plan showing health facilities

tion of its kind on the continent.” Located next to the hotel cafeteria on the lower level, it offered guests treatments for rickets, infantile paralysis, tuberculosis, kidney and bladder troubles, and a host of other ailments. The department offered quartz ray, diathermy, an autocondensation cushion, a Nagle-schmidt couch, carbonic acid baths, ultraviolet rays, and Schnee baths. Electrical treatments were also available in the individual hotel rooms; a trained nurse was in “constant attendance,” and James F. Ball, the hotel’s electrotherapist, accepted “no patients for treatment unless such treatment [was] prescribed by the patient’s own doctor.”⁶¹

Similarly, Montreal’s luxurious 1,046-room Mount Royal Hotel (designed by Ross and Macdonald), which opened in 1922, included facilities for surgery on its first floor and special nurses for the care of sick children.⁶² And Montreal’s twenty-story Beaver Hall Building of 1928–1929, the prestigious headquarters of the Bell Telephone Company of Canada, designed by Barott and Blackader, included an entire floor (Figure 22) of medical facilities, including two examination rooms, a laboratory, an infirmary, a first-aid room, an office for the medical advisor, and a “quiet room” for women.⁶³

Juxtaposing hotels, office buildings, and hospitals of the

1920s and 1930s should make us question the very idea of modern building types. New practices, like hydrotherapy, transcended these types. And the design issues facing the architects of the industrial sectors of the buildings overlapped considerably. Hospital kitchens and laundries, including those by Stevens and Lee, were featured in journals such as *The Canadian Hotel Review*, just as hotel facilities held great interest for hospital administrators and architects.⁶⁴

In many ways, the hospital of the 1920s was consciously modeled on the city. Reciprocally, buildings like the Chateau Laurier, the Mount Royal Hotel, and the corporate headquarters of Bell Telephone used hospital architecture to complete their image as a miniature city. The medical facilities at the Mount Royal, for example, were described as “completing the final link which would permit of a guest remaining constantly in doors yet having everything which the city outside could offer.”⁶⁵

Hospitals, hotels, and office buildings of the 1920s were all multipurpose megastructures designed as miniature cities in order to overcome what were increasingly viewed as the disadvantages of urban life, especially overcrowding and commuting. In an essay published in 1929 entitled “A City under a Single Roof,” Raymond M. Hood outlined his solution for New Yorkers to “save time and rush.” Hood’s tall buildings (at least thirty-five stories) were to occupy three city blocks and include stores, theaters, offices, clubs, restaurants, hotels, and housing. “Put this worker in an unified scheme and he need hardly put his feet on the sidewalk during the entire day. His business, his lunch, his club and his apartment are all in the same building. The time he saves goes either into recreation or into greater production,” reported Hood, drawing directly on the rhetoric of Taylorism.⁶⁶

Real hotels and hospitals shared other architectural effects as well. In the case of the Chateau Laurier, as well as in the domestic sectors of the hospital, historicist imagery, on the exterior of the building at least, had a very purposeful symbolic function: as an ideological cover for social change. For example, the use of the “big house” look for women’s buildings was extremely persuasive.⁶⁷ Its blatant domestic imagery smoothed the transition for middle-class women to the world of paid work, while at the same time offering the promise of gentle protection in that realm. The homey interiors underlined this message. Lounges for nurses, such as the one at the Kingston General Hospital (Figure 23), were furnished with comfortable chairs and tables, typical of middle-class houses at the time. The furniture was arranged casually, loosely grouped around fireplaces and pianos, intended to simulate intimate, homelike gatherings.

Historicist imagery functioned in various ways in other segments of the hospital. On the exterior of the hospital service building, for example, it clearly blanketed the structure’s utilitarian role. On the other hand, such imagery was banned in operating suites in order to ensure the image of sterile, aseptic, modern medicine. And in terms of the hospital’s urban image, a dignified exterior treatment almost certainly reflected the dependence of hospitals on charitable donations. In the design of the original Royal Victoria Hospital by British architect Henry Saxon Snell in 1889–1893, for example, the multiple references to Scottish baronial architecture presumably pleased the hospital’s founders and administrators, many of whom had emigrated from Scotland. Stevens opted to employ this same architectural vocabulary in his two major additions to the building.

FIGURE 23: Stevens and Lee, Kingston General Hospital, Kingston, nurses’ lounge of 1927





FIGURE 24: Stevens and Lee, Hôpital Notre-Dame, Montreal, about 1930, superintendent's office

Stevens considered the exterior imagery of his hospitals almost incidental to the plan. He frequently mentioned the “psychological effect” of the hospital’s exterior in his publications:

The severe, barren, forbidding exterior of the old hospital has given way to a studied architectural treatment, pleasing to the patient and the public. The small extra cost of a well designed exterior is more than repaid in its psychological effect on the entering patient and the visitor. If the patient can enter with the right impression of the institution, such impression reacts for the good of the patient’s convalescence.⁶⁸

The psychological effects of historicist decoration were especially important in the design of the hospital’s administration department, which also relied on the image of the big house to conjure up images of comfort, trust, traditional values, and dependability. Stevens described an ideal administration department in purely psychological terms:

The entrance to this department should be carefully studied from the psychological standpoint, with reference to the effect on the would-be patient. Decoration should play an important part in it. The

architect should be allowed to depart from the severe design which characterizes other portions of the building, though over-elaboration should be avoided on account of its obvious expense.⁶⁹

On the question of style, the architect pointed to the plan. In his chapter on “Details of Construction and Finish,” he explained:

The exterior details of the hospital should be made to conform to the style of architecture in which the building is designed and should be left to the architect, it being borne in mind that the detail and exterior treatment should be subservient to the plan; in other words, the exterior should be designed around the plan, and not the plan made to suit the elevation as is so often the case.⁷⁰

This attitude is reiterated in Stevens’s published works, where he insisted, over and over again, that the test of a good hospital was its plan. He even went so far as to describe its importance in terms of a percentage. As early as 1915, he argued in *Architectural Record*:

Unlike most architectural problems, the *plan* of the hospital is the strongest factor in the design. . . . While the design should never be overlooked, the plan should hold at least eighty per cent of importance

of the entire structure; and if the plan is right, we should be able to clothe it properly.⁷¹

In the Foreword to his book, Stevens restated this notion that the plan of the building and its exterior were separate domains, even inferring that the latter might not require his expertise. “While many exterior designs are here shown, no attempt has been made to discuss architectural style, forms of construction or building material, since these may not differ from those of other classes of buildings.”⁷² This tendency to separate style and plan was most evident in the important behind-the-scenes role played by Stevens, for example, on projects designed by other, often local, architects. On Percy Nobbs’s Pathological Building of 1924 for the Royal Victoria Hospital, for example, Stevens and Lee were hired as consulting architects. They were paid a fee of 1 percent for their thorough critique of Nobbs’s designs in 1922.⁷³ Not surprisingly, their comments focused on the plan.⁷⁴ It is also clear from the hospital’s copies of Stevens’s correspondence that his knowledge of parallel institutions and connections to other experts, particularly physicians, were considered essential aspects of his expertise.⁷⁵

The larger lesson of Stevens’s words versus his hospitals illuminates the inherent danger of regarding historicist building types as anti-Modern or necessarily conventional and reveals the paucity of stylistic interpretations of all architecture, the mode of most architectural historians until the 1970s. Purely formalistic approaches to architecture have resulted in the widespread misinterpretation of interwar hospitals as reactionary, or at best anti-Modern. And what it has meant for the history of hospitals in particular is that huge interwar buildings, like those of Stevens and Lee, are generally omitted from studies of the building type (not to mention studies of Modernism), seen, mistakenly, as simple reverberations of the earlier model. In the only comprehensive study of hospitals as a building type, for example, authors John D. Thompson and Grace Goldin skip from the Johns Hopkins Hospital in Baltimore, 1885, to skyscrapers of the post-1930 period. Goldin’s new book, *Work of Mercy*, follows this same pattern.⁷⁶ The hospital’s structure, its endorsement of aseptic medical practice, its sanctioning of expert knowledge, its appeal to new patrons, its encouragement of new ways of working, its response to urbanization, its use of zoning, its acceptance of modern social structures, its resemblance to other modern building types, its embrace of internationalism, and its endorsement of standardization were entirely modern.

Hospital architecture as a primary source tells us something different from textual sources in the history of medicine. Many historians of medicine who have considered the idea of the modern hospital between 1890 and 1930—Morris Vogel,

Charles Rosenberg, Rosemary Stevens, Lindsay Granshaw, and David Gagan, to name a few—have for the most part charted a rather smooth “transformation of general hospitals . . . from marginally useful agencies of medical charity into socially and medically indispensable centers for the scientific treatment of disease.”⁷⁷ The buildings of Stevens and Lee, however, reveal a certain degree of reluctance to accept fully the aesthetic of Modernism, well into the 1920s.

Modernism, to Stevens and his generation, literally meant clothing modern plans in historic dress in order to smooth the effects of social change. Historicism, in fact, was an important part of making the hospital modern, especially in its role of cushioning some of the less pleasant effects of urban life. The overall image of the modern factory for healing was simply too sterile or too scary for post-World War I society. Good health was still related in a real way to traditional values, through the symbols of home and the values associated with traditional architecture. Hospitals, in fact, relied on the likeness of the big, safe house to convince middle-class city dwellers that their chances were as good there as at home, especially to those who might pay much-needed extra fees for semiprivate or private accommodation. This may have been the intention of a photograph of the superintendent of Hôpital Notre-Dame (Figure 24), who clearly rearranged his office so that the perspective of the new building would appear in the image.

Or maybe medicine in the 1920s was not as scientific (diagnostic/therapeutic) as historians of medicine have led us to believe. Many different “styles” of medicine were practiced in similar buildings; perhaps the seemingly arbitrary historical references made by architects like Stevens are illustrations of how hospitals responded to and encouraged social changes in health practices. Technologies at the end of the nineteenth century, like X-ray, or like the ECG at the turn of the century, were apparently used mostly for confirmation or merely to satisfy physicians’ curiosity (rather than as a tool for diagnosis as they are today), and this continued until well after World War I. As historian of medicine Joel Howell has noted, “The mere existence of diagnostic technology did not dictate how or where it would be used; both hospital and machine had to change before the x-ray or any other machine could significantly influence the utilization of hospital care.”⁷⁸

Modernist imagery did not come to typical urban general hospitals until the 1930s and really not in full force until the undecorated white boxes of the 1950s. By then, there was no reason to stem the optimism for an ever-increasing scientific medicine. Stevens retired due to ill health in 1943. In the fall of 1940, he remarked with unusual ambivalence: “It is to be noticed that the majority of the newer large hospitals all over the world have applied the so-called modernistic architectural detail to the exterior design. This is a good sign,” he said.⁷⁹

Notes

This paper is part of a larger study of interwar hospital architecture funded by FCAR and the Hannah Institute for the History of Medicine. I am especially indebted to research assistant David Theodore for many of the insights presented here. The suggestions of Eve Blau, Adrian Forty, Peter Gossage, Greg Hise, Joel D. Howell, David C. Sloane, Christine Stevenson, Abby Van Slyck, and an anonymous reviewer have also been extremely useful. Isabelle Gournay provided references to many of the articles by and about Stevens. Celine Lemercier collected relevant material at Hôpital Notre-Dame, Hôpital Sainte-Justine, and the Sir Mortimer B. Davis Jewish General Hospital of Montreal. An earlier version of this paper was presented at the annual meeting of the SAH in 1998, where Robert Bruegmann and Sandy Isenstadt made helpful suggestions for its improvement.

¹ Edward F. Stevens, *The American Hospital of the Twentieth Century*, 2nd rev. ed. (New York, 1928), 139.

² Stevens built the west wing in 1923 and the east wing in 1931.

³ Note that Stevens's design for Notre-Dame included a small teaching amphitheater, typical of his teaching hospitals. In 1932 he referred to the amphitheater operating room as "almost a thing of the past except in intensive teaching hospitals." See Edward F. Stevens, "The Trend in Hospital Construction on the North American Continent," *The Canadian Hospital Annual Reference Number 9* (January 1932): 26. His ideas on operating rooms were articulated in his articles on the subject. See Edward F. Stevens, "The Surgical Unit," *Modern Hospital 1* (September 1913): 18–21; Harold L. Foss and Edward F. Stevens, "An Ideal Operating Suite," *Modern Hospital 44* (February 1935): 65–69.

⁴ An account of the disappearance of the surgical amphitheater is given in Owen H. Wangenstein and Sarah D. Wangenstein, *The Rise of Surgery: From Empiric Craft to Scientific Discipline* (Minneapolis, 1978), 453–473.

⁵ Stevens, *American Hospital*, 140 (see n. 1).

⁶ Stevens stated as early as 1932 that "the old skylight is rarely seen" and that artificial illumination was generally preferred to daylight. Windows, however, were still used for ventilation. See Stevens, "The Trend in Hospital Construction," 26 (see n. 3).

⁷ "Notre Dame Hospital, Montreal, Completes \$1,500,000 Building Program," *Canadian Hospital 9* (June 1932): 17.

⁸ More research is needed to determine the geographic extent of these trends. Some hospitals in Europe in the 1920s also combined traditional exteriors and modern planning. I am grateful to Adrian Forty and Christine Stevenson for pointing to the Middlesex Hospital, in London, as an interesting parallel to the work of Stevens and Lee. Designed by Alner W. Hall in 1927–1935, the new building was built in phases. Its H-plan included modern features: medical and surgical wards, separate space for women, four large operating theaters. Middlesex Hospital is red brick and Portland stone, supported by a steel frame. It is described in Harriet Richardson, ed., *English Hospitals 1660–1948* (Swindon, Wilts., 1998), 37–38, as "a still fashionable neo-Georgian, perhaps with a few transatlantic overtones." For a history of the institution, see Hilary St. George Saunders, *The Middlesex Hospital 1745–1948* (London, 1949). On the influence of many American institutions, excluding hospitals, on European architecture, see Jean-Louis Cohen, *Scenes of the World to Come: European Architecture and the American Challenge* (Paris/Montreal, 1995).

⁹ This number is mentioned in several obituaries. See "E.F. Stevens, Architect, Dies in 86th Year," *Boston Herald*, 1 March 1946, and "Edward F. Stevens, Noted Architect, 85," *New York Times*, 1 March 1946, 22. Stevens appears in several biographical sources, notably *National Cyclopaedia of American Biography* (1927), B: 244–245; *Who Was Who In America* (1942–1951), 2: 509; and *Who's Who* (1941–1942), 2370.

¹⁰ The articles in medical and architectural journals about Stevens and Lee's hospitals are too numerous to list here. The firm received particularly good coverage in *Modern Hospital*, *Construction*, *Architectural Record*, and *Canadian Hospital*. On their World War I hospitals, see Edward F. Stevens, "Our War Hospitals in France," *Architectural Record 43* (March 1918): 257–284; Edward F. Stevens and Charles Butler, "Our Overseas Hospitals," *American Architect 113* (12 June 1918): 785–800.

¹¹ Letter from Elizabeth Andrews, Reference Archivist, Massachusetts Institute of Technology, 10 February 1995.

¹² See "Some Recent Hospitals by Kendall, Taylor & Co.," *Architectural Record 41* (March 1917): 231–253.

¹³ Brown recounted their impressions in two articles in *Hospital World 1* (March 1912): 166–172, and (April 1912): 244–265. On his career, see *The Canadian Men and Women of the Time*, 2nd ed. (Toronto, 1912), 155.

¹⁴ Letter from Stevens to D. M. Robertson, Superintendent of the General Protestant Hospital, Ottawa, 12 March 1920, Ottawa City Archives, RG MG38, box 62.

¹⁵ Stevens frequently noted the lack of provisions for various therapies in American hospitals by showing slides of European examples. See *Hospital World 6* (December 1914): 251–252; "The Need of Better Hospital Equipment for the Medical Man," *Modern Hospital 3* (December 1914): 367–371.

¹⁶ The formation of their partnership was announced in *Hospital World 1* (March 1912): 210.

¹⁷ The biographical information on Lee is scanty. See *Who's Who in Canada* (1925–26), 179–180.

¹⁸ A description of the TGH is in "The New Toronto General Hospital," *Hospital World 4* (July 1913): 36–45, although the architects are unnamed. Lee alone signed the ground floor plan reproduced in Joan Hollobon, *The Lion's Tale: A History of the Wellesley Hospital 1912–1987* (Toronto, 1987), 17.

¹⁹ These buildings have been the subjects of institutional and local histories. See Denis Goulet, François Hudon and Othmar Keel, *Histoire de l'Hôpital Notre-Dame de Montréal 1880–1980* (Montreal, 1993); Shelley Hornstein, "The Architecture of the Montreal Teaching Hospitals of the Nineteenth Century," *Journal of Canadian Art History 14* (1991): 12–24; D. Sclater Lewis, *Royal Victoria Hospital 1887–1947* (Montreal, 1969); Neville Terry, *The Royal Vic* (Montreal, 1994); Margaret Angus, *Kingston General Hospital: A Social and Institutional History* (Montreal, 1973); and James De Jonge, "Metamorphosis of a Public Institution: The Early Buildings of Kingston General Hospital," *Society for the Study of Architecture in Canada Bulletin 22* (September 1997): 74–82.

²⁰ Interwar hospitals are not included in Nikolaus Pevsner, *A History of Building Types* (Princeton, 1976), 139–158, or John D. Thompson and Grace Goldin, *The Hospital: A Social and Architectural History* (New Haven, 1975). An interesting exception is Isabelle Gournay, "L'Architecture hospitalo-universitaire," *Journal of Canadian Art History 13* and *14* (1990 and 1991): 26–43. See also Adrian Forty, "The Modern Hospital in England and France: The Social and Medical Uses of Architecture," in Anthony D. King, ed., *Buildings and Society: Essays on the Social Development of the Built Environment* (London, 1980), 72–79; Christine Stevenson, "Medicine and Architecture," in *Companion Encyclopedia of the History of Medicine*, ed. W. F. Bynum and Roy Porter (London, 1993), especially 1512–1514. Sociomedical histories which touch on hospital architecture/medical space include: Lindsay Prior, "The Architecture of the Hospital: A Study of Spatial Organization and Medical Knowledge," *British Journal of Sociology 39* (1988): 86–113; S.E.D. Shortt, "The Hospital in the Nineteenth Century," *Journal of Canadian Studies 18* (1983–1984): 1–14.

²¹ "Completes \$1,500,000 Building Program," 17–26 (see n. 7).

²² See "The Hospital and the Community It Serves," *The Modern Hospital Year Book 1* (1919): 17–19.

²³ Stevens, *American Hospital*, 5–6 (see n. 1).

²⁴ A copy of this detail, dated 20 August 1925, is in the Archives of Ontario, Arthur Heeney Jr. Collection, C-27, series D.

²⁵ "Hospital Noises and How to Minimize Them," *Modern Hospital 24* (June 1925): 511. See also "Sound Absorption, Insulation and Air Control: An Important Trio," *Modern Hospital 45* (October 1935): 88–92.

²⁶ Stevens used Celotex in the corridors of the Ross Pavilion at the Royal Victoria Hospital; see R. L. Lindahl, "Relieving the Noise Evil in Hospitals," *The Canadian Hospital Annual Reference Number 9* (January 1932): 36.

²⁷ See "Preparing the Trays," *International Hospital Record—Hospital Matron* (15 September 1914): 10.

²⁸ On the history of linoleum, see Pamela H. Simpson, "Linoleum and Lincrusta: The Democratic Coverings for Walls and Floors," in *Perspectives in Vernacular Architecture, VII*, ed. Annmarie Adams and Sally McMurry (Knoxville, 1997), 281–292.

²⁹ The supplier of rubber to the Royal Victoria Hospital in 1926, Gutta Percha & Rubber, Ltd., of Toronto, expressed considerable hesitation in this specification, stating that the plans for rubber on the walls and ceiling were "something quite beyond our sphere." See letter from J.H.S. Kerr to H. E. Webster, 10 May 1926, in possession of the Royal Victoria Hospital.

³⁰ Harold J. Smith, "The Development and Planning of a Large General Hospital," *Construction 17* (December 1924): 370. The subject of flooring was

often discussed in the professional literature. Stevens's ideas on hospital floors were articulated in "More About Hospital Floors," *International Hospital Record* 18 (December 1914): 9, and "A Discussion of Hospital Floors," *International Hospital Record—Hospital Matron* (15 September 1914): 5; see also "The Trend in Hospital Construction," 31–32 (see n. 3).

³¹ "Ross Pavilion of The Royal Victoria Hospital," *Construction* 10 (June 1917): 191; a contemporary comparison of a hotel and hospital lobby is found in Lionel H. Pearson, "Some Modern American Hospitals," *Architects' Journal* (28 October 1925): 643.

³² Stevens, *American Hospital*, 28 (see n. 1).

³³ "A Heated Garage For Hospital Doctors," *Canadian Medical Association Journal* 22 (January 1930): 108–109.

³⁴ These statistics are from Dr. M. T. MacEachern, "What Is Hospital Standardization?" *McGill News* 3 (September 1922): 8. On standardization in general, see Edward T. Morman, ed., *Efficiency, Scientific Management, and Hospital Standardization: An Anthology of Sources* (New York, 1989); George W. Stephenson, "The College's Role in Hospital Standardization," *Bulletin of the American College of Surgeons* (February 1981): 17–29; Rosemary Stevens, *In Sickness and in Wealth: American Hospitals in the Twentieth Century* (New York, 1989), 105–139.

³⁵ Examples of these include "Introduction to the Architectural Check Lists," *Hospital Yearbook* 13 (1934): 1–2; *Hospital Yearbook* 14 (1935): entire issue.

³⁶ See "Introduction to the Architectural Check Lists," *The Hospital Yearbook* 13 (1934): 1–2. Goldwater's obituary stated that he was also a registered architect and an "advisory construction expert for 156 hospitals in the United States, Canada, Newfoundland and British Columbia." See "Dr. S.S. Goldwater is Dead Here at 69," *New York Times*, 23 October 1942, 21.

³⁷ This "negotiation of cognitive exclusiveness" as essential to the development of specialist professions is explained by sociologist Magali Sarfatti Larson, *The Rise of Professionalism: A Sociological Analysis* (Berkeley and Los Angeles, 1977), 15–18, 30–31. For a discussion of how architects did the same thing, see Dell Upton, *Architecture in the United States* (Oxford, 1998), 247–283.

³⁸ Edward F. Stevens, "How Ottawa Is Solving Its Hospitalization Problem," *Modern Hospital* (January 1926): 69.

³⁹ Edward F. Stevens, "The Trend in Hospital Construction," 24 (see n. 3).

⁴⁰ "The Last Word in Hospital Design," *Contract Record and Engineering Review* 38 (21 May 1924): 486.

⁴¹ Jeremy Taylor, *The Architect and the Pavilion Hospital: Dialogue and Design Creativity in England, 1850–1914* (London and New York, 1997). My own review of the book is forthcoming in *Victorian Studies*.

⁴² Forty, "Modern Hospital" (see n. 20); Anthony King, "Hospital Planning: Revised Thoughts on the Origin of the Pavilion Principle in England," *Medical History* 10 (1966): 360–373.

⁴³ An interesting discussion of the apparent flexibility (related to increased occupation) of a hospital of all private rooms is found in Thompson and Goldin, *The Hospital*, 207–225 (see n. 20).

⁴⁴ Henry Ford (in collaboration with Samuel Crowther), *My Life and Work* (London, 1923), 216.

⁴⁵ Stevens, *American Hospital*, 42 (see n. 1).

⁴⁶ Edward F. Stevens, "The Open Ward vs. Single Rooms," *Modern Hospital* 18 (March 1922): 233. Thompson and Goldin have noted how the trend toward private accommodation was completely obliterated by the Depression, as almost instantly nobody at all could afford private rooms and hospitals remodeled them as semiprivate. See Thompson and Goldin, *The Hospital*, 216 (see n. 20).

⁴⁷ "Montreal Jewish General Hospital Opens With Impressive Ceremony," *Canadian Hospital* 11 (November 1934): 5.

⁴⁸ Joel D. Howell, *Technology in the Hospital: Transforming Patient Care in the Early Twentieth Century* (Baltimore, 1995), 30–68. On the impact of Taylorism and scientific management in general, see Siegfried Giedion, *Mechanization Takes Command: A Contribution to Anonymous History* (New York, 1948), 77–127.

⁴⁹ Stevens, *American Hospital*, 497 (see n. 1).

⁵⁰ "Construction Section," *Transactions of the American Hospital Association* 29 (1927): 369–370.

⁵¹ *Montreal General Hospital 106th Annual Report* (1927), 72.

⁵² Stevens, *American Hospital*, 443 (see n. 1).

⁵³ On the hotel laundry, see "A Modern Hotel Laundry," *Canadian Hotel Review* 5 (November 1927): 13–14. The sanitary reform of hotels, Pullman cars,

and restaurants is included in Nancy Tomes, *The Gospel of Germs: Men, Women, and the Microbe in American Life* (Cambridge, 1998), 172–182.

⁵⁴ Stevens, *American Hospital*, 468 (see n. 1).

⁵⁵ D. L. Richardson, "The Fetish of Fumigation—A Relic of the Past," *Modern Hospital* 33 (August 1929): 90–91; "Should Private Rooms be Disinfected After Patients with Simple Infections Have Left Them?" *International Hospital Record* (25 September 1914): 8.

⁵⁶ See William A. Pite, "Hospital Operating Theatres," *Architects' Journal* (24 June 1925): 972.

⁵⁷ Edward F. Stevens, "Surgical Units," *Modern Hospital* 1 (September 1913): 18–21.

⁵⁸ Stevens's paper was published within months of the conference. Edward F. Stevens, "The Need of Better Hospital Equipment for the Medical Man," *Modern Hospital* 3 (December 1914): 367–371, and *Hospital World* 6 (December 1914): 253–258. The stormy reception of his ideas is suggested in "Urges Elaborate Hospitals," in *Hospital World* 6 (November 1914): 227–228.

⁵⁹ Edward F. Stevens, "The Physiotherapy Department of the American Hospital," *Architectural Record* 60 (July 1926): 18.

⁶⁰ See Glenn Gritzer and Arnold Arluke, *The Making of Rehabilitation: A Political Economy of Medical Specialization, 1890–1980* (Berkeley, 1985), 58; Gerald Larkin, "The Emergence of Para-Medical Professions," *Companion Encyclopedia of the History of Medicine*, ed. W. F. Bynum and Roy Porter (London, 1993), 1333.

⁶¹ *The Hydro and Electro Therapeutic Department Turkish Baths & Swimming Pool of the Chateau Laurier*, brochure from about 1930, in the Osler Library, McGill University. The therapeutic facilities are also described in "The New Chateau Laurier, Ottawa," *Journal of the Royal Architectural Institute of Canada* 7 (November 1930): 393–411.

⁶² "Install Hospital and Surgery for Stricken Guests," *Montreal Star* (16 December 1922): 25.

⁶³ "The Bell Telephone Building—An Imposing Montreal Structure," *Contract Record and Engineering Review* (December 1926): 266–267; "The Beaver Hall Building, Montreal," *Journal of the Royal Architectural Institute of Canada* 6 (October 1929): 353–372.

⁶⁴ See "A Wonderful Diet Kitchen," *Canadian Hotel Review* (January 1928): 17–19, 60; "The New Kitchens Sainte-Justine Hospital," *Canadian Hotel Review* (April 1928): 20–22.

⁶⁵ "Install Hospital and Surgery for Stricken Guests," 25 (see n. 62).

⁶⁶ Hood's essay is published in Manfredo Tafuri, *The Sphere and the Labyrinth: Avant-Gardes and Architecture from Piranesi to the 1970s* (Cambridge, 1987), 191–195.

⁶⁷ Annmarie Adams, "Rooms of Their Own: The Nurses' Residences at Montreal's Royal Victoria Hospital," *Material History Review* 40 (1994): 29–41.

⁶⁸ Edward F. Stevens, "The Trend in Hospital Construction," 24 (see n. 3).

⁶⁹ Stevens, *American Hospital*, 27 (see n. 1). Stevens suggested that hospitals should reflect their surroundings, i.e., that suburban hospitals should appear more domestic, while urban hospitals should be more "stately." See Edward F. Stevens, "What the Past Fifteen Years Have Taught Us in Hospital Construction and Design," *American Architect* 132 (5 December 1927): 705.

⁷⁰ Stevens, *American Hospital*, 493 (see n. 1).

⁷¹ Edward F. Stevens, "The American Hospital Development, Part I," *Architectural Record* 38 (December 1915): 645.

⁷² Stevens, *American Hospital*, n.p. (see n. 1).

⁷³ Letter from the Royal Victoria Hospital Superintendent to Edward F. Stevens, 10 April 1922, in possession of the hospital.

⁷⁴ Letter from Stevens to Prof. P. E. Nobbs, 1 May 1922, in possession of the Royal Victoria Hospital.

⁷⁵ Stevens claimed he was "consulting with some of the best men in their line in order to get the 'last word'" in a letter to H. E. Webster, Superintendent of the Royal Victoria Hospital, 3 May 1922, in possession of the hospital.

⁷⁶ Grace Goldin, *Work of Mercy: A Picture History of Hospitals* (Erin, Ontario, 1994).

⁷⁷ David Gagan, "A Necessity Among Us": *The Owen Sound General and Marine Hospital 1891–1985* (Toronto, 1990), 28.

⁷⁸ Joel D. Howell, "Machines and Medicine: Technology Transforms the American Hospital," in *The American General Hospital: Communities and Social Contexts*, ed. D. E. Long and J. Golden (Ithaca, 1989): 132.

⁷⁹ Edward F. Stevens, "Newer Trends in Hospital Plans and Equipment," *Hospitals* 14 (October 1940): 83.

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