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Author(s): Dietrich Neumann

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“The Century’s Triumph in Lighting”: The Luxfer Prism Companies and their Contribution to Early Modern Architecture

DIETRICH NEUMANN, Brown University

To characterize this new prism as one of the most remarkable improvements of the century in its bearing on practical architecture, is to speak but mildly. In the opinion of some of the foremost architects of this country the Luxfer prism is destined to work an entire revolution in planning and to necessitate very extensive changes in construction. The building material that was so enthusiastically praised by the Inland Architect in 1897, and shortly after was even proclaimed to be the “century’s triumph in lighting,” was indeed about to have a considerable impact on the commercial architecture of America’s urban centers. The idea seemed surprisingly simple. Window glass with horizontal prismatic ribs on the inside would redirect the light from outside and cast it deeply into a room, thus bringing the surplus of light near the window into areas that it had not previously reached [Figure 1]. The material was offered as the ideal solution for the developers of commercial architecture caught between the need for large floor areas and the quest for well-lit offices. The promotional brochures claimed that prismatic glass provided so much light in the back of a room that one could not only save the energy of artificial lighting but often could gain additional floor space by omitting light wells in the center of a building or by using well-lit basements as offices.

Prismatic glass was the most sophisticated and complex development among the many attempts in the last decades of the nineteenth century to bring more daylight into the dark interiors of factories and densely built urban centers. Innovative approaches included reflective white enameled terracotta for the walls of light courts and large mirrors to reflect light from the façade into the interior. Numerous new glass products for building purposes were developed in Europe and the U.S. Among them were early prototypes of hollow glass blocks and heavy load-bearing slabs of glass bringing light into basement rooms from the floor above, or into staircases in light wells.

Several products made use of the well-known optical principle that light changes its direction when it passes from one medium to another, as from air to water or, in this case, glass. Throughout the eighteenth and nineteenth centuries conically shaped glasses already had been used to redirect light into dark rooms in basements or in ships. Thaddeus Hyatt, one of the pioneers of American concrete construction, patented different systems of glass cones and lenses in metal or reinforced concrete frames for sidewalks from 1845 onwards. They were so successful that many early American building codes recommended these so-called Hyatt Lights as a fireproof light source for basements. Translucent, light-diffusing glasses such as rough plate glass, ground on both sides, or corrugated glass with horizontal grooves were used from the 1880s onwards to provide factories with an evenly distributed light. Corrugated glass had the additional effect of refracting a large part of the light deeper into the room and gained some success in New England’s factories as “factory ribbed glass.”

The product that came closest to the development of the new prism glass was the so-called stallboard light, which had been developed in England in 1883 and quickly had become a standard feature in British commercial architecture. It consisted of square glass tiles with horizontal v-shaped ribs on the inside, which were set in rows in a metal frame, adjacent to the pavement lights at the bottom of the exterior wall or above the display window. The brilliance created by these prismatic stallboard lights was reportedly so powerful that the employees had to rearrange their desks in order not to be blinded by the sudden surplus of light. Similar ideas were patented at the same time by a number of individual inventors both in Europe and the U.S. Among them was the British inventor James Pennycuick, who filed a U.S. patent in 1882, which was eventually to provide the basis for the Luxfer Company’s success. He proposed window glass with prismatic ridges on the inside, which would “double the quantity of reflection or illumination of the plain window-glass of the same size.” After a number of unsuccessful attempts at finding commercial support for his “improvement in window glass,” Pennycuick founded the “Radiating Light Company” of Chicago in 1896 with a small group of local entrepreneurs. This company...
succeeded in winning the support of a number of prominent Chicago businessmen, including William H. Winslow, Edward C. Waller, Cyrus H. McCormick, George A. Fuller, Charles H. Wacker, and Levi Z. Leiter. The company’s first president was John Meiggs Ewen, one of the leading building engineers of Chicago. In April 1897 the company adopted the name “Luxfer,” referring to the Latin lux for light and ferre, meaning to carry.

Luxfer Prisms
The financial power of Luxfer’s shareholders was the key factor behind the enormous success of the product in the following years. It provided the means necessary to refine the prismatic glass technically, to develop a full product range, to submit and defend patents, and, perhaps most importantly, to develop a comprehensive and sophisticated marketing strategy. Unlike other building materials prismatic glass was advertised with an ambitious concept clearly aimed at the concerns of prosperous and educated downtown businessmen and their architects. Luxfer promised substantial savings thanks to an increase in available space and better working conditions, and it claimed that prismatic glass would contribute to the development of modern architecture. The new, expensive product appeared on the market at a moment when a widespread enthusiasm for the accomplishments of modern technologies was joined by a growing awareness for the values of a simple life in harmony with nature. Prismatic glass was praised as both a product of scientific progress and a remedy for some of the negative effects of modern civilization, such as the disadvantages of artificial light or the darkening of streets due to skyscrapers and elevated railroads. The material was presented as a natural, healthier, and even more spiritual alternative to current technologies: “Prisms, without loss, without any cost of maintenance, displace gas and electric lights, and in their place give pure, healthful light. Heat, noxious vapors, dirt and disease give way before the Creator’s pure light of day.”

The company hired the prominent physics professor and spectroscopist, Henry Crew of Northwestern University, and his assistant, Olin H. Basquin, not only to develop the product further and to explore its potential applications, but also to signal the scientific intent of its enterprise. Through a series of experiments Basquin established the average brightness of the Chicago sky, which directly influenced his calculations for the Luxfer Prism designs. He is still credited today with being the first person to record daylight measurements scientifically.

In contrast to the existing applications such as corrugated glass, stallboard lights, or Pennycuick’s patent, Crew and Basquin aimed at a precisely predictable light refraction. They developed mathematical formulas to calculate specific, individual “prescriptions” for a building’s lighting needs, similar to the way eyeglass prescriptions are precisely adjusted to a patient’s imperfect vision. Crew claimed that their products took direct inspiration from August Fresnel’s mathematically exact system of prismatic lenses, which since 1821 had been the standard equipment for lighthouses all over the world. In January 1898 Crew and Basquin published the Luxfer Company’s Pocket Hand-Book of Useful Information and Tables Relating to the Use of Electro-Glazed Luxfer Prisms, which presented the full product range, a number of calculation tables, technical details
for the installation of the product, and numerous examples of successful applications.20 The company offered three production lines: conventional prismatic basement lights, stained glass, and the widely advertised Luxfer Prisms.

Due to the complicated production process, the prism glass could initially only be produced in small, 4 x 4-inch tiles (larger plates either tended to crack when they were pressed into the mold, or, if they were too hot, to burn off the sharp edges of the mold).21 The prisms were flat on the outside and equipped with twenty triangular horizontal ribs on the inside [Figure 2]. They were about 3/32 inch thick with an additional 5/32 inch for the triangular ribs. Luxfer offered three quality grades of glass and nine degrees of refraction to respond to different lighting situations.22 The tiles were assembled into metal frames, usually two to four feet high and as wide as the opening required, held by a grid of thin metal bars of soldered zinc caming and cement, or the new, sophisticated, and very expensive method of copper electroglazing (see below).23 These prism plates would then be installed in the upper sashes of windows, often replacing the transoms that had previously provided ventilation, or in front of a window as a separate screen, called a “forilux.” In narrow alleyways a protruding canopy could be installed to capture direct light from above (so-called zenith-light) [Figures 3, 4, 5]. Often the horizontal bands of prism-glass would illuminate a store from an installation above the awnings that at the same time protected the display windows from direct sunlight.

The prospective client or architect would use the tables in the company’s handbook to calculate the type of prism and the square footage needed in his building, based on the size of the room, the required brilliance (for desk work, fine merchandise, general merchandise, or storage) and, most importantly, the “sky-angle,” calculated from the height and distance of the buildings opposite.24 For those architects who shied away from this rather time-consuming procedure, an average angle of 57° was suggested. Very soon Luxfer began to offer prismatic glass with this average angle in larger sheets of up to 36 x 84 inches for factories.25 The glass tiles were prefabricated on commission by different glass manufacturers such as the Pressed Prism Plate Glass Company in Morgantown, West Virginia and then assembled according to specification by different local metal workshops with galvanizing capacities or in Luxfer’s own manufacturing workshop at the corner of Elizabeth and Fulton Streets on Chicago’s West Side.26

In the year 1897 the Luxfer Prism Company submitted 162 design and mechanical patents for different versions and technical details of the prism tiles, the frames, canopies, and the production equipment.27 The basic principle of light refraction through prismatic glass as such could not be patented, since it was commonly known and by no means new.

The most significant new invention among Luxfer’s patents was the process of electroglazing, which had been developed in Chicago in 1897 by William H. Winslow, a local iron manufacturer and one of Luxfer’s shareholders.28 Here, the prisms were placed between thin copper ribs (ca. 3/8 inch wide and 1/32 inch thick) and exposed to an electrolytic bath in copper sulfate for thirty-six to forty-eight hours. During this procedure additional copper molecules were deposited on the edges of the copper bands, forming flanges that eventually welded the copper and glass tiles firmly together. The small diameter of these flanges (less than 1/8 inch compared to at least 3/16 inch of lead or zinc bars), resulted in considerable savings in weight compared with other metals, and obscured about 25 percent less of the prism plate. Luxfer claimed that this narrow metal

Fig. 3: Three types of installations for prismatic glass: replacing the window glass, as a separate screen in front of it, or as a protruding canopy, from Canadian Luxfer Prism Co., ed., Prisms for Lighting Buildings of every Description (Toronto, n.d.), 14, 18.
framework rendered the plates more capable of resisting wind pressure, hail, and rain than a piece of ordinary window glass of the same size. In addition, these composite structures were proven to be fireproof, because the prism tiles held by the metal grid could expand more flexibly under heat than could large expanses of single sheets of glass. As a consequence, electro-glazing set out on a career of its own beyond prism glass installations and was frequently employed for art glass of all kinds and as a fireproof glazing method employing ordinary window glass. The method was, however, twice as expensive as the customarily used lead or zinc glazing.

Significantly the majority (96 of 162) of the patents held by Luxfer were design patents, which did not protect an invention, but only a product’s shape and appearance. A large number of them (41) were solely concerned with ornamental patterns to be applied on the outer surface of so called “Iridian” prisms to enliven the appearance of the assembled prism plates. This ornament did not enhance the refraction—in fact it probably obstructed it slightly—but the company claimed that “a fine textile-like effect” would be produced, so that the appearance of the product was that of a “highly interwoven crystal fabric, as delicate and brilliant as the most exquisite of cut glass ware.”

The company hired the young Chicago architect Frank Lloyd Wright as a product designer, whose office at that time was on the same floor of the Rookery Building in Chicago as that of the Luxfer Prism Company. Luxfer’s concept must have had a strong appeal for Wright, since it embodied his own sensitivity to the natural environment and his interest in new building materials and technologies. Wright provided two different kinds of designs: those for the single 4 x 4-inch prism tiles and those for entire prism plates [Figures 6, 7], which in most cases required a number of different tiles to complete an overall pattern and would have complicated planning and assemblage considerably. Most of Wright’s forty-one designs were simple ornamental line drawings, somewhat reminiscent of the system of geometrical and organic ornament developed by his former employer, Louis Sullivan. They clearly resembled
Wright’s other ornamental work at that time, such as his illustrations for two books he published in the winter of 1896–97 with William H. Winslow at their Auvergne Press. At least one of Wright’s patented designs was mass-produced and can still be found on storefronts throughout the United States [Figures 8, 9]. Its simple linear pattern consists of interlocking squares and circles based on a simple sequence of numbers: within the 4 x 4-inch frame of the prism-tile sits a square of 3 1/2 inches, within that a circle of three inches diameter and in the center a square of two inches in length. Wright also designed and patented one of the vertical brass frames (the above-mentioned forilux) for holding a set of prisms in front of a window.

“Architectural possibilities of the Luxfer Prism”

Apart from the claim that prismatic glass was a sophisticated optical invention, the firm’s publications emphasized that its products contributed to the stylistic development of modern architecture. Luxfer’s Pocket Hand-Book, which was sent to each prospective client, explained what the company expected: as a “new building material” Luxfer Prisms could be made part of the surface decoration of a building and fight the current deterioration of architectural style. “This opens a new field to the artistic designer, and offers a wide range of possibilities to the architect who has heretofore been forced to cut his building to pieces in order to light it, and has been confined to the decoration of the meager wall surfaces around monotonous openings in the walls. When Luxfer Prisms are used as a filling for the window openings, their action and effect is totally different from that of glass...they have an appearance of being opaque, with as rich and substantial a surface as any part of the wall of the building.” These arguments were clearly meant as a response to the emergence of the sober aesthetic of contemporary office buildings with their enormous windows, which Luxfer considered a “necessary evil.” By reintegrating parts of the window into the surface of the façade, Luxfer contributed a competing and less radical aesthetic vision to the intense debate about the influence of steel and plate glass on the development of a modern style. In 1896 Dankmar Adler had described the new style of architectural design as being “founded upon the

FIG. 5: Luxfer Prisms in a canopy installation, from Sweet’s Architectural Catalogue (1906), 264.
discovery of the steel pillar, the steel beam, the clear sheet of plate glass, electric light and mechanical ventilation. . . .” Adler had acknowledged the challenge that “the unpromising and garish sheet of plate glass” presented to the designer, but suggested that a sensible application could turn “these utterances of scientific prose into the language of poetry and art.” It was this notion of a poetic application of modern, machine-made materials, that Luxfer wanted to suggest: “When the material used is that which is known as ‘Iridian,’ the effect produced by means of the interaction of prism and pattern is that of prismatic crystal, indescribably rich and susceptible to as beautiful treatment as ornamental carvings on the stone or the ornamental work on the terracotta of the elevation.” Such romantic descriptions suggest that the authors were familiar with the numerous accounts of utopian glass architecture, common among architects and writers in the 1890s in the United States and Europe. Luxfer urged its customers to fill the entire window opening with prismatic glass and to use the prisms in each story as “one of the principle ornamental features of the building.” Even in cases where additional light was not required, they argued, the narrow metal grid would provide stability against wind-pressure and fire. Most importantly, however, openings covered by prismatic glass would provide “a screen to prevent persons within from looking out, and also to prevent those without from looking in.” In buildings, where the view is unpleasant or disagreeable, its use may provide not only a means of shutting out unpleasant sights, but a beautiful and interesting substitute. Transparen- cy would be replaced by translucency, an office or store brightly lit by daylight could be isolated from the reality of the city outside.

But even if only the transoms were filled with prismatic glass, its effect on the structure and appearance of a building could be considerable. Luxfer frequently pointed out that light shafts could be rendered obsolete and valuable floorspace would be gained as a response to the new surplus of light. Basements could be brightly lit and used as valuable office space, and in new buildings the average story height could be reduced considerably since enough light would reach the back of a room.
In January 1898 the company launched a nationwide competition to illustrate "new possibilities in the use of Luxfer Prisms as a building material, considered from the standpoint of the owner's interest, as well as that of good modern architecture."45 Some of Chicago's most prominent architects were on the jury: Daniel H. Burnham, William Le Baron Jenney, William Holabird, and Frank Lloyd Wright, as well as Henry Crew of Northwestern University. To encourage the competitors, the announcement was accompanied by illustrations of two visionary projects for office buildings using Luxfer Prisms [Figures 10, 11]. No architect's name was given for either design, but "design no. 1" was later republished by Wright as his own. "Design no. 2," similar in character and overall layout, was drawn by the same draftsman. This design, too, was in all probability created by Wright. Framed by a heavy ornamental band, this façade is the more conventional of the two designs with five clearly marked bays and major and minor support members. The prismatic glass is shown in its usual application in transoms and canopies. "The first and second stories are provided with canopies swung from the top of ornate posts or columns beginning at the second floor level. These columns also carry electric lights. The entire surface of the first and second story fronts, underneath the canopies is of plate glass, showing the structural members behind."46 In the top story five ornamental squares, each surrounding a central window, clearly echo the geometric patterns of Wright's patented and mass-produced design for individual prisms on a large scale, thereby establishing a type of trademark signature for the company. The more advanced and daring design no. 1 takes this idea further. Wright changed the structural system from five bays to six bays to achieve an even 11 x 11-foot-square grid in all stories. This was neither practical nor economical, but it allowed Wright to turn the whole façade into an enlarged representation of the prism installations that it advertised. The preliminary pencil drawing for the façade shows two circular lines in the center, indicating that Wright played with the idea of applying his geometric design for the individual prism tiles to this façade as well [Figure 13]. His choice of an 11-foot grid reflected Luxfer's claims that prismatic glass would allow a reduced story height. Wright also responded to the firm's suggestion that the entire opening between structural members should be filled with Luxfer Prisms and that they were best used in each story of the building, although neither the refraction of light close to the floor nor the use of prism glass in the top stories would have been very efficient. The prisms worked most effectively when they sat flush with the wall, unobstructed by any reveals or cornices above. Wright demonstrated this by moving the prism screens of the first two floors in front of the stanchions, and making the square prism fields protrude slightly. "The structural members in the first and second stories

FIG. 8: Frank Lloyd Wright, design patent for single prism light, 1897.

FIG. 9: Luxfer Prism, ornamental design by Frank Lloyd Wright, 1897.
are screened by the prism surfaces which are carried in front of them. The plate glass is retained in the lower part of the first story for show window purposes and for the same reason a plate glass center is inserted in the second story for lux, also covered by a canopy. In Wright's designs both the application of the material and the pattern of the façade itself are clearly dictated by the façade's function as an advertisement for a specific product and are not the result of Wright's apparent ability to foresee the architecture to come, as has often been assumed.

The reception and interpretation of design no. 1 over the years gives insight into how contemporary historiographers tried to present Wright as a key figure for the origins of the modern movement, an identity Wright himself claimed as well. Forty years passed before Wright published design no. 1 again. He presented it in the Architectural Forum in 1938 as a predecessor for his St. Mark's Tower project for New York City of 1929, thereby linking it to his early attempts at designing a true curtain wall. In 1942 Henry-Russell Hitchcock, adopting this view, called the scheme "epoch making" without taking into consideration that the design had been essentially unknown for forty years. Nikolaus Pevsner followed in 1949, recognizing in it a "personal paraphrase of Sullivan's ideas." Grant Carpenter

FIG. 10: Frank Lloyd Wright, Luxfer Prism Skyscraper, Design No. 1, 1897, from The Inland News and Architect Record (January 1898).

FIG. 11: Frank Lloyd Wright (?), Luxfer Prism Skyscraper, Design No. 2, 1897, from The Inland News and Architect Record (January 1898).
that this façade "has since appeared in many guises in many countries. A type of façade now fashionable." Wright's purified 1957 version has since been republished many times by historians and biographers, always as the prophetic late-nineteenth-century design that Wright would have liked us to believe it was.54

An early sketch for the design, the above-mentioned pencil drawing, was published for the first time in 1962 by Arthur Drexler in conjunction with an exhibition at the Museum of Modern Art [Figure 13].55 Wright had partially changed this drawing as well. He divided it in the middle, showing his new version on the left side (the traces of the eraser and of the former design are still visible), but half of the original design with the corner turret remained on the right side. Probably at this moment Wright added the handwritten note in the lower right corner dating the drawing 1894–95.56 It is much more likely, however, that the design was done in 1896 or 1897 (the dates given by Wright when he first published it in 1938 and in A Testament in 1957), concurrent with Wright's geometric patterns for the prism plates and in conjunction with the Luxfer competition.

Manson, one of Wright's collaborators, described how in 1957 he had to stop Wright from altering his 1897 drawing with eraser and pencil before it was photographed by Manson for his book, Frank Lloyd Wright to 1910.50 Manson succeeded in intercepting Wright and the drawing appeared unharmed in that publication the following year, accompanied by a text that further enhanced its legend. Manson claimed that the design was not only a predecessor for Sullivan's Carson Pirie Scott & Co. building, but even for the "glass-fronted box of modern practice," such as the UN building in New York.51 What had originally been conceived as an alternative to the emerging aesthetic of steel and plate glass architecture was now claimed as a forerunner of exactly that. It is also untrue, of course, that Wright's design represents an early example of a glass curtain wall, but the notion has been frequently repeated since then.52 After the incident with Manson, Wright changed his drawing anyway, publishing a purified (or rather, cleaned-up) version in 1957 in his own book, A Testament [Figure 12]. Wright erased both corner turrets, most ornamental features, and the complete attic story. He left the design dated as 1897, and claimed

FIG. 12: Frank Lloyd Wright, Luxfer Prism Skyscraper, Design No. 1, 1897, as redrawn by Wright in 1957.

FIG. 13: Frank Lloyd Wright, Luxfer Prism Skyscraper Design, initial sketch, 1897.
Luxfer Prisms would reach the maximum of effect considered from the standpoint of light power, as well as that of a new production of modern architecture. The suggestion is developed in two designs, one based upon ten stories and a divisional unit of 11 feet 10 inches; the other, for a twenty-four story building, surmounted by a restaurant, roof garden, and observatory, with a plan especially adapted to the use of Luxfer Prisms.63

Much more radical than Wright’s proposals for the Luxfer Prism building, the Boari drawings actually do represent what seems to be the first design for a virtual glass curtain wall for a skyscraper, and certainly deserved the attention of later critics concerning themselves with the search for a predecessor of the modern office building. The smaller design clearly entered into a dialogue with Wright’s proposal. It has the same proportions, the same number of stories, the same eleven-foot structural grid. But instead of merely placing prismatic glass between floor and ceiling, Boari attached a homogenous glass screen in front of the entire structure, thus increasing the glass surface by 20 percent. This increase might have been his main objective, in line with the company’s desire to sell as much of their product as possible, but in doing this he also created a glass curtain wall. The screen curves outwards at the bottom, gaining more light from above similar to Luxfer’s canopies, and demonstrating the ephemeral quality of the glass sheathing.

Frank Lloyd Wright himself, it seems, hardly ever used prismatic glass, since he rarely had opportunities to design the office buildings and warehouses for which the material was mainly intended.57 The characteristic square pattern of his Luxfer façade, design no. 1, was used again in his (unexecuted) designs for the Sarabhai Calico Mills Store in Ahmedabad, India, in 1946 and in the administrative offices of the Guggenheim Museum in New York in 1951.

Probably due to a poor response to the company’s competition, an extension was granted until 15 June 1898, and the final result was published in September 1898.58 Robert C. Spencer received the first prize for the design of a Chicago-style warehouse with an internal glass-covered arcade [Figure 14].59 In its restrained treatment of ornament and glass ceiling it was comparable with Otto Wagner’s Postsparkasse in Vienna, which was designed at around the same time.60 The third prize was given to Solomon Spencer Beman for a huge convention hall with rings of prismatic glass in its roof.61

Undoubtedly the two most exciting entries, winning second prize, came from the thirty-five year old Italian architect, Adamo Boari.62 Boari designed two different skyscrapers—ten and twenty-four stories high—whose façades were entirely covered with Luxfer Prisms [Figures 15, 16]. His designs were accompanied by a short explanatory text: “Our effort has been to use the Iridian Luxfer Prism as the whole surface, practically eliminating openings and reveals. Consequently the use of

FIG. 14: Robert C. Spencer, entry, Luxfer Competition 1898, from The Inland Architect and News Record, September 1898.

FIG. 15: Adamo Boari, ten-story version of a skyscraper for the Luxfer Competition, 1898, from The Inland Architect and News Record, September 1898.
FIG. 16: Adamo Boari, twenty-four-story version of a skyscraper for the Luxfer Competition, 1898. The ten-story version is visible on the left.
Both versions appeared in an illustration drawn after the competition for inclusion in the 1899 exhibition of the Chicago Architecture Club, which was published in the accompanying catalogue. The freestanding twenty-four-story tall skyscraper seems to be a cluster of five columns on a tapered base, entirely wrapped in a translucent glass curtain wall. It provided the vision of a magnificent, shimmering building as the centerpiece of a contemporary city.

The application of Luxfer Prisms
The immediate success of Luxfer Prisms must have been astounding. In November 1897, after less than a year on the market, the company announced that "179 premises of average size have been equipped in the city of Chicago, and four thousand two hundred and ninety-six arc, incandescent and gas lights have been extinguished during the daylight hours. The cost of the artificial light saved during the period of one year is in a majority of instances equal to the cost of the equipment of Luxfer Prisms." Half a year later an article in the Chicago Economist claimed: "The aggregate of business executed during the past year has been upward of half a million dollars. Some 1500 different installations have been made in nearly 100 different cities of the country." Luxfer had established local offices in ten different American cities. The majority of buildings equipped with Luxfer Prisms in the first year was located in Chicago, followed by New York, Philadelphia, St. Louis, and a number of smaller cities. They were mostly commercial structures, but Luxfer products were also applied in residences, schools, and hospitals. In a vast majority of cases only the first floor was equipped with Luxfer Prisms. The prisms were equally popular for the retrofitting of existing buildings as well as a feature in newly planned edifices. Old photographs of American urban centers often show how the appearance of entire streets was changed and unified by the application of prismatic glass to almost every building.

Luxfer printed numerous, carefully chosen letters from satisfied clients in its sales brochures. "The Luxfer Prism Company has done more to furnish light in our buildings than all the high-building ordinances our council has been able to devise," wrote an enthusiastic store owner in Chicago. A Chicago tailor sent "a gas bill of 1896 and the corresponding ones for 1897, covering the period which the Prisms have been in my store. They speak with more force than I can. I am confident that I shall not find it necessary to use gas or artificial light during the day at any time the coming season." A housewife reported the improvement that had been made in her dining room: "This room was so dark at times during the day that persons passing through it were in danger of knocking articles off the dining room table, as they could not distinguish them sitting there, but, since your Prisms have been installed, one can read ordinary print at the farthest end of the room." Many of these letters made it perfectly clear that Luxfer Prisms were by no means a cheap purchase: "I want to say that while the prisms are away and beyond the most expensive item in our building, and my friends think I’ve been awfully extravagant in lighting up for a morning newspaper, I am perfectly satisfied that the expenditure will mean more than pay. Our basement is the brightest, purest-atmosphered and sweetest scented in town, and the men have had a better average health than for the five years past,” wrote the owner of the Ohio State Journal in Columbus, Ohio. Luxfer claimed in its advertisements that between 25 percent and 100 percent of the installation costs would be saved each year by a reduction in the expenses for artificial light. Compared to simple plate glass, prism glass costs were indeed very high: in 1903 plate glass cost about five cents per square foot, "factory ribbed" glass nine cents, and prismatic glass up to fifty cents per square foot.

Although the letters quoted above can hardly be considered hard evidence, there can be no doubt that Luxfer’s prismatic glass worked astonishingly well in many situations. A number of independent tests between 1900 and 1913 reported the material’s daylighting capacity in the depth of a room to be between five and fifty times as high as that of ordinary glass. However, the success of the material depended strongly on specific local circumstances. Basquin described the characteristics of the ideal (albeit unlikely) room for the most efficient application of prismatic glass: "The room most easily lighted is one with a high ceiling, with perfectly plain walls unbroken by offsets of any kind, with whitewashed walls and ceiling, and, finally, a room devoid of furniture." For rooms less than fifty feet deep several reviewers recommended using the simpler and much cheaper corrugated glass instead. Vertical prism installations reached their limits if the building opposite was higher than twice its distance from the façade. In such cases protruding canopies were recommended. They could deliver sufficient light for storage in rooms overshadowed by a building up to five times as high as the width of the street. Prism installations were not necessary when the street width was at least three times the height of the building on the other side (or, of course, if there was no opposite façade at all, as was often the case with the upper stories of tall buildings). "A simple test as to whether Luxfer Prisms will improve the light in a room is to stand at the rear end and look through the window. If little or no sky is visible, prisms will effect a saving in the artificial lighting bill." Luxfer’s calculation tables assumed the even brightness of an overcast sky. If sunlight struck the prism plates directly from above it would still be cast deeper into the room, however, it could also cause a strong, unpleasant glare and increase the temperature in the back of the room. Basquin recommended installing ‘white Holland shades’ in such cases and found consoling words for his prospective clients. When a customer
entered a store with the bright light behind him, making "his face hard to recognize as long as he keeps his back to the window," Basquin reassured the salesmen that "this inconvenience is little detriment to trade, for [...] the customer is perfectly at his ease and the whole interior looks bright and cheerful to him."76

Prominent examples of buildings that were retrofitted with prismatic glass in the early years were the Rookery and Home Insurance buildings [Figure 17] in Chicago in 1897, the Stern Bros. Department Store in New York in 1897, and the trading room in Adler & Sullivan's Chicago Stock Exchange in 1908 [Figure 18].77 Even Philadelphia's City Hall received a number of prismatic glass installations. Luxfer's stockholders set examples by immediately applying Luxfer Prisms to their own buildings. Cyrus McCormick, for example, installed Luxfer Prisms in his office building in 120 State Street and in two of his residences in Chicago.78 Harlow N. Higinbotham equipped the entire first floor of the Second Leiter Building on State Street in Chicago (William Le Baron Jenney, 1889–91) with prismatic glass.79 William H. Winslow replaced all the windows in his Chicago factory with the new product early in 1897 and reported in a letter to the Luxfer Company that their efficiency had not been impaired by the amount of dust accumulated on them, and that his workers seemed "to be more cheerful under the improved conditions."80

Retrofiting existing structures with prismatic glass provided the advantage of a measurable success of the installation by comparing the new to the former lighting conditions. In such cases however, Luxfer's contributions to a new architecture were least likely to be convincing. The retrofitted prism plates and canopies often had the appearance of inappropriate repair work and revealed to the public that the interior lighting had been insufficient.

Holabird & Roche's group of the three McCormick Buildings of 1898 [Figure 19], on Chicago's Michigan Avenue, became one of the first examples for an application of the material in a new structure. The three buildings were situated on a lot 168 feet wide and 160 feet deep. Luxfer Prisms were originally specified for every story in all three buildings.81 Eventually only the northernmost façade of the group, designed by Louis Sullivan for Gage Bros. & Co., was equipped with Luxfer Prisms in every story. This reduced application of the new material might well have been due to the influence of Edward A. Renwick, Holabird & Roche's supervising site-architect, who had severe reservations about the effect of the prisms: "One of our clients wanted Sullivan to design the façade of a building, but wanted us to do the inside and erect the building. It was for a millinery business and, when artificial light was poor as it was in those days, it was important that there be as much daylight as possible. Now we would have run the windows up just as far as they could go, for the light at the top carries farther. But against our judgment Sullivan insisted on putting four feet of ornamentation at the top of the windows. He said to the owner, 'If I came to you for a hat, I'd use your judgment.' The owner let him go ahead and the store was ruined for a good many years—until artificial light approximating daylight had been developed."82 Renwick's criticism was not unfounded. The location on Michigan Avenue was crucially different from the Gage Brothers' former address, where a narrow street and an elevated train track had justified installing prisms in several stories the year before.83 Here, however, all the upper floors enjoyed an unrestricted view of Lake Michigan; skylight would enter horizontally through the windows and on average overcast days the advantage of prismatic glass over plate glass was negligible. In the morning hours the façade was exposed to direct sunlight from above which was refracted deeply into the room. Contemporary photographs show that Basquin's advice to use white Holland shades for sun protection was gladly accepted by the inhabitants. Clearly, here it was mostly the material's potential as a new architectural feature that had been the reason for its display at such a prominent location. The disagreement between Renwick and Sullivan and a comparison between the adjoining façades is telling. Holabird & Roche's façades proudly show large expanses of glass and the stark,

FIG. 17: William Le Baron Jenney, Home Insurance Building, Chicago, 1885, retrofitted in 1897 with Luxfer Prism plates and canopies in the second and third floor, ca. 1897 (demolished in 1931).
unornamented brick cladding of the structural skeleton. Louis Sullivan used richly ornamented buff-colored terracotta and introduced comparatively small individual windows underneath the horizontal bands of prism glass (gradually reduced in height from forty to twenty-seven inches in the upper stories), illustrating the alternative approach to modern architectural design advocated by the Luxfer Prism Company and coinciding with his own philosophy of design. When Holabird & Roche added four stories to Sullivan’s existing structure in 1902, they again installed bands of prismatic glass in order to remain faithful to the original design.

The architect William Gray Purcell later remembered that traditional architects were often not receptive to the idea of Luxfer Prisms: “Beaux Arts architects back there in 1900—and that meant practically all the architects in the world except about two dozen—had a mind, a sort of collective mind that just hated Luxfer Prisms. The Greeks hadn’t had Luxfer Prisms and the Romans hadn’t had Luxfer Prisms. So how could you put them in a building without destroying your prestige? . . . Regular architects just wouldn’t touch Luxfer Prisms and building owners whose tenants wanted them had to get some contractor to insert them above the show windows.”

Apart from the prism’s impact on the aesthetics and proportion of the façade, the company claimed that the additional influx of light could render light courts in the center unnecessary and the prisms would thus have a profound impact on floor plans and sections as well. “Architects! By Luxfer Prisms you can bring in daylight without the use of large light wells” was a slogan frequently used in the firm’s advertisements. In how many cases architects might have left out originally considered light courts after discovering the qualities of the new material is difficult to determine. Three examples in Chicago can be documented, however. Holabird & Roche described in December 1897 one of their recently completed buildings at 84 Wabash Avenue in Chicago: “The building is seven stories high and erected on a lot twenty-five (25) feet front and one hundred and sixty (160) feet deep. Our original plans contemplated a light shaft in the center of the building, occupying about 20 x 35 feet. This shaft we finally left out, and [we] put in the Prisms. The result has surpassed our expectations, as each
floor is perfectly lighted throughout; thus saving about forty-two hundred square feet of rentable floor space.87

Shortly afterwards, in 1898, the great department store of the Mandel Brothers on State Street in downtown Chicago was completely remodeled by the firm of William Le Baron Jenney [Figure 20]. Luxfer Prisms played a pivotal role in this renovation. The original colonnades in the first two stories were removed and “new steel columns, with steel lintels of long span, formed a frame for immense pieces of plate glass,” which the Inland Architect considered “a new style of architecture, entirely American. . . .” Above the display windows a continuous band of Luxfer Prisms, about five feet high, was introduced, to send the exterior light to the rear of the store, thereby completing “the development of a new style in commercial architecture.” But again the impact of the Luxfer Prisms did not stop at the façade: “Originally two light shafts were in use, but these are dispensed with and about eight hundred square feet of floor space secured on each floor above the first.”88

This merger of commercial improvements and new architectural sophistication sparked an immediate reaction. The celebrated opening of the Mandel Brothers store on Memorial Day in May 1898 was greeted on the same day by the announcement that a million-dollar department store out of marble and bronze would be built directly across the street. One year later, construction was begun on the Schlesinger and Mayer store (now Carson Pirie Scott & Co.), by Louis Sullivan. William H. Winslow’s firm did the ornamental ironwork, and the Luxfer Prism Company supplied prism plates for the façades in the first two floors [Figure 21]. The successful use of prism glass at the Mandel Brothers store, with its subsequent gain of more interior floor space, clearly served as a model for the application of Luxfer Prisms in general and especially for the decision not to provide any lightshafts for the interior of the Schlesinger and Mayer store. It was generally expected that the gain in additional floor space would pay for the investment of forty thousand dollars for Luxfer Prisms in less than two

years. The important role prismatic glass played in the design becomes obvious from an advertisement for the opening, in which Luxfer tiles appear next to a view of the building on left and right [Figure 22]. Louis Sullivan’s drawings show how carefully he integrated the prismatic glass installations into the ornamental pattern of the metal frames around the display windows.

In the following years innumerable new office buildings throughout the United States were equipped with the material. Holabird & Roche continued to apply Luxfer Prisms in their commissions, usually to the transoms of the first-floor display windows. Examples include the McClurg [Figure 4] and the Ohio buildings at Wabash Avenue in 1898 and 1906–7 and the Born Building on Fifth Avenue (now S. Wells St.) in 1908. Hill and Woltersdorf equipped all twelve stories of the Church building on Wabash Avenue with prismatic glass in 1903, and Ernest Flagg’s Singer Loft building (1904) on Broadway in New York City featured a large protruding canopy above the entrance. Louis Sullivan used the material again in 1913–15 in his Van Allen and Son department store in Clinton, Iowa. Here Luxfer’s product was applied in a “continuous band of prismatic glass originally set like a clerestory around the room.”

By the turn of the century several firms with similar products were competing with the Luxfer Prism Company, marketing their products under names such as “Luminous Prism,” “American 3-Way Prism,” “Searchlight Prism,” “Daylight Prism,” or “Solar Prism.” They were fiercely pursued by the patent lawyers of the Luxfer Prism Company. In the early 1920s, prismatic glass was offered by all major glass producers. By then it was produced not only in small 4 x 4-inch squares but also in the form of sheet glass up to 60 x 100 inches. The large firms simplified the application procedure by cutting down the variety of available prism angles to two or three. After a few years, the material, which had started as an exclusive possession of prosperous businessmen, had become a widely popular device that even store owners in small towns could afford. The above-mentioned cases, where the prisms were installed in all stories of a building or caused the abandonment of a planned or existing light court remained exceptional. Judging from the large number of prisms still in place, however, they must have been produced by the millions.

The American Luxfer Prism Company merged with one of its competitors, the American 3-Way Prism Company, on 17 November 1926 and still existed in the late 1930s under the name, “American 3-Way Luxfer Prism Company,” of Cicero.

FIG. 20: William Le Baron Jenney, renovation of Mandel Brothers store, Chicago, 1898. Luxfer Prisms were installed in the first five floors. The main entrance to the Carson Pirie Scott & Co. (formerly Schlesinger and Mayer) store is visible on the right, from a contemporary post card.

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Illinois. However, its product line concentrated on other structural glass applications. During the 1920s prismatic glass slowly began to lose its impact. Apart from the rise of electricity, technical disadvantages contributed to the dwindling success of the prisms. Contrary to the company’s claims, the installations needed a certain degree of constant maintenance. The horizontal ridges on the inside were much more difficult to clean than ordinary window glass, and as a result they darkened and eventually let in less light than normal windows. The soldered zinc bands did not age well and leaks became a frequent problem. None of the canopies survived the impact of inclement weather. The complicated procedure of choosing different angles of refraction according to local conditions and the assemblage of small glass tiles into larger frames was too costly to be continued at a time when the building industry was pushing for rationalization and when electric lighting became generally affordable. Fashion for storefront designs shifted in the 1930s towards simplified, larger forms and grander, illuminated store signs, often covering the transom area above the display windows. The introduction of air conditioning required generally lower ceiling heights. When load-bearing, hollow glass blocks were introduced in 1935, a new, more efficient and cheaper daylighting device became available. In sum, what once had been a symbol of a new and different architectural modernity had become an old-fashioned way of lighting.

**Luxfer companies abroad**

In 1897, when the Luxfer Prism Company entered the U.S. market it also patented its major ideas abroad in Canada, Mexico, Russia, India, Australia, and Europe. Branches were established in several countries shortly afterwards. They offered a product range similar to that in the United States, consisting of pavement lights, art glass, and prismatic glass. Soon brass plates with the name “Luxfer” appeared next to basement-lights on sidewalks in major European cities such as London, Vienna, Leipzig, and Budapest. Buildings in places as far apart as Copenhagen, Denmark, or Jaromer (now in the Czech Republic) displayed the prism tiles in their façades.

The prismatic glass for the European branches was produced by the Val St. Lambert glass factories in Liège in Belgium, and the St. Gobain glass factories near Paris, France. Like their American parent company, the European branches clearly aimed at high public visibility by participating in major trade fairs and actively seeking the attention of the architectural profession. In 1899 the French branch launched a competition among French and Belgian architects, modeled after the successful competition in the U.S. the previous year. They enlisted prominent architects, such as Jean-Louis Pascal and Paul Nénot, as jurors. Numerous reports about successful applications appeared in trade magazines and architectural journals through the following decades, among them the account of the successful illumination of a newly installed stained-glass window in London’s Southwark Cathedral, overshadowed by an adjacent warehouse, but brightly lit after the installation of Luxfer Prisms. In many cases the light-refracting qualities of prismatic glass had an obvious impact on the formal decisions of the architects, as in the case of the enormous spherical canopy above the entrance to Hanover’s Molling Department Store of 1909 [Figure 23] or—even more dramatically—in the manifolded prismatic ceiling light suspended in the central courtyard of Piet Kramer’s De Bijenkorf Department Store in The Hague of 1924–26. Here the principle of light refraction through protruding canopies, which had been applied at the outside of the store, was reversed and the light was cast sideways into the open stories from the centrally located daylighting device [Figure 24].

One of the most thoughtful and creative applications of prismatic glass in Europe was accomplished in a small bar in the center of Vienna. In 1908 Adolf Loos designed the Kärntner Bar for a narrow sidestreet, the Kärntner Durchgang. He not only employed Luxfer basement lights like his neighbors, but he also designed the interior of the bar in response to the optical qualities of prismatic glass and provided another example of the direct impact that the material’s qualities could...
have on the design of a building. Mirrors on three sides of the room underneath the marble ceiling seem to enlarge the space optically and to continue it to infinity. From the inside, a screen of brown onyx plates, thin enough to be translucent, is visible above the entrance. On the outside, this screen is covered by a canopy with a triangular section. Early photographs and several of Loos's drawings clearly show the characteristic pattern of 4 x 4-inch prism plates on its upper surface [Figures 25, 26]. Using the tiles to maximize what daylight fell into the narrow Kärntner Graben and to direct it through the onyx plates into the room, Loos filled the locale with a peculiar colored light that was reflected endlessly by the mirrored walls. This was a brilliant application of the canopy's known ability to gather and refract light. But Loos went further in the architectural application of the canopy than his colleagues in Chicago and New York: by transforming the suspended canopy into a stable triangular feature, displaying the American flag and the bar's name underneath, he gave the structure itself the form of a prism, illustrating the underlying principle. This unusual canopy was removed during World War II, and has only recently been restored, using sheets of wire glass in its upper half, however.

The Deutsches Luxfer Prisma Syndikat in Berlin became one of the most successful of the foreign branches. Friedrich Keppler, its director, had realized that the complicated system of different prismatic glass tiles in the transom above a display window was too costly to install and maintain, and also too limited in its architectural applications. Furthermore, the demand for such a device was lower in European cities than in the United States. Keppler therefore enlarged the company's product range. Prismatic tiles, basement lights, and art glass were still produced, but were joined by a new system of structural glass, which presented a breakthrough for the application of glass in architecture, generated enormous inter-
nest among the architects of the modern movement, and paved the way for the introduction of the hollow glass block in the 1930s.

Luxfer's new product, called Glaseisenbeton, or Keppler-System, introduced in 1909, was based on a system of thin reinforced concrete bars holding heavy glass tiles in place. These tiles did not have prismatic ridges, but were still not entirely transparent, due to their thickness. The thin reinforced concrete bars would be contained in slots along the edges of the glass tiles, and reflections from the inner surface of the tiles rendered them almost invisible. Keppler had profited here from Luxfer's experience with pavement lights set in concrete and from the idea of a structural square grid that the electroplated copper bands had provided for the prism tiles. The system could be used for entire non-load-bearing walls, again providing a translucent screen that could be integrated into a building's surface more easily than window openings. Although the new glass tiles had quite different qualities from those of the older prismatic glasses, they were still frequently called Luxfer Prisms. All the products of the German Luxfer Prism Company were on display in Bruno Taut's famous exhibition pavilion at the Werkbund Ausstellung in Cologne of 1914 [Figures 27, 28]. The German Luxfer Prism Syndikat was, in fact, the main sponsor for the building, donating the building materials and providing many of the exhibits. It can be assumed that Luxfer also initiated the project. The walls in the lower part of the building were constructed of Keppler's new Glaseisenbeton. The dome above consisted of two layers, an outer one of simple plate glass between concrete ribs, and an inside one of simplified prismatic tiles, in the familiar 4 x 4-inch size, joined together by William Winslow's electroglazing process. The shape of the dome resembled a large, polished diamond, symbolizing the quality of the advertised product while also illustrating the name of the leading periodical of the German glass industry, Diamant. In the center of the building was a fountain, colorfully lit from underneath its glass floor; the staircases consisted of a steel frame filled with prismatic tiles. The floor was made of concrete with colored glass lenses embedded in it.

Taut's pavilion rightly has been celebrated as a prime

![Image of the interior courtyard of De Bijenkorf Department Store, The Hague, 1924-26, with prismatic glass installation refracting light sideways into the open stories.](image)

FIG. 24: Piet Kramer, De Bijenkorf Department Store, The Hague, 1924–26, prismatic glass installation above the interior courtyard, refracting light sideways into the open stories.
example of expressionist architecture and a brilliant formal manifesto, but the building was also an exhibition pavilion in a trade show, with the explicit purpose of displaying a firm’s products. As such, it was part of a long-standing tradition of a particular building type to which it owed a considerable amount of its details. Since the late nineteenth century the glass industry had exhibited its skills and products in glass pavilions at every major trade fair. Many of them had features such as glass domes, glass staircases, or a central fountain. Luxfer had presented its products in separate exhibition pavilions at the Brussels World’s Fair in 1910 and at several trade shows in the following years. At the Baufachausstellung in Leipzig in 1913 Luxfer’s domed pavilion out of prismatic glass, glass tiles, and reinforced concrete was designed by the prominent German
architect Bruno Möhring and won a gold medal. Bruno Taut’s pavilion is part of this tradition. None of its predecessors however, enjoyed such enormous and well-orchestrated publicity. The collaboration between manufacturers and artists to render their products publicly visible and to turn them into an integral part of the cultural discourse clearly had been one of the goals of the German Werkbund. But it also recalls the collaboration between Frank Lloyd Wright and the Luxfer Prism Company seventeen years earlier.

The Deutsche Luxfer Prismen Gesellschaft and especially Keppler’s system enjoyed tremendous success during the rise of German modern architecture in the 1920s. Luxfer glass ceilings were employed in 1929 by Otto Haesler in the auditorium of the Volkschule (primary school) at Celle; Luxfer glass walls were used by the Luckhardt brothers in their housing estate of 1926 on Berlin’s Schorlemer Allee, and they were specified in 1922 by Hans Scharoun for his famous Friedrichstraße skyscraper and by Bruno Taut for his never-executed hotel in Magdeburg of 1922. Walter Gropius and many others praised the potential of Keppler’s application enthusiastically. Luxfer continued its tradition of involving well-known, progressive architects in the marketing of its products and commissioned Hans Poelzig in 1931 to design their Berlin exhibition stand. Luxfer’s Glaseisenbeton patents were adopted and modified by the French glass manufacturer, Société de Saint Gobain, and developed into the famous Nevada glass tile construction, which was used by Pierre Chareau in his Maison de Verre of 1929 and in Le Corbusier’s Clarté apartments at the Porte Molitor in
Paris (1932). The Nevada glass tile had a size of 20 x 20 cm and was 4 cm deep (8 x 1 1/2 inches). On its flat side it had a pattern reminiscent of dried earth (hence the name Nevada), and on the other side a hollow circular mold to reduce its weight and to diffuse the transmitted light. Similar to its German predecessor, the tile had grooves on all sides to contain and hide the thin reinforced concrete beam.\textsuperscript{114} Keppler’s system was used by the American 3-Way Luxfer Prism Company to build something like a successor to Bruno Taut’s famous exhibition pavilion, a breathtakingly beautiful, shimmering, colored glass house on the rooftop of the Barbizon Plaza Hotel, built in New York City in 1932 by Murgatroyd and Ogden (the actual glass house was by Lawrence Emmons).\textsuperscript{115}

In 1935 the American glass industry finally introduced the machine-made, hollow glass block, which took over the prism’s role as a mass-produced structural daylighting device, since it had a number of qualities superior to those of prism glass or Keppler’s glass and concrete construction. Hollow glass blocks were a better insulator than simple glass tiles, their surface was easy to clean, and they were stable enough to be load-bearing. Entire translucent walls could be built up to a certain height by simply using mortar without the additional support of reinforced concrete bars. The producers of hollow glass blocks adopted the principle of light refraction through prismatic ridges around 1939–40, when several firms started offering products such as Pittsburgh Corning’s Prism Light-Directing Blocks, or Owens-Illinois’s Insulux Light Directional Blocks in their advertisements.\textsuperscript{116} Here, the prismatic ridges were placed on the inside of both halves of the hollow glass block, and were thus protected from dust. In this form some of Luxfer’s original ideas lived on. Many school buildings in the United States used prismatic glass blocks in the 1940s and 1950s, placed directly above the steel framed windows, in a fashion similar to the way Luxfer Prisms had originally been employed. Once again, outside light was directed horizontally into the room or up towards the ceiling and reflected down from there. Light-directing glass blocks are still being produced and marketed today. In addition there has been a renewed interest since the 1980s in daylighting techniques, and prismatic glass is once again being scientifically explored and has been applied in a number of cases.\textsuperscript{117}

Although many of the original prismatic glass installations have been replaced, their characteristic square pattern can still be found easily in storefronts throughout the United States.\textsuperscript{118} They are more apt to have survived in smaller cities with slow economic development. Often however, suspended ceilings or insufficient cleaning over the years have deprived the prisms of their lighting potential. Their history and purpose have all but vanished into oblivion.

The material itself, based on a sound optical principle and designed with the explicit purpose of saving energy, deserves a prominent place in the history of daylighting technologies for architecture. The developers and main producers of prismatic glass, the Luxfer Prism Companies, were active participants in two important and intertwined debates of their time—the competition among different lighting technologies and the discussion surrounding the production of modern architecture. At a moment when electric light began to replace gas light as the dominant means of modern artificial illumination, Luxfer promoted daylighting as a cheaper, healthier, and thoroughly scientific alternative. Both in the United States and abroad the firm’s policy of inviting young progressive architects to improve Luxfer’s designs, suggest architectural applications, and create the firm’s exhibition pavilions was instrumental in establishing publicity for the product and helped to secure its immense commercial success.

Conclusion
The story of the Luxfer Prism Company sheds light on a somewhat different, less-known history of early modern architecture. In 1969, Reyner Banham had argued convincingly for an as-yet-to-be-written architectural history that would be based upon technology and materials, on the typical rather than the exceptional, and on building processes rather than the creativity of individual architects.\textsuperscript{119} To this day, the complex general conditions of architectural production have received far less attention than they deserve. We still do not know enough about how modern buildings actually came about, how the participants in the building process interacted, how building materials were invented and promoted. What emerges from a study of the Luxfer Prism Company is an image of stylistic and structural change in architecture linked to the entrepreneurial talent and resources of manufacturers and builders, or driven by the visions of building engineers. Their activities have left traces in trade publications, patent records, and court cases, more than in architectural magazines and monographs. The dissemination of commercially successful building products and marketing strategies seems to have been faster, wider, and less hampered by national boundaries than the alleged influence of a published building or a manifesto. The architect’s role often was that of a responding participant in a complex interactive process rather than that of the leading protagonist. Contextualizing all building activity in the larger framework of architectural production offers a way to move beyond the selective paradigms of historiographical modernism towards Banham’s vision of a more balanced account of the building process.

Notes
This paper is based on research that began in 1989. I have presented parts of it in talks given at the Department of Fine Arts at Harvard University in 1991, at the Architecture Department at Yale University in 1992, and at the Annual Meeting of the Society of Architectural Historians in Philadelphia, since

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1992 I have circulated earlier versions of this paper to several colleagues and friends. I would like to thank Juergen Schulz for his support and encouragement of my research, as well as for numerous critical comments on my paper. I am grateful for generous editorial advice provided by Nancy Austin, Patricia Huntington, Dian Krits, Evelyn Lincoln, and the anonymous reviewers of the JSAH. Brown University’s John Rose Workman Award, which I received in 1993, helped to finance my research trips. Jeff Barr, Anne-Laure Carré, C. F. Edwards, Richard Gelpke, Paul Israel, Joe Jerneic, Markus Kristan, David Lynch, Claire Markovitz, Gavin Mayhew, David McGinnis, Charles Parrott, Rodney Piles, Patrick Pinnell, Martin Rambusch, Burkhardt Rukschcio, Tim Samuelson, Joseph Siry, Lisa A. Smith, Christopher Vernon, and Virginia Wright provided valuable additional information.


7 State of Rhode Island and Providence Plantations, “An Act in Relation to Buildings in the City of Providence and for other Purposes,” Chapter 688, Section 29 (Providence, 1878), 21.


10 The first one seems to have been Robert Bughton in England, who suggested "sheets of glass with one face plane and one face with a series of parallel ridges, which are of such a form as to direct the light by simple reflection or by refraction in the required direction." R. Bughton, “Daylight Diffusers,” British Patent no. 139 (13 January 1880). “Daylight Patent Co. v. Marcus Pruss Co.,” Federal Reporter 110 (1901): 980–85. In 1885 a German physicist, Karl Mohrmann, who taught at the Royal Polytechnic in Hanover, published a booklet on methods of daylighting. He had been inspired by the intense discussions about the lighting scheme for the Reichstag in Berlin which was then currently under construction, and suggested prismatic glass, which he described in some detail. Karl Mohrmann, Uber die Taglichtbehauung inner Räume (Berlin, 1885); "Oberlichter von Linsen und Prismenglas. Centralblatt der Bauverwaltung 5 (1885): 256.

11 James G. Pennycook, “Window-Glass,” U.S. patent no. 312,290 (17 February 1885, filed 12 August 1882); Pennycook acknowledged that it is not broadly new to provide window-glass with reflecting ridges," but he suggested that the angle chosen in his application was more efficient.

12 Pennycook’s patent was owned by the Prismatic Glass Company in New Hampshire (1885–89), the Alpha Glass and Metal Company in New Jersey (1889–90), a number of individual businessmen, and finally by Thomas W. Horn, who founded the Prismatic Glass Company of Toronto, Ltd. in 1896 and eventually became one of the cofounders of the Luxfer Prism Company in Chicago. In the numerous court cases in which Luxfer defended its products against competitors, Pennycook’s patent was regularly quoted as central to Luxfer’s claims. The competing firms referred to Thaddeus Hyatt’s and other unprotected patents of prismatic pavement lights as predecessors to their own products. The Luxfer Prism Patents Company et al. v. Trustees of Columbia College et al.; "Demurrer Book” (1897–1911), case no. N-6805, U.S. Cir. S. D. New York, 5–4.

13 The stockholders of the Luxfer Prism Company came from the highest ranks of Chicago’s urban elite. There were a number of successful bankers such as Ernest A. Hamill (1851–1927), Frederick T. Haskell (1867–1935), Chauncey Blair (1845–1916), and Edward C. Waller (1845–1931), and prominent lawyers such as John P. Wilson (1844–1922). There were presidents of major national companies, such as Cyrus H. McCormick (1859–1936), president of the McCormick Harvesting Machine Co.; Charles Henry Wacker (1856–1921), president of the Wacker & Wick Brewing & Malting Co.; Levi Zeiger Leiter (1834–1904), former president of Field, Leiter & Co.; William H. Winslow (1857–1934), president of the Winslow Brothers Company; Harlow Niles Highboetham (1838–1919), president of Marshall Field & Co.; and George A. Fuller, president of one of America’s leading construction companies. “American Luxfer Prism Company,” The Economist 20 (15 August 1898): 199; Who was Who in America 1897–1942 (Chicago, 1942), 804, 1889. John Meigs Ewen (1859–1959) was president of the Luxfer Prism Company for the first four years, followed in 1901 by Harlow Niles Highboetham, in 1906 by Parry L. White, and in 1916 by Robin L. White. Ewen initially held 60 percent of the shares of the Luxfer Prism Company. He was general manager for the George A. Fuller Construction Company. Parry L. White was the former director of the Luminous Prism Company, one of Luxfer’s competitors. J. W. Leonard, The Book of Chicagoans (Chicago, 1905), 194; The Luxfer Prism Patents Company et al. v. The Ministers, Elders, and Deacons of the Reformed Church of the City of New York et al. (1887–99), case no. N-6805 U.S. Cir. G. S. D. New York, statement of Parry L. Wight, 4 March 1899.

14 The correct formation of the word would be Luxfer, but this term had negative connotations and was therefore not suitable for advertising. “The Century’s Triumph in Lighting” (see n. 2); “To make dark places light,” The Economist 17 (1 February 1897): 224. John M. Ewen as president, Henry M. Bacon as secretary, Thomas W. Horn, and James Pennycook had founded the Radiating Light Company in Chicago in October 1896, changing the name two months later to Semi-prism Glass Company and finally, in March 1897, to Luxfer Prism Company. Statement of Incorporation of the Radiating Light Company (7 October 1896); Report of Commissioners of the Radiating Light Company (19 October
is also of interest. All patents are published with an illustration and an abbreviated text in the *Official Gazette of the U.S. Patent Office*. In the following references to patents only their number and the date of institution is given. Sixty-six mechanical patents and ninety-six design patents were issued by eleven different assignors on behalf of the Luxfer Prism Company in 1897 (a few more followed during the next years). Trade mark: no. 30,255 (22 June 1897); technical patents: nos. 568,789; 574,770; 754,843; 579,350; 583,580; 585,594; 586,211–29; 586,247–61; 595,257–77 (6 October 1896–7 December 1897). In addition Luxfer acquired earlier mechanical patents, which were close to their own product line: nos. 247,996; 303,359; 312,290; 317,077; 396,911; 396,912; 492,363 (4 October 1881–21 February 1893); Design Patents: nos. 25,573; 26,829; 26,864–68; 26,890; 26,988–89; 27,322–48; 27,677–80; 27,840–41; 27,968–28,020 (2 June 1896–7 December 1897); patents were issued on behalf of the Luxfer Prism Company in 1897 to the following assignors (DP=design patents, MP=mechanical patents): Frank Lloyd Wright, 41 DP, no MP; Olin H. Basquin, 9 DP, 17 MP; Henry F. Belcher, 12 DP, 8 MP; John M. Ewen, 15 DP, 2 MP; William H. Winslow, 4 DP, 10 MP; Frank C. Soper, 5 DP, 6 MP; James G. Pennycook, 5 DP, 1 MP; William S. MacHarg, 2 DP, 3 MP; Edward C. Waller, 2 DP, Kraft Booth, 0 DP 1 MP, L. H. Jordan, 0 DP 1 MP; Crew and Basquin, Pocket Hat, 366–67.


32 Wright occupied office 1123 in the Rookery Building, the Luxfer Prism Co. office, 1129. Wright’s U.S. design patents, nos.: 27,977–28,015; 28,017; 28,020 (7 December 1897, filed 4 October 1897); Brian Spencer published a photograph of a Wright-designed prism in 1974, Robert L. Sweeney was the first one to point to the existence of the patents in 1978. Brian A. Spencer, ed., *The Prairie School Tradition* (New York, 1974), 48; Robert L. Sweeney, Frank Lloyd Wright, An Annotated Bibliography (Los Angeles, 1978), 5. David Hanks illustrated two of Wright’s patent designs in 1979. David A. Hanks, *The Decorative Designs of Frank Lloyd Wright* (New York, 1979), 15. Several Wright-designed prisms were acquired in an auction in 1987 by the Domino’s Pizza Collection in Ann Arbor Michigan, and published in the catalogue of their traveling exhibition. David A. Hanks, *Frank Lloyd Wright, Preserving an Architectural Heritage* (New York, 1989), 29. The published photograph, however, shows the prisms with their ribs in a vertical position, which would not have provided the intended effect of casting
light horizontally deeper into a room.  

33 William C. Gannett, The House Beautiful (River Forest, 1896–97); and John Keats, The Eve of St. Agnes (River Forest, 1896–97).

34 Frank Lloyd Wright, "Design for a Prism Light," U.S. design patent no. 27,977 (7 December 1897, filed 4 October 1897). Even had submitted a general, mechanical patent for a "Figured Prism-Light" one week before to protect the general idea of ornamenting prism tiles. He used a variation of Wright's design as an illustration, which differs slightly in two respects: four small triangles are placed on the four major axes, and two different widths of lines are used for the curved pattern. John Mengg Ewen, "Figured Prism Light," (see n. 31). It is this variation that was mass-produced by Luxfer.

35 Sullivan had used motifs strikingly similar to Wright's later prism design in the top cornice of the Schiller Building's central tower of 1892, where Wright had had an office in 1893.


37 "Architectural Possibilities of the Luxfer Prism" (see n. 1).


44Luxfer claimed to have improved the lighting efficiency of the conventional prismatic basement lights considerably by combining them with a vertical installation of a forlorn prism screen inside the basement. Luxfer suggested reducing the story heights as a result of the prismatic illumination by about one foot each, thereby giving the architect more freedom and allowing more stories to be accommodated within a certain height limit. Crew and Basquin, Pocket Hand-Book, 9, 76–77.

45 "An Interesting Competition," The Inland Architect and News Record, no. 6 (January 1898): 63–64.

46 "Our Illustrations," The Inland Architect and Building News, no. 6 (January 1898): 64.

47 Ibid.


50 Letter by Manson to Jean Duffy of the Reinhold Publishing Company, of 1 November 1957, Grant C. Manson Papers, Public Library, Oak Park, Illinois. I am indebted to William Joroshek, librarian at the Oak Park Public Library, for this information.

51 Grant Carpenter Manson, Frank Lloyd Wright to 1910 (New York, 1958), 88; Manson's remark might have been intended as a consoling tribute to the master, who had been disappointed that he had not been given the chance to build the UN building himself. Manson had probably forgotten that Wright had called the UN building a "deadpan box" and a "fascist symbol." Robert C. Twombly, Frank Lloyd Wright (New York, 1979), 570–71; Harvey Breit, "Talk with Frank Lloyd Wright," New York Times Book Review (24 July 1949): 11.


54 For example, see Frampton, "Text-Tile Tectonic" (see n. 52), 143.

55 Arthur Drexler, The Drawings of Frank Lloyd Wright (New York, 1962), ill. no. 21; both presentation drawings for the 1898 publication in the Inland Architect and Wright's redrawn version seem to have been lost.

56 Bruce Brooks Pfeiffer describes Wright's habit of taking old drawings out again and again over the years and writing on them subsequently: "A drawing from the nineteenth century will have, for example, a note written in 1920, and then another written in 1950 and so forth." Bruce B. Pfeiffer, "The disegni inediti di Frank Lloyd Wright," Domus 713 (1990): 72–75. The date of 1895 has been frequently adopted for Wright's designs for the Luxfer Prism Company. For example, Anthony Alofsin, Frank Lloyd Wright: An Index to the Taliesin Correspondence (New York, 1988), I:iii; Yukio Futagawa, Frank Lloyd Wright Monograph 1887–1900 (Tokyo, 1986), 84. In his autobiography Wright referred only briefly to his work for the Luxfer Prism Co. of Chicago, I to be consulting engineer for making prism-glass installations in office buildings throughout the country, had enabled me to build the workroom— then I called it a "studio"—next to our little Oak Park dwelling place. Frank Lloyd Wright, An Autobiography, 3rd (4th imprint, 1977), 162. If Wright's claim that he financed the studio addition in Oak Park with money from the Luxfer Prism Company is correct it could help to confirm the date of the studio addition as 1898. Due to the above-quoted note, and Wright's earlier dating, the studio addition has occasionally also been dated as 1895. Since not all the information in Wright's biography has proven reliable, the link between Luder's commission and the studio may be wrong. No evidence at all exists for Wright's claim that he acted as "consulting engineer." His role would be better described as that of a product designer.

57 Wright briefly considered Luxfer Prisms in 1936 for the horizontal window bands in the Johnson Wax plant and contacted the American 3-Way Luxfer Prism Company before eventually deciding in favor of the Pyrex tubes. Jonathan Lipman, Frank Lloyd Wright and the Johnson Wax Buildings (New York, 1986), 65. Wright had also specified Luxfer Prism glass for the translucent road surface in his Sugarloaf Mountain Project in 1924. He most likely thought of heavy, load-bearing slabs of glass, set in concrete, which were also produced by Luxfer and also occasionally called Luxfer Prisms. Mark Reinhberger, "The Sugarloaf Mountain Project and Frank Lloyd Wright's Vision of a New World," JSAH 43 (March 1994): 38–52. Wright might have known Walter Burley Griffin's plans to use Luxfer Prism Lights as a load-bearing material in the road surface of a bridge to span Willow Creek in his Rock Crest and Rock Glen Project in Mason City, Iowa as early as 1912–13. Marion Mahony Griffin, "The Magic of America" (illustrated typescript at the New York Historical Society, ca. 1940), 4:299. (I am indebted to Christopher Vernon for this information.)

58 "Time Extended," The Inland Architect and News Record 31, no. 4 (May 1898): 38–39; "Result of the Luxfer Competition," The American Architect and Building News 61, no. 1187 (1898): 103. There were thirty-nine entries, fourteen prizes were awarded. First Prize: $2,000, Robert Spencer, Jr., Chicago; Second Prize: $1,000, Adamo Boari, Chicago; Third Prize: $500, S. S. Beman, Chicago; Fourth Prize: $300, Curtiss Hoffman, Chicago; Fifth Prize: $200, Frederick S. Sewall, Chicago; nine prizes at $100 were given to James E. Fisher, Bloomington; Hugo F. Liedberg, Chicago; Frederick S. Sewell, Chicago; Field & Medary, Philadelphia; J. L. Wees, St. Louis, (two prizes); Alfred Fellheimer, Chicago; David S. Williams, Fort Snelling, Miss.; Howard Bowen, St. Louis.

59 Robert C. Spencer, Jr. (1864–1953) was a friend and colleague of Wright's and the first to write a long article in an architectural periodical about Wright's work. As president of the Chicago Architectural Club he was instrumental in exhibiting Wright's work in the Thirteenth Annual Exhibition in 1900. Robert C. Spencer, Jr., "The Work of Frank Lloyd Wright," Architectural Review 7 (June 1900): 61–72.


61 S. S. Beman (1853–1914) was the architect of the Pullman suburb and many office buildings in Chicago, and also had been one of Wright's early clients. T. J. Schlereth, "S. S. Beman's Pullman," in Chicago Architecture, ed. John Zukowsky (Munich, 1988), 174–89.

62 Adamo Boari (1863–1928) studied civil engineering in Ferrara and
Bologna. He moved to Brazil in 1889 and then to Chicago. He won the competition for the Mexico City Opera House with a neoclassical design in 1904, and moved to Mexico to execute the building. While working on this competition, he shared office space with Frank Lloyd Wright and his collaborators in Steinway Hall in Chicago (Wright, Testament, 35). The Mexico City Opera House provided Boari with an opportunity to apply his experiences with the Luder competition. Boari provided daylight throughout the theater and created a large curtain wall, the largest iron curtain ever built. A movable screen of 216 sq.


64 Chicago Architectural Club, Twelfth Annual Exhibition Catalogue (Chicago, 1899), 113. I would very much like to thank Patrick Pillenn for drawing my attention to this important illustration. The drawing may have been executed by Walter Burley Griffin, who worked for Boari in 1899. Christopher Vernon (Department of Landscape Architecture, University of Illinois at Urbana-Champaign) compared this drawing with Griffin’s drawings of the same period among the Peter Harrision Papers at the National Library of Australia in Canberra, Australia, and confirmed a highly convincingly likeness in style and execution.

65 American Lufer Prism Company (see n. 3), 9.

66 “American Lufer Prism Company” (see n. 13), 199.

67 In their monthly advertisements in the Inland Architect and News Record (from April 1897 to March 1900) Lufer mentioned branch offices in New York City, Boston, Philadelphia, Cleveland, Pittsburgh, St. Louis, San Francisco, New Orleans, Detroit, and Minneapolis.

68 Among them, Holabird & Roche, S. S. Bevan, J. C. Burnham, Dankmar Adler, and William J. J. Irons, as well as some of the shareholders such as William H. Winslow, George A. Fuller, and Edward C. Waller. Crew and Basquin, Pocket Hand-Book, 105–85.

69 Crew and Basquin, Pocket Hand-Book, 106.

70 Ibid., 192.

71 Ibid., 119, 169.

72 Milo S. Ketchum, The Design of Steel Mill Buildings and the Calculation of Stresses in Framed Structures (New York, 1913), 305.

73 One report stated that the light in the back of a room could be improved ten to fifteen times, the Lufer Prism Company itself claimed that figure to be up to twenty-five times, an independent report by the New England Mutual Insurance Companies hinted at a possible efficiency rate of up to fifty times. Marsh, “Daylight Illumination,” (see n. 19), 224–32; Crew and Basquin, Pocket Hand-Book, 6: “Experiments on the diffusion of light through prismatic and ribbed glass windows, (see n. 8), 33–34.

74 Basquin, Daylight Illumination (see n. 28), 805. Lufer also gave samples of color with the degree of light absorption, and formulas of how to respond with an additional amount of prism glass. Lufer Prism Company, Table of Color Corrections for Lufer Prism Areas, (n. p., n. d.).

75 The British Lufer Prism Syndicate, Ltd., Sales Brochure (London, 1905). 4. A window’s orientation towards the sun was not taken into consideration, since only the constant brilliance of the zenith-light could be used for calculation. Crew and Basquin, Pocket Hand-Book, 187–235. Ketchum, The Design of Steel Mill Buildings (see n. 72), 300.

76 Basquin, “Daylight Illumination of Stores” (see n. 18), 810.

77 The prismatic glass was probably put in when the Trading Room was remodeled as the Foreman Brother’s Banking Company in 1908. John Vinci, The Trading Room: Louis Sullivan and the Chicago Stock Exchange (Chicago, 1989), 49, 51.


79 See photograph in Larry A. Viscochil, Chicago at the Turn of the Century in Photographs (New York, 1984), 81.

80 Crew and Basquin, Pocket Hand-Book, 171.


85 William G. Purcell in a letter to Richard Nickel, dictated 15 April 1958; Purcell Papers in the Northwest Architectural Archives, University of Minnesota Libraries, St Paul Minnesota. (I am indebted to Tim Samuelson for this information.)

86 Advertisement, The Inland Architect and News Record 31 (1898), 2:xiii.

87 Crew and Basquin, Pocket Hand-Book, 112; 84 Wabash Avenue is not mentioned in Bruegmann, Holabird & Roche (see n. 81).


90 Paul E. Sprague, The Drawings of Louis Henry Sullivan (Princeton, 1979), ill. no. 114. The prisms at the Carson Pirce Scott & Co. store were taken out during a renovation project in 1936, and the carefully orchestrated balance between Sullivan’s wild flowering cast iron and terra cotta ornaments and the geometric pattern of glittering prismatic glass has been destroyed.

91 Bruegmann, Holabird & Roche (see n. 81), 177–79, 289, 315.


96 McGrath, Glass (see n. 5), 573–641.

97 Souvenirs Architectural Catalogue 1933, A 668–A 669, C 257, C290. The American 3-Way Lufer Prism Company produced mainly prismatic base lights and heavy, load-bearing glass slabs with a light-diffusing surface pattern. The term Lufer Prism was still often applied to these products. See n. 56.


For example, the Luxfer Prism Company Limited (founded 1899) in Germany, the Deutsche Luxfer Prismen Syndikat in Berlin-Weisseensee (founded 1899), the Osztr. Magyar Luxfer Prismen Gyar K.F.T. in Budapest (founded 1906); and the Société Luxfer in Brussels, Paris, and Lyon (founded 1899). The foreign branch usually paid a third of its profits to the American mother company and received technical advice and backup for the first fourteen years. In England, Luxfer Prisms were promoted both independently and in conjunction with the firm of Hayward Broders & Eckstein, which had been selling pavement lights, stallboard lights, and metal products in England since 1785. W. Eckstein was one of the cofounders and held 25 percent of the shares of the British Luxfer Prism Syndicate. Luxfer UK Limited, ed., Fifty Years at Cockpath (Nottingham, 1991), 6–9, 24–25; Hayward Brothers, Trade Catalogue (see n. 9), 249–56. Crew and Basquin, Pocket Hand-Book was translated into French and German. Who's Who (see n. 17), 23:116. The foreign branch existed between 1899 and 1914, soon followed and in some cases survived by competitors, which promoted prismatic glass as “Luminus,” “Lighthouse,” “Lumière,” “Verre-Soleil,” and “Excelsior” prisms. Éclairage rationnel, Luxfer Prism, Didot-Bottin, Annuaire de Commerce (Paris, 1899), 1515; Didot-Bottin, Annuaire de Commerce (Paris, 1914), 1695. The most powerful competitor of the French Luxfer Company seems to have been the consortium of glass-producing firms, which the St. Gobain glass manufacturing company organized in 1910. This Union Commerciale pour la vente des produits spéciaux, which boasted assets of seventy-one million francs, offered products similar to those by the Luxfer Company, including prismatic glass and pavement lights. Didot-Bottin, Annuaire du Commerce (Paris, 1911), 1695. An account of the Austrian-Hungarian Luxfer Prism Company is to be found in J. von Bue, “Die Glasindustrie in der Deutsch-Böhmischen Ausstellung in Reichenberg 1906,” Diamant 28, no. 22 (1 August 1906): 724. The Canadian and British Luxfer Prism Companies have survived to this day, however specializing in art glass and pavement lights.


P. Grandjean, “Note sur les prisms Luxfer,” Revue Universelle des Mines, de la Metallurgie 47, no. 3 (1900): 105–38; Val St. Lambert was initially the sole producer of prismatic glass for Europe with an output of 150,000 tiles per month. The British Luxfer Prism Company ordered prism tiles from Val St. Lambert as late as 1934, when a dispute over prices seems finally to have ended the collaboration. Val St. Lambert, Dalles & Prisms (ca. 1938), handwritten notebook from the Val St. Lambert Company in the possession of the Corning Museum of Glass, F-6941. A contract between the French and Belgian Luxfer Prism Syndicate (a subsidiary of the British Luxfer branch) and the St. Gobain Company in the St. Gobain Archives of 5 August 1902 speaks of an exclusive sales agreement between the two companies (I am indebted to Anne-Laure Carré at the Sorbonne for this information).


“Les Luxfer Prisms’ have wonrhtons on the North Transept Window in our Collegiate Church of St. Saviour Southampton. The wall of a huge warehouse towers above the windows and when the memorial in painted glass was erected in the early part of last month, it was an absolute failure through want of light, but the ‘Luxfer Prisms’ produced such an astonishing transformation as to make it worthy of being unveiled by H.R.H. the Duke of Connaught on June 22, 1898.” wrote the Rector of London’s St. Saviour’s Collegiate Church. Hayward Brothers, Trade Catalogue (see n. 9), 256.

Schulze, Glas (see n. 3), 21–23. In Piet Kramer’s department store prismatic glass of one of Luxfer’s competitors was used. It was called Safire and was marketed by the Deutsche Stern Prisengesellschaft G.m.b.H., Berlin.

The most extensive information about this bar is to be found in Burkhard Ruskischio and Roland Schadel, Adolf Loos, Leben und Werk (Salzburg, 1982), 137–39, 456–59; Benedetto Gravagnuolo, Adolf Loos Theory and Works (London, 1982), 117–19; Arts Council, ed., The Architecture of Adolf Loos, exh. cat., (London, 1985), 36–41. Loos himself used Luxfer basement lights shortly afterwards in the courtyard of the Goldmann & Salatsch store. Hermann Czech and W. Mistelbauer, Das Looshaus (Vienna, 1984), 55. Luxfer also produced the molten glass panels above the staircase in the center of the store. Burkhard Ruskischio, coauthor of the above-mentioned monograph on Adolf Loos and the architect responsible for several restorations of Loos buildings in Austria, confirmed to me in July 1994 that Loos had used Luxfer products several times and had also mentioned Luxfer Prisms in his (unpublished) lectures. Among Loos’s assets was a trade catalogue of the Luxfer Prism Company.

Friedrich Keppler (1862–1940), a German-born architect, had emigrated to the U.S. in 1888, joined the American Luxfer Prism Syndicate and returned to Germany to become the head of the German branch after the turn of the century. “F. L. Keppler, Leader in Structural Glass,” New York Times (8 January 1940), 21.

Deutsche Werkbund Ausstellung Köln 1914, ed., Offizielles Katalog, exh. cat. (Cologne, 1914, reprinted 1981), 225, 252. In good photographs of the interior of the pavilion the name Deutscher Luxfer Prisengesellschaft can be deciphered on the diagonal concrete beams. Apart from Luxfer’s products, Taut’s early sketches for the glass pavilion and models of glass architecture by the Taut brothers and others were on display, as well as the creations of Tiffany’s in New York, whose headquarters on Broadway in New York had been equipped with Luxfer Prisms as early as 1897. Crew and Basquin, Pocket Hand-Book, 278.

The glass pavilion has been documented in publications on expressionist architecture, such as Wolfgang Pehnt, Expressionism Architecture (London, 1973), 75–78, most recently in Angela Thiekkott, ed., Kristallisationen, Splißtungen, Bruno Tauts Glasbau (Basel, 1993). The most detailed (and fairly unknown) account of Luxfer’s technical qualities can be found in Felix Linke, “Das Glas als Dichtung und Wahrheit,” Braunschweiger GNC Monatschrift (1923): 154–61.


In fact, illustrations of Luxfer’s earlier exhibition pavilions have not yet been found. They are, however, described in detail in the contemporary literature: “Berliner Ausstellungen 1910,” Diamant 31 (1910): 645; “Die Glashausindustrie auf der Bruesseler Weltausstellung,” Diamant 31 (1910): 834; “Die internationale Bauaufstellung in Leipzig,” Diamant 35 (1913): 739; Liese, “Das Glas als Baustoff” (see n. 3), 162–70.


Julius Posener, “En se promenant dans la Deutsche Bauausstellung,” L’Architecture d’Aujourd’hui 6 (1931): 45–50; I am indebted to Anne-Laure Carré at the Sorbonne for this information.


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In Germany the firm of Siemens reintroduced prismatic glass to the market, and, with its pavilion at the Seville Expo ’92, presented a prototype of a building lit by this technique. In the United States, Hendrik Gerris, a physics professor at Brown University, and others, work with refractive plastic foils that carry microprismatic ridges cut by a laser beam. The basic principle has remained the same, but the tasks in creating these new materials have become more complex, adding to the quest for more light a concern for its color and quality. Michael Freund, “Christian Kunst,” Frankfurter Allgemeine Magazin, no. 685 (16 April 1993): 10–16; L. Young, “Natural Light at Work,” Metropolis (April 1993): 51–68.

For example, in Chicago a few of the Luxfer Prisms have survived in the backs of both the above-mentioned Gage and McClung Buildings. The Rookery Building still retains numerous prismatic glass installations in most stories of its back façade. In Philadelphia, the Witherspoon Building of 1896 at 1319–1323 Walnut Street by Joseph Juston retains its original prismatic glass. The Young, Smyth, Field, & Company Building at 1216–1220 Arch Street in Philadelphia of 1902 still displays vast expanses of prismatic glass in all eight stories in both its front and back façades. It was designed by the Philadelphia architecture firm of Field & Medary, which had won one of the prizes in Luxfer’s design competition of 1898. Numerous examples of prism installations can be found in storefronts on Buffalo’s Main Street, or on Keany and Bush Streets in downtown San Francisco (for example, 66 Keany Street). Brooklyn’s Williamsburg Savings Bank at 175 Broadway (1875, by George B. Post; additions in 1906 by Helme, Huberty & Hudswell) also contains vast expanses of prismatic glass in its semicircular windows. In Albuquerque, New Mexico, the KiMo Theater on Fifth Street and Central Avenue (1927, by Robert and Carl Bolter) contains prisms in several of its first-floor windows. One of the most remarkable examples of a large number of surviving Luxfer Prism installations is Ann Arbor’s Nickel’s Arcade (1915–18, by Hermann Pipp) at 326–330 South State Street, in which all of the stores are equipped with prismatic glass and the floor contains Luxfer basement lights.

118 See, for example, “Special Lighting Needs,” Architectural Review (February 1940): 35.

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Fig. 26, ALA 258, (c) ARS, New York/VBK, Vienna, 1994
Fig. 27, Jahrbuch des Deutschen Werkbunds (1915), 82.
Fig. 28, Deutsche Werkbund Ausstellung, Köln, 1914, ed., Offizieller Katalog, (Cologne 1914), 225

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