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# Remodeling and Expanding Carnegie-Era Library Buildings

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## ABSTRACT

One of the most satisfying undertakings in library building design can be the expansion and remodeling of historic public libraries from the early twentieth century. However, although the logic of preservation and conservation leads to strong public interest in the reuse of existing structures, the costs can be extremely high and the results can be functionally disappointing. Among the major problems frequently faced are modern building codes, load-bearing walls, the difficulty of installing modern HVAC systems, flimsy original construction materials, locations that no longer meet community needs, poor electrical wiring, elderly windows, historic brickwork that is difficult to match, inadequate sites, total inaccessibility for users with disabilities, bad modern lighting, and basements with low ceilings. However, many of these problems can be solved—or at least dealt with—with careful programming and planning, and expansion projects can result in handsome libraries that can serve for a second century.

## INTRODUCTION

This article concerns the remodeling and expansion of American small and medium-sized public library buildings constructed between about 1900 and the First World War. While many of these structures were funded by Andrew Carnegie, many others were not. Saying “Carnegie-era,” however, is a quick and easy way to refer to them all.<sup>1</sup>

One of the most satisfying undertakings in library design can be the expansion and remodeling of historic libraries. When owners walk into projects with a firm idea of functional needs and the special challenges of dealing with existing buildings, the results can be outstanding.

However, although the logic of preservation and conservation leads to

strong public interest in the reuse of existing structures, the costs can be extremely high, and the results can be disappointing from a functional viewpoint. If, in addition, the historical qualities of the original structure are compromised or ruined, not much is gained by reuse.

Although generalizing is always dangerous, Carnegie-era libraries tend to have a number of architectural characteristics in common:

- *Most Carnegie-era libraries reflect the stylistic attitudes of the early twentieth century and typically replicate various eras of European architecture.* Many were influenced by the Columbian Exhibition of 1893 and have classical revival designs, but a wide range of other traditional styles exist. In addition, some handsome Carnegie-era libraries were constructed in the arts and crafts style.
- *None of the Carnegie-era libraries I have seen were designed to be accessible in the modern sense of the term.* They have exterior and interior steps, narrow interior clearances, impressively inaccessible restrooms, doors at the ends of narrow hallways, stack units with steep steps and narrow aisles, and other problems. One of the constant challenges in modernizing Carnegie-era public libraries is bringing them into line with the requirements of the ADA and state accessibility codes.
- *Most Carnegie-era libraries have architecturally dominant front entrances.* Exterior steps lead up to their front doors, and within the libraries, further steps lead up to the main floors and down to the basements. Many of the internal staircases to the basements are twisty affairs, with pie-shaped steps and poor head clearances.
- *Obviously, no Carnegie-era libraries were designed with modern HVAC systems in mind.* They tend to have radiators and no air ducts. Carnegie-era libraries that have not been fully modernized often have window air conditioners, which are noisy and inefficient and unsightly and drip condensate upon the places beneath.
- *Carnegie-era libraries have bearing walls, both exterior walls and walls between interior rooms.* Creating wider openings in bearing walls is difficult. Because concealing wiring in bearing walls requires serious surgery, many Carnegie-era libraries have retrofitted wiring in surface-mounted wire mold, disfiguring their historic woodwork and walls.
- *Many Carnegie-era libraries have multi-deck steel stack units.* Typically, these are at the backs of the libraries, either fitted between smaller rooms or housed in small rectangular extensions at the back of the main buildings. The stack units I have seen in Carnegie-era libraries are by and large magnificently inaccessible.
- *In many Carnegie-era libraries, the central entry hall houses a service desk, which originally controlled access to the stack unit behind.* The central halls are flanked by reading rooms. The assumption is that originally the room on one side of the desk served adult users and the other room served children.

- *The basements of Carnegie-era libraries typically had meeting rooms, restrooms, boiler rooms, storerooms, etc.* Over the years, many libraries apparently ran out of space and relocated their children's departments to their basement meeting rooms (Bobinski, 1969, p. 171).
- *Unless they have been modernized, Carnegie-era libraries have completely obsolete wiring.* I have worked with libraries that had as few as three electrical outlets for two floors, plus knob and tube wiring that survived into the twenty-first century.
- *Smaller Carnegie-era libraries tend to have wooden joists and rafters.* Often these are sturdy, but there may be implications for code compliance when buildings are expanded.
- *Carnegie-era libraries tend to be uninsulated.* Exterior walls are solid masonry. Original windows were single pane. The easiest place to add insulation has been in attics, and most of the Carnegie-era libraries I have visited have retrofitted attic insulation. (Massive masonry walls can help by storing heat and cold, but they have no insulating value.)
- *In many Carnegie-era libraries, windows were designed to bring in light rather than provide a view of the outside world.* Windows were often set high in exterior walls, and perimeter book cases lined the walls beneath the windows.
- *Some Carnegie-era libraries are on large sites, while others completely fill their lots, leaving little or no space for expansion, let alone space for off-street parking.*
- *Some Carnegie-era libraries have skylights, typically located over their formal entry halls.* In almost every case I have seen, these apparently leaked like sieves (in the predictable style of skylights everywhere) and were roofed over long ago.
- *Almost all the Carnegie-era libraries I have seen have some sort of modernized lighting.* Photographs of original buildings show incandescent fixtures, often with small bulbs and glass shades that must have provided both very dim illumination and a great deal of direct glare.
- *Over the years, Carnegie-era libraries have not always been treated well.* Many have been equipped with aluminum storm windows or even unsuitable modern windows with muntin patterns that have no resemblance to the originals. Other libraries have suspended acoustic ceilings concealing their original historic ceilings, crown moldings, and column capitals. Some libraries have retrofitted exterior vestibules to reduce heat loss and protect staff and users from winter winds. Historic front doors have been replaced with inexpensive doors without panels.
- *In many communities, surviving Carnegie-era libraries are regarded as the most architecturally interesting buildings in town.* Consequently, many communities and library boards of trustees are faced with difficult and possibly unpopular decisions regarding the future of their Carnegie-era buildings.

This article evaluates some of the problems facing the owners of Carnegie-era library buildings and suggests possible solutions. The article is based on decades of experience with Carnegie-era library buildings rather than a review of the library literature.

### PROGRAMMING

With Carnegie-era library buildings in particular, programming needs to precede any design work. The great danger with historic libraries is the tendency to ask not "What kind of library services does our community want and what kind of library spaces will this require?" but rather "What neat things can we do with this old building?" The result of this approach can be a handsome structure that fails to meet current functional public library needs.

All library building programs need to be written in the abstract, without consideration of existing buildings. In the process of preparing the program, the library should enumerate its functional needs, describe the spaces and adjacencies needed to meet those needs, and summarize the necessary square footages, all without regard to spaces in the existing building. While programming without referring to existing structures is always important, it is particularly vital in the case of Carnegie-era libraries, where architectural spaces in expanded buildings may be proposed only because they can be executed rather than because they are needed for library service.

Most programs develop net assignable square footages (space required for such basic library functions as collections, reader spaces, computers, staff workspaces, storage, etc.) and then add fudge factors for nonassignable spaces (restrooms, foyers, staircases, elevators, HVAC, panel rooms, mop closets, the thickness of walls, etc.). Although this approach works well with the construction of modern buildings, the limitations of Carnegie-era library buildings due to unusable spaces, massive wall thicknesses, etc., suggest that programs should be limited to assignable spaces only, since the use of standard fudge factors for unassignable space may lead to extraordinarily insufficient estimates of gross space.

Once the program is completed, it can be used as a yardstick to test whether the existing building can be expanded and remodeled to provide the assignable spaces required to meet the current needs of the library. This is the appropriate time to study how the program may need to be tweaked to allow necessary spaces to be fitted into existing spaces, because planners will then be very aware of any compromises that are being made.

Programs are particularly vital when other historic buildings are located near Carnegie-era libraries and people are tempted to either link two historic buildings or to expand libraries in serpentine fashion, wind-

ing among adjacent structures. Linking two historic buildings is a perilous undertaking at best. If the linkage leads to providing unneeded spaces, involves coping with floors at widely varying levels, or results in labyrinthine floor plans, the process needs to be stopped before it gains local traction.

### AWARENESS OF COSTS

It is extremely easy to underestimate the cost of remodeling and modernizing an existing historic library building. If a building needs a new HVAC system, new wiring, new roof, new lighting, new plumbing, an elevator, a sprinkler system, abatement of asbestos and lead paint, fire-rated staircases, replacement of book stacks, and substantial other work to bring it into compliance with building codes, the necessary work can cost easily as much as new construction—and sometimes substantially more. In addition, all sorts of problems can be uncovered only after construction begins. For these reasons, initial cost estimates can include perhaps 15 to 20 percent extra for contingencies, and final estimates typically include about 10 percent for contingencies, as opposed to about 5 percent for new construction.

Remodeling historic Carnegie-era libraries without simultaneously expanding them significantly is unlikely to be successful unless the libraries have a great deal of currently unused space. Remodeled libraries will need increased space for air ducts, larger restrooms, legal clearances between furnishings, replacement of historic book stacks with accessible shelving, retrofitting of electrical outlets and data conduit, addition of an elevator, and provision of additional staircases required to meet safety codes. All of this means that the existing building will hold substantially less after remodeling.

One of the problems that accompany possible remodeling and expanding of historic libraries is public pressure. Even if expanding a historic library building is clearly unworkable, few people will believe that reworking it involves throwing good money after bad.

When considering remodeling and expansion, therefore, a Carnegie-era library will need:

- *A written building program listing the spaces needed when the building is finished—not those the owners or architects think they can create by conversion of existing spaces, but spaces required to meet the library's long-term service needs.*
- *The opinions of architects and engineers on the physical condition of the library building and its suitability for expansion.* Unfortunately, some century-old buildings are simply beyond fixing. I've worked with Carnegie-era library buildings that were literally collapsing, sometimes with failing footings, heaving floor slabs, tilting masonry walls, and other major structural problems. It was hard for communities and historic preservation enthusiasts to come to grips with the fact that the only way to

preserve such buildings would probably be to demolish them and construct replicas.

- *A schematic design prepared by the library's architects, showing how the building can be expanded and remodeled to provide the spaces detailed in the building program.*
- *A review carried out by the library's building consultant of the architect's design for expansion and remodeling, to be sure that there are no functional problems.*
- *If the library project is subject to the authority of an historical preservation agency, input or signoff from the agency on the proposed work.*
- *A solid cost estimate for the project.*
- *The architects' estimate of the cost of starting over with a completely new building, to provide the owners with realistic comparative costs.* Unfortunately, estimates for the cost of remodeling and expanding historic buildings can be extraordinarily inaccurate. One Illinois Carnegie library, for example, found its lowest bid was three times the architects' estimate.

If discussions about the need to abandon a historic library and start over on a new site get ugly, it is important to let hired professionals—architects and programmers—take the flak. Remember the basic rule: the library's board of trustees should always deliver any good news, and hired professionals should deliver all of the bad news. The professionals will probably be more believable, but the important thing is that if they are from out of town, they can quietly steal away at the end of the meeting.

## BUILDING CODES

Unless they have been remodeled and expanded in the recent past, Carnegie-era libraries will be seriously out of conformance with existing building codes.

Determining what the owners can and cannot do is a technical undertaking that will require conversations between architects, engineers, and local code enforcement officials. Inevitably there are gray areas. While officials may be willing to bend on zoning issues, such as setbacks, requests that life-safety codes be waived will not be welcome. However, sometimes historic buildings may be allowed to vary from some building codes, while more recent buildings of less architectural significance may not.

Whatever happens, it is important that libraries find out the implications of building codes before making confident public announcements concerning expansion.

### *New code categories resulting from expansion*

Many building code requirements vary with the size of the structure. A library may find, for example, that its building is perfectly legal as a small structure but is no longer legal as part of a substantially larger structure. This can frequently happen if the construction materials in the building are inappropriate for the larger structure. For example, existing wooden

structural components may not meet local fire codes for significantly larger buildings. If this is the case, it is possible that a library may not be allowed to expand its building. Or it may be required to construct what amounts to two separate buildings with a narrow opening between them, equipped with doors that close automatically in case of fire. A narrow opening between two sections of the building may work well if each section is the right size to house a major component listed in the building program. But if the resulting spaces do not match the program, the library may find it difficult or impossible to develop the functional spaces it needs. And if a department is divided between two essentially separate spaces, this may introduce expensive problems with staff oversight.

Another frequent requirement when buildings expand is the addition of a sprinkler system. The IBC (International Building Code), for example, specifies that any library over 12,000 square feet must have a sprinkler system, but Carnegie-era libraries were not intended to have them. If a retrofitted sprinkler system cannot be concealed above existing ceilings, the results may be unattractive.

#### *Asbestos and other pollutants*

Almost any building constructed before the mid-1970s is likely to contain asbestos. Even if a Carnegie-era library building had no asbestos at the time it was built, asbestos-laden materials may have been added later.

In some cases, asbestos that is intact and not crumbling and will be covered by new material can be left in place, but libraries need to find out what the situation is, what kind of remediation (safe removal) may be necessary, and what it is all likely to cost.

Lead paint was banned in interiors in 1978. As with asbestos, lead paint was great except for its poisonous qualities. If it is stable and not attached to crumbling surfaces, it is not a big problem. But it can be nasty if libraries need to modify things. For example, sanding wood that has been painted with lead paint leads to airborne lead dust.

## DEALING WITH TYPICAL FUNCTIONAL PROBLEMS OF CARNEGIE-ERA BUILDINGS

### *General building footprint*

Many Carnegie-era libraries are simple, rectangular structures, with flat exterior surfaces to which additions can be attached. Over the years, I have seen libraries extended to one or both sides, extended to the rear, encased on three sides (leaving only the historic front exposed), encased in L-shaped additions (leaving historic corners exposed), and other arrangements. Simply extending Carnegie-era buildings to the rear is probably the easiest approach, but sometimes available sites don't allow it.

Most expanded Carnegie-era libraries are provided with new, grade-level entrances. This works particularly well if one side of the building

faces a side street. Usually an elevator with doors on both sides is installed inside the grade-level entrance. In a two-story library, users can take the elevator from grade level either up to the main floor or down to the basement.

Some of the nineteenth-century public library buildings that preceded Carnegie-era libraries can be far more difficult to expand, particularly those libraries that have central halls from which smaller wings radiate, for there may be no way to connect the original structure seamlessly with a new addition.

Many Carnegie-era libraries have steel stack units with two or more decks. These are almost always completely inaccessible. When the stack units are removed, the resulting space may house only a very small fraction of the books the original stacks held, and new shelving will need to be provided elsewhere. In some Carnegie-era libraries, the stack units are housed in small rectangular structures projecting from the back wall of the library; most remodeling and expansion projects in libraries of this type involve removing the stack wings to create flat rear walls suitable for new additions.

I've seen at least one Carnegie-era library where the original, inaccessible steel stacks were left in place, providing a major barricade between the original building and the new addition and helping to make the original library even more out-of-the-way and forgotten. (I've always wondered how that library dealt with ADA issues.)

While most additions to Carnegie-era libraries match the floors of the original buildings, another approach is to build a grade-level addition adjacent to the library, with a new grade-level entrance in the new addition. This arrangement makes it possible to have a single service desk that controls all accessible access to the building. The resulting split-level structure may have open stairs leading from the new addition to the historic first floor (and to the basement, if codes permit), greatly reducing the isolation of these older floors in the expanded building (figs. 1 & 2).

The same single grade-level entrance can sometimes be created with a two-story addition if the site slopes, making it possible for users approaching the library from another side of the building to walk directly into the basement or first floor (fig. 3).

A number of architects designing additions to Carnegie-era buildings have left historic outside walls as part of the exposed interior design of the expanded buildings. These walls can be attractive, but they may emphasize the fact that the resulting library is two buildings rather than one and take away from a feeling of unity.

When the subject of expansion comes up, someone is likely to raise the idea of adding another floor. Even if the footings and columns are strong enough (which is extraordinarily unlikely, even with modern libraries), public libraries need to expand outward rather than upward in order to





Figure 1. The Detroit Lakes, Minnesota, Public Library is one of a several libraries built using the same plans. It was expanded by MS&R (Meyer Scherer & Rockcastle), architects, Minneapolis, who designed an addition at grade level, making it possible for users to enter the building without using stairs or an elevator and improving exit control. Photograph by Lea Babcock Scherer courtesy of MS&R.

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Figure 2. A view of the interior of the new addition to the Detroit lakes Public Library. Steps up to the original first floor are visible at the rear. The elevator and the steps to the basement cannot be seen from this angle. Photograph by Lea Babcock Scherer courtesy of MS&R.

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Figure 3. The LaSalle, Illinois, Public Library was located on a sloping site that allowed a new two-story addition to have a grade level entry to the basement. Photograph courtesy of apaceDesign, architects and engineers, Peoria.

limit staffing costs. And adding an additional floor to most small historic buildings would probably create an artistic abomination.

#### *Load-bearing walls*

“Bearing walls” are walls that hold up a building.

Since most if not all Carnegie-era libraries were constructed with load-bearing walls, it can be difficult to open up larger spaces. While it is almost always possible to create openings where solid walls exist, this can be expensive and may even require strengthening foundations where the remaining portions of walls end up carrying more weight than the footings below them were intended to support.

One of the standard solutions when expanding historic libraries is to convert existing windows to archways, because the lintels over the windows are already in place. Cutting out a section of wall to essentially lower the window sill to the floor may have little or no impact on the structure of a building and therefore be a relatively inexpensive alteration.

Unfortunately, the expansion of old buildings with small rooms and bearing walls can lead to larger structures that are labyrinths, with too many rooms and too many invisible corners to supervise.

Many historic small libraries of the Carnegie era have reading rooms that flank central halls at the front, and stack units flanked by offices at

the rear. If the offices all have bearing walls, it may be difficult to open up spaces in the backs of existing libraries. And the artistic character of the formal reading rooms may be hurt if they are enlarged. If a new wing is added at the rear of the library, the old offices may create a wasp waist between the original reading rooms and new public spaces at the back of the building. The danger in such a situation is that the original front reading rooms may become forgotten adjuncts, spaces down the hall and around the corner.

*Inadequate heating, ventilating, and air conditioning*

Carnegie-era buildings were built with radiators but without cooling systems, and they do not have the ductwork necessary for modern forced-air heating, ventilating, and air conditioning systems.

If a historic library has two floors—a main floor and a basement—it may be fairly easy to add ductwork to heat and cool the main floor because many old buildings have substantial attic spaces that provide sufficient room for ducts.

However, if a library has two floors plus a basement, there will be no attic space available for ductwork to provide air to the main floor. Hanging ductwork from an historic ceiling is an abomination, so the only option may be installing ducts in the basement.

Whether or not they must house ductwork for the floor above, basements in Carnegie-era libraries are often a serious problem for modern HVAC systems. If a basement has an eight-foot ceiling, for example, the addition of ceiling-mounted ductwork will make basement spaces too low for occupancy. However, sometimes it is possible to install perimeter ducts that leave the center of the basement usable.

Many historic library buildings are energy hogs. Neither solid masonry walls nor single-pane windows provide much (if any) insulation. Rooms with high ceilings are more expensive to heat than those with low ceilings. The lack of entry foyers can expose users and staff to blasting winter winds.

Unfortunately, ill-considered responses to inadequate insulation can ruin attractive buildings. Some historic windows have been replaced with modern windows with different muntin patterns, essentially ruining the historic appearance of the buildings. Some libraries have added cheap aluminum storm windows, which are ugly but at least do not result in the destruction of the original windows. Handsome ceilings with elegant cornices have been hidden by suspended acoustic tile ceilings. Awkward foyers have been added to the front of historic buildings to block winter winds.

A number of solutions are possible. Although it is more expensive, existing small-pane windows with single glazing can be replaced by double-pane windows that look essentially identical. Many Carnegie-era libraries

have large attic spaces, making it easy to insulate ceilings. If high ceilings lead to concentration of heat, paddle fans can often be installed that suit the era of the buildings. Historic skylights can be covered over and lit electrically.<sup>2</sup>

*Inadequate electrical wiring*

Carnegie-era libraries can have extraordinarily tangled wiring, frequently cobbled together over many years and sometimes in spectacular non-compliance with even rudimentary building codes. It is still possible to find old libraries with working knob and tube wiring, often with its original insulation happily cracking off and with fuses for higher amperages than the wire can safely conduct.<sup>3</sup>

Because historic buildings often have solid masonry walls, it is tempting to add new wiring by attaching metal conduit to the surface of the walls. Unfortunately, the result can be extraordinarily ugly. By the time a Carnegie-era library is remodeled and expanded, it may already have a variety of unsightly exposed electrical conduit that was added piecemeal over the years as occasional new outlets or light fixtures were needed. A major remodeling job is a great time to get rid of the mess.

If a library cares enough to preserve and expand its historic building, it should care enough to hide the new wiring. The attractive way to add wiring is to channel through the plaster (and sometimes part of the masonry beneath) to provide space to bury electrical conduit in the walls.

Modern computer usage—whether PCs or laptops—requires access to both 110-volt service and Ethernet throughout library buildings. There is always a temptation to save money by providing an inadequate number of outlets or by attempting to get by exclusively with wireless data communication, despite the problems with slow speed, lack of reliability, and inadequate bandwidth that result.

*Old windows*

One of the most important sources of character in historic buildings is their windows. The dimensions of the frames and muntins and the number and proportions of the window panes play a critical role in the appearance and aesthetics of historic libraries.

One of the worst things that has been done to historic buildings is replacing historic windows with modern windows that do not match the originals. Removing small pane windows, for example, and replacing them with large sheets of glass can alter the appearance of a building destructively. If modern aluminum sash windows are used to replace original steel sash windows, the result is likely to be unfortunate. For reasons of strength, aluminum windows will probably have bulkier muntins than steel windows, and even if the pattern of window panes is similar, the new windows will look distinctly different.

Obviously, the best thing is to leave historic windows in place, but they

often have serious problems. Old wooden windows may be rotting out, and iron window frames may be badly rusted. Windows may have been destructively modified in the past. Sometimes, the best solution may be to use photographs of the original building to create custom-made windows that match the originals as closely as possible but are better insulated.

Another problem with historic buildings is that window sills are often too high to allow users to see the outside world. A century ago, the main function of windows in libraries was to provide natural light, and book shelving was frequently located along perimeter walls beneath windows. However, library users today often want to read in locations that let them see the outside world pass by. In my opinion, constructing additions with windows that match those in the original buildings but have lower sills does not destroy the historic look of the buildings, particularly if the tops of the new and old windows all align, the framing elements match, the muntin patterns are as identical as possible, and the widths of the new and old windows match.

If a Carnegie-era library is subject to the oversight of a historic preservation agency, the agency may pay special attention to what the library plans to do with its existing windows.

*Cheap or fragile construction materials*

It is fun to believe that historic buildings were always well built, but that can be far from the truth. For example, many Carnegie-era libraries have cornices that resemble stone balustrades but are actually made of painted sheet steel. If this material is rusting out, or if more is needed, details of this kind can usually be matched in fiberglass or similar materials.

One of the most attractive features of classical library buildings is architectural terracotta—ornamental details made of glazed ceramic material. Eventually, some terracotta develops major crazing and cracks. Other terracotta simply needs to be matched on additions. While replacement terracotta is available, the cost can be significant, and some architects have been very successful at matching historic terracotta details by making molds from the originals and using them to produce replicas from materials like fiberglass.

*Poor functional locations*

Some otherwise great library buildings find that with the passage of time, the building is no longer in a functional location.

This is particularly true for public libraries, because they interact strongly with their neighborhoods. If all of the retail stores around the library have closed and relocated to preferred areas, the library loses much of the synergy that occurs between libraries and commercial neighbors. If a homeless shelter has been established close to the library, it may be time to move away.

Changes in library use patterns in the last century have led to massive

increases in need for off-street parking. Few historic libraries had large parking lots, so in addition to providing space for a new addition, a library may also need to find space for a substantial parking lot.

*Historic construction that is difficult to match*

Matching exterior brickwork is a special problem, since many types of brick used a century ago are not easily available. For example, the slender Roman bricks with thin horizontal mortar joints that are sometimes found in late nineteenth and early twentieth century buildings are particularly hard to match. Taking the time to thoroughly investigate brick sources is important, and the rush to select brick quickly may lead to gross mismatching that grates on the eyes forever. One standard approach to satisfactory expansions of historic buildings is to never place new and old bricks directly adjacent to each other. If a new architectural element perhaps 10 to 20 feet wide separates the two areas of brick, it is much harder to tell that the two types of brick do not match (Fig. 4).

*Deciding whether to match historic styles*

Opinions differ strongly on whether historic buildings should have matching additions or have distinctly different modern additions. The argument against matching additions is that the building exemplifies the intent of the original architects, and any addition should be obviously an addition, a structure that no one will assume was part of the architects' vision for the building. I find this contention a somewhat silly one, some-



Figure 4. The brickwork of the new wing of the expanded LaSalle Public Library closely matches the building's original brickwork, but any difference is made less noticeable by separating the two areas of brickwork by the new, accessible entrance. The original building is on the right. Photograph courtesy of apaceDesign, architects and engineers, Peoria.

thing that bothers primarily design professionals who are either historical purists or are offended by the prospect of being asked to imitate older building styles. Usually everyone one else, particularly the users of the building and the residents of the area if serves, is happy with a matching or very similar addition.

One of the problems with unmatched modern additions to historic buildings is that they can age badly. When the new addition is constructed, the building consists of a charming historic library and a trendy modern wing, and the two function comfortably together. But after thirty years, when styles for contemporary architecture have changed, the building may consist of a charming historic library and a painfully dated addition. The combination may work out over the years, but it also may not, and why take a chance on the snotty snickers of passersby to come?

Architects may also contend that matching an original look is impossible because it will be too expensive. This can be the case, but one suspects that the real motive is often a desire to make a contemporary design statement instead of a derivative one. To reduce costs, original looks can be matched in somewhat simplified form, skipping for example the most expensive stonework details.

Historic preservation agencies, however, may feel strongly that matching additions are inappropriate, and that may influence design decisions.

#### *Lack of adjacent land*

In many cases, the ability to expand a Carnegie-era library building (or any number of more recent buildings) is hampered or prevented by the lack of adjacent land. I have worked on at least three projects involving historic library buildings that had to be abandoned due to lack of expansion land.

Some libraries have been built on sites that were always too small to support expansion. This is one of the worst mistakes that can be made in library planning. At the time the new library is built, it seems huge—a building that will last forever. But in ten or twenty years, the library is packed solid. Library collections grow, and new services—never anticipated when the library was designed—need to be housed.

Needing to expand a library when the available space is too small leads to hard decisions. Libraries cobble on crowded additions. They try to build upwards, which is almost always impossible or badly advised. Or they delay and delay before finally cutting their losses and starting over on new sites.

Other libraries have had expansion space, but they sold it or gave it away. On a scale of bad planning from 10 (great planning) to 0 (seriously awful planning), this rates about a -10. If historic libraries are in desirable locations, protecting adjacent expansion land can be a major political problem, with businesses, government agencies, schools, and other

agencies inkingly coveting the prime central land surrounding the library. It is essential that owners stand firm, but it is not always easy. People with designs on the library's land are particularly good at announcing that electronic publishing means the end of books or that public library boards want to expand buildings merely to stroke their own egos. Some observers will brand even a tin bicycle shed a "Taj Mahal."

Public libraries have sometimes sold off portions of their land to raise construction money. Inevitably, when the library needs to expand, the space it sold off is no longer available, or available only at an unaffordable price. O. Henry wrote about ironic situations of this type.

In addition, changes in zoning may make a library's current site too small. A good example is the requirement that libraries detain water runoff. At the time a Carnegie-era building was constructed, on-site water retention was not an issue, but when the time to expand arrives, the library may find out that new zoning requirements now require that any new addition be accompanied by a pool to hold runoff.

The morals of all this are simple:

- Never let land around a historic (or modern, for that matter) library go. Whatever trivial amount of money the sale yields will be insignificant compared to the cost of acquiring land later.
- Never let land available for purchase near a library slip through the library's fingers. The land may not be needed for decades, but when the day comes, the library will be ready.
- Libraries need to pay particular attention to proposed developments near their buildings. Few community leaders will understand when certain changes will lead to functional disasters for nearby libraries, and library boards need to be ready to speak up loudly.

#### *Lack of accessibility*

Any library built before the passage of the Americans with Disabilities Act or similar state statutes may have serious problems with accessibility.

Carnegie-era libraries are full of steps. Most of the steps I have seen are practical staircases for movement between floors rather than the irrelevant steps introduced in more recent buildings because the designer thought they were cute. However, all of these have to be overcome.

Many libraries also have inadequate clearances to allow wheelchair traffic. These can range from narrow doorways to narrow stacks, cramped restrooms, and other common problems.

Historic entrances in Carnegie-era libraries are almost always totally inaccessible, and there are no quick and easy solutions. Many people will suggest adding entrance ramps to make it possible to reach historic front doors, but unless the difference in height is a foot or two, a ramp will be endless. Moving just two feet vertically requires a ramp a minimum of 24 feet long, and eight feet requires well over 100 feet of ramp. The ramp



will be miserable or impossible to negotiate in the winter, and it will make a significant contribution to the architectural destruction of the building.

Even if ramps to historic front entrances were practical, there are often additional steps immediately inside the front doors of Carnegie-era libraries, making the whole topic academic.

The only practical solution to access to the vast majority of libraries of the Carnegie era is to provide a second entrance at grade level, with an elevator inside that can transport people to the various original levels of the library. Elevators with doors on both sides make this kind of installation easy. To avoid trying to cut into the original fabric of the building, new grade level entrances are almost always installed in the addition to the library.

Although elevators are essential, some Carnegie-era libraries have installed cheap substitutes for elevators, almost always with unpleasant results. Connecting two floors with an enclosed ramp takes an impressive amount of floor space and subjects users in wheelchairs to a long and dismal uphill struggle. Some libraries have installed enclosed lifts with manual doors, resulting in situations where staff have to rush to assist disabled users. Other libraries have installed chair lifts running along stair railings, requiring wheelchair users to be helped into the lifts while friends or staff members tote their chairs up and downstairs.

It is essential that new entrances be at grade level, with movement between floors all internal. As an impressive example of poor design, when one Carnegie library in Illinois was expanded, the architect added a huge new exterior staircase, supplemented by a ramp down to the basement level. The results were miserable. The staircase faced northwest and was covered with ice all winter, forcing the library to rope it off for weeks at a time. The exterior ramp down into the basement channeled rainwater into the building, leading to frequent floods.

The main difficulty in providing direct user access to two different floors from a new, grade-level entrance is arranging things so that library staff at a main floor service desk can oversee users entering or leaving the basement level. It is easy to position a service desk so that staff there can simultaneously watch the new entrance to the main floor and the historic entrance, but watching basements is much more difficult.<sup>4</sup> This has led some libraries to use basements for other purposes than collections, readers, and computers. Meeting rooms and storage appear to be the most common uses.

Larger historic libraries can improve staff oversight by using two elevators. The first elevator lifts users from the entry level to the floor with the lending desk and security gates. After passing the lending desk, users can take a second elevator to other floors. It may even be possible to have the same desk supervise both the new entrance and the historic entrance, but in some cases these will be too far apart, since security gates need to be

close enough to service desks for users passing through them to be easily observed by staff.

Once a new entrance has been provided, it is tempting to take the historic entrance out of service. Watching two doors is expensive, and the original entrance may be poorly sheltered from winter weather. Unfortunately, a major architectural message of historic buildings is frequently “this way in.” If historic doors are taken out of service, the building loses essential navigational clarity. If a library is forced to take a historic front door out of service, about the only acceptable thing to do is to convert it to an emergency exit but otherwise leave it strictly alone, so it can be used as an entrance once again if times change.

Probably the worst thing architects and owners have done with historic entrances is to simply brick them up. Bricked up historic entrances are, to use a delicate phrase, butt ugly. At this point, one is tempted to ask why anyone bothered to keep the old building at all.

Although there are no doubt Carnegie-era libraries that were originally built with accessible restrooms, I have never seen one, and expansion will probably require all new restrooms.

#### *Basements with low ceilings*

Most basements in Carnegie-era library buildings have low ceilings, severely limiting the use of basement spaces. When these buildings are expanded, the solution to the problem is usually to drop the level of the basement floors in the new additions to provide adequate ceiling height. The change in level between the two basement floors may be only a couple of feet, so elevator service may not be essential between the two basement levels. But I worked with one 1901 Carnegie library where the architect deftly installed an elevator with stops at two basement levels, street level, and two upper floors.

Often, however, the highest (or lowest) and best use of original basement spaces will be for storage and perhaps mechanical systems.

#### *Dated lighting*

The Carnegie-era libraries I have seen all have some sort of replacement lighting. The original light fixtures with incandescent bulbs and glass shades must have provided a great example of the dim and glaring lamps mentioned memorably in the *Battle Hymn of the Republic*.

One common lighting approach is chandeliers with translucent glass bowls that are large enough to provide good distribution of light. The major problem with fixtures of this type is that they tend to have accumulations of dead bugs, but many are available with opaque central ornaments to conceal bugs.

If a library room is compatible with cove lighting, either with an existing cove or one that has been retrofitted, it may be possible to provide much of the light from the cove while using a central fixture with fairly

dim lamps to give users the feeling that the light is coming from an historic source. The accompanying photograph of the Indianapolis Public Library shows how a similar approach was used to light a large, historic room using chandeliers shaped somewhat like wagon wheels. The large bulbs on the bottom of the chandeliers are there primarily to provide a psychological sense of where the light is coming from, but the actual light comes from brilliant lamps mounted on the tops of the chandeliers and illuminating the ceiling (fig. 5).

### DEALING WITH PRESERVATION AGENCIES AND CITIZEN GROUPS

Depending on state and local laws, the expansion and remodeling of Carnegie-era libraries may be subject to the control of state preservation agencies and local agencies. There may also be citizen groups that have no legal standing but are eager to participate in decisions.

My experience has been that almost everyone welcomes the preservation of Carnegie-era libraries so warmly that relationships start out warm and friendly, but they may become strained if requirements established by historic agencies have strongly negative implications for library functions.

The largest problems I have encountered have involved sites—sites too small for expansion or sites with other buildings that people want to see preserved. In the case of one library that was completely trapped between other important buildings, the city finally agreed to close a major street rather than have the library abandon its historic building—but only after studies indicated that was the only option.

Citizen groups may also insist that the library be merged architecturally with adjacent buildings or that it be expanded in a serpentine fashion, weaving its way between adjacent historic buildings. Although one can envision situations where these concepts might work, in general the library will have to find a polite but fast and positive way of saying the ideas stink.

### PHASING EXPANSION PROJECTS

When libraries—both historic and modern—need to expand, one major decision is whether to stay in the building during expansion work or to move out temporarily.

If the library continues to provide service in its building during expansion and remodeling, the result is a “phased” construction project.

A simple phased project may begin with the construction of a new wing. When construction is complete, the library may camp out in the new wing while the existing library is remodeled. Then the library moves back into the remodeled space.

Some projects involve more than two phases, and planning them becomes reminiscent of planning complex military campaigns.



Figure 5. The Indianapolis and Marion County Public Library. The room's chandeliers combine intense uplighting with decorative visible light bulbs. Photograph by Fred Schlipf.

#### *Advantages of phased construction*

The main advantage of phased projects is that libraries do not have to move out during construction.

And that's about it.

#### *Problems with phasing*

Despite the allure of phasing, there are a number of evils that accompany it.

One major problem with phasing a major construction job is that the required time for the work can nearly double. Instead of (for example) taking 18 months, a project may take 30.

Phasing can also lead to conflicts over use of sites during construction. This is a particular problem when open land around the building is limited. Construction companies need space for their construction trailers, for parking for workers, and for piling construction materials. Open lawn around the library is usually not a good place for staging construction work because nothing should be placed within the drip line of any trees the library wants to retain. As a result, a common way to provide space for

construction equipment, parking, dumpsters, and construction materials is to cannibalize the library's parking lot, leaving staff and patrons no place to park during the project.

Trying to use a library that is under construction can be a major pain for both users and staff. If a library tries to operate behind a plywood partition while construction is going on inches away, it can expect to be subjected to a constant barrage of the sounds of masonry drills, falling objects, loud conversations, and workers' radios. There will also be impressively bad smells. Construction dust may leak into the area of the building in use as a library and make some users or staff ill.

Because of construction, a library may have problems getting patrons and staff in and out of the building. Entrances will wander about as the project continues, and the library will have to provide all-weather access to each of them. Temporary staff parking and even patron parking may need to be blocks away.

The better integrated the new and old sections of the building will be, the greater the problems with phasing. If the new addition is almost totally separate from the original building, phasing may be easier, but the resulting building is likely to be dysfunctional. Sacrificing good interior arrangement for phased construction sounds like a very poor exchange.

An example of miserable failure in integrating an addition is provided by the Northwestern University Library in Evanston. The library was expanded in the late 1960s by a major addition to its historic Deering Library. The new addition is connected to Deering only by a basement tunnel and a link into the back of the map library. The fact that the new addition is impressively dysfunctional—not even counting the rotten connections between the two sections—is just an extra benefit.

Owners of historic buildings can assume that bids for multiphased construction will be substantially higher than for single-phase construction. Contractors don't like to have owners and users underfoot, possibly entering construction areas with resulting liability concerns.<sup>5</sup> Contractors will spend more money bringing all the trades back a second or third time. Because phased construction will extend construction time, contractors will worry more about inflation in costs ("escalation," in terms of the trade) and increase their bids accordingly. Phasing will mean a variety of extra costs for temporary divider partitions and other items that will be discarded at the end of construction.

For all of these reasons, bids for single-phase work will be lower than bids for multiphase construction. For smaller libraries, it will almost certainly be cheaper to move out during construction, even with the extra costs of renting temporary space and hiring commercial movers, than to carry out construction in phases.

Phased construction can also lead to major problems with HVAC

equipment. Because the equipment in the new addition may have to function together with new equipment added to the original building, libraries can't be sure that everything will work properly together until the project is completely done. The problem is that libraries need to turn the equipment on in the new addition while they are camping out there. If a year passes during the second phase (remodeling the original building), by the time the project is completely finished, the one-year warranties on the Phase I equipment will have expired. If the total system doesn't work correctly when the project is done, the library will have trouble because half of the equipment will already be out of warranty.

This sounds like a minor point, but it is not. Modern HVAC systems are extraordinarily complex and expensive. In a library construction job, the cost of HVAC may be 25 percent of total construction cost. Commissioning the system (making sure that everything works correctly and that the library staff members know how to operate the system) is a major undertaking. A library will not be happy if, when HVAC components in the Phase I part of the job don't function correctly when the total project is over, the contractor and architect informs the library that the Phase I part is now out of warranty, and that it was working just fine when the equipment was turned it over to the library fifteen months earlier.

One solution to this is to have the agreement with the library's contractor provide that the warranty on the HVAC system will commence at the completion of the final phase of construction, but libraries may find contractors balking at this requirement.

If a library moves out during construction, it will move just twice, but with complexly phased construction, a library may have to move a number of times.

I'm convinced that the least expensive (and by far the least painful) way to expand and remodel an historic library building is to simply move out for the duration.

#### *So Why Phase Projects?*

One of the main reasons libraries phase projects is that they cannot find temporary housing. However, if a library can find no space large enough to house its collections and services temporarily, it is a lot better off putting part of the collection in dead storage for a year than trying to live in a building under construction. (With automated lending systems, it is easy to develop a list of least-used items in the collection.)

Another reason for phasing is that owners may want to extend the project time to match cash flow. If this is important to the library, phased construction may help. But it is important to be aware of the extra costs that accompany phased construction. When all is said and done, pay-as-you-go construction may actually be a bad fiscal choice.

### WHAT CAN GO WRONG?

As this article has indicated, modernizing and expanding Carnegie-era libraries can be a perilous but rewarding undertaking.

- Matching historic construction materials is difficult and often expensive. I worked with a library that replaced a century-old slate roof. The result was magnificent, but it was not a project for the fiscally timorous. Because of complex construction, remodeling and expanding an historic library will probably cost just as much as building a functionally equivalent new building.
- Sometimes, matching historic construction materials is essentially impossible. For example, matching historic brick is a major problem with Carnegie-era libraries. Many libraries of that time were constructed with Roman brick, long thin bricks with thin mortar joints. Bricks of that type are no longer available. The usual solution is to avoid butting new and old bricks together.
- Because Carnegie-era libraries are often surrounded by other historic buildings, library boards may find themselves pressured to combine libraries with other historic buildings or to expand in serpentine fashion to avoid other buildings. Although these are not totally evil ideas, they generally come close enough for all practical purposes.
- Historic buildings that would be constructed on a single floor as modern libraries end up with two or more floors, with resulting extra costs for staircases, elevators, and elevator maintenance.
- Retrofitting air ducts and wiring may require very serious surgery. Making do with too few electrical outlets and data ports will handicap future use of the library. Dropping historic ceilings to conceal air ducts (or dangling air ducts from historic ceilings) is destructive.
- The complexity of expanded Carnegie-era buildings can make them expensive to supervise. Instead of a single entrance there will probably be both a modern, accessible entrance and the original historic entrance. A small library will typically have an elevator leading directly to two floors, while a larger one may have two elevators, one leading to the main floor service desk and a second connecting the main floor to other floors. Instead of having most library services provided from a single, large room, there will be a number of smaller rooms—sometimes on two or three floors—that are harder to watch. If badly done, buildings can become labyrinths, or historic rooms can be forgotten.
- Making full use of available space in a small library can often result in public service departments on two levels, which may require more staff than a library can afford. Since the major cost of running a public library is staff rather than structure, staffing implications are of more financial import than design implications.

- Entrances need to be visible from service desks. In some Carnegie-era libraries, tight sites make this difficult to arrange.
- The lack of insulation in the original building will increase energy costs.
- Most Carnegie-era libraries have bearing walls, which make alterations far more difficult.
- Some cities or library boards that are not in love with their historic buildings have badly misused surviving historic spaces when buildings were expanded. One of the worst ideas I have seen (in more than one place) is filling historic and architecturally elegant front reading rooms with book stacks.
- Bricking up historic entrances or replacing historic windows with non-matching modern windows can do so much artistic damage that one wonders why people bothered to remodel the building at all.
- Surviving architectural plans for historic libraries are sometimes extremely inexact, and architects need to avoid relying on them. In addition, libraries of this age will probably have large numbers of undocumented previous alterations. Remodeling may involve a substantial amount of exploratory surgery, and budgets will need to include more funds for correcting unexpected situations.
- Carnegie-era libraries require elevators with the permanent continuing expense of maintenance. As discussed above, cheap substitutes like lifts and ramps don't work.
- Expanding and remodeling Carnegie-era libraries require more time and effort for architects than constructing new libraries, and owners should expect fees to be correspondingly higher.
- Excavating next to the foundations of historic libraries can be tricky. Architects and engineers need to plan transitions in ways that will help to avoid expensive reinforcement of the original footings.

## CONCLUSIONS

One of the most satisfying things one can do is expanding and modernizing a Carnegie-era library building, preserving its best features for the future while converting it into a library for the twenty-first century.

In many cases, its continued use as a library may be the building's only hope. The same problems that make the building unsuitable for library use—inaccessibility, too many small spaces, bad insulation, lack of modern electrical and mechanical systems, failure to comply with modern building codes, and so on—may make it equally unsuitable for adaptive reuse, and once the library moves out, the building may simply stand vacant.

The successful reuse of historic libraries can lead to renewed community pride and enthusiasm—and frequently to fiscal support that might not have materialized if a new building were proposed.



Once a Carnegie-era building has passed the hundred-year mark and been successfully enlarged and preserved, we can look forward to how boards of library trustees yet unborn can plan further enlargement when the building nears its two hundredth anniversary. If things were done well in the early twenty-first century, planners in the early twenty-second may find the building ware and waiting, just as their predecessors did long ago.

## NOTES

1. The article is based on extensive personal experience with Carnegie-era library buildings rather than on a review of the literature. Thanks to Mark Misselhorn, associate partner, apaceDesign architects and engineers, Peoria, and Joe Huberty, partner, Engberg Anderson, architects, Milwaukee, who read and commented on the article.
2. The 1893 Chicago Public Library (now the "Cultural Center") has two huge domed skylights of Tiffany glass. The skylights leaked like sieves, and for decades they were covered with steel. In the 1994 remodeling, the skylights were roofed over and lit electrically. The effect is amazing and worth a visit. Most historic libraries have vastly smaller skylights, but many of these lend themselves to the same approach.
3. Knob and tube wiring uses ceramic tubes to separate wires from wood when they pass through structural members, and ceramic knobs to support wires away from wood and other surfaces. The system was generally used from about 1880 through the 1930s. Because wires were held away from surfaces, they radiated heat well. But by separating positive and negative wires, the system led to greater magnetic fields around wires. And knob and tube systems do not have ground wires. Insurance companies may not want to insure libraries that have knob and tube wiring, and some building codes may ban it.
4. Unfortunately, some expanded Carnegie-era libraries have new, accessible entrances that cannot be seen from service desks. One library I know has to keep the accessible entrance locked for security reasons. When users with disabilities need to get into the library, a staff member must run downstairs to the accessible entrance, assist the user with the door of the enclosed lift, then run back upstairs to open the lift door.
5. This is a serious concern. For example, while one Carnegie-era library in Illinois was being expanded, a user climbed over a construction fence and up the front steps to reach the historic front door, which had a large "Entrance closed" sign. Finding the door locked, the user turned around, fell down the steps, broke both elbows, and sued both the builders and the library.

## REFERENCE

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