



INTERNATIONAL
COUNCIL ON ARCHIVES
Section on Architectural Records

A GUIDE TO THE
ARCHIVAL CARE
OF ARCHITECTURAL
RECORDS

19th-20th CENTURIES



*This work is dedicated
to the memory of Andrée Van Nieuwenhuysen.*

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OF ARCHITECTURAL RECORDS
19th-20th centuries

ICA, Paris, 2000

This work is also published in French as:
Manuel de traitement des archives d'architecture

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Archives nationales/Institut français d'architecture,
Archives d'architecture du xx^e siècle, Paris.

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Published with the support of the Bureau de la recherche architecturale et urbaine,
ministère de la Culture et de la communication, direction de l'Architecture et du patrimoine, France.

Cover: Ernest Cormier, Cartoon for a stained glass window. Canadian Centre for Architecture, Montreal, 01 Arc 61N

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Foreword

Nearly two decades ago, the International Council on Archives (ICA) realized the importance of architectural records as chronicles of mankind's built environment. Recognizing the many practical problems these fragile, over-sized materials presented to archivists and their institutions, the ICA established its Committee on Architectural Records (later known by a number of different names, including ICA/PAR, "Provisory Group on Architectural Records"), to bring increased attention to these important documentary materials. In 1998-2000, the Provisory Group began transforming itself into a Section of the ICA.

Since then, the committee has sought to increase international notice of the importance of architectural records and to improve standards for their care. Members of the ICA group and the many professional colleagues with whom they have visited and corresponded through the years have added their knowledge to develop a consensus of the best international practices for the care of architectural records. This guide is the result of this investigation and discussion.

Many people contributed to the committee's work and discussions. Lorenzo Mannino and Jean-Pierre Babelon were early leaders, whose vision ensured the committee's effective beginning. Later Arnaud Ramière de Fortanier, Maygene Daniels, and Robert Desaulniers served as chairmen of the group.

Individual members of the committee and other individuals too numerous to name contributed information about their own experiences and practices essential to the development of this guide. We are grateful for their many ideas.

Our particular thanks go to certain individuals without whom this publication would not have been possible. Arnaud Ramière de Fortanier conceived the idea for the guide and began its evolution. The late Andrée van Nieuwenhuysen contributed her great scholarship and wisdom to its early stages.

Manuel Real provided essential information concerning descriptive practices. Pedro Lopez Gomez generously shared his scholarly knowledge concerning Spanish archives. Margaret Condon and Meryl Foster contributed information concerning practices at the Public Record Office and elsewhere in the United Kingdom. Mariet Willinge has added her knowledge of the international environment and the particular concerns of museums of architecture and the International Confederation of Architectural Museums. Alice Thomine has amplified information on modern architectural records in France. Pierre Frey has generously shared his experience, especially in areas affected by electronic technologies.

As representative of the International Confederation of Architectural Museums, Jöran Lindvall (Arkitekturmuseet, Stockholm), has advocated with patience and wisdom the importance of sound professional practice in museums of architecture and elsewhere.

Meryl Foster and Mariet Willinge read the English version of the text for accuracy and correct international usage. Alice Thomine did this for the French version.

The authors and committee particularly wish to thank the National Archives of Canada and especially Betty Kidd for support of the professional translation of this guide. The editors have built on this foundation with the goal of ensuring that the text in both French and English is comprehensible to professional archivists and fully accurate.

This publication has been developed with the guidance and support of the ICA. We hope that this will be the first in a series of handbooks dedicated to providing practical information to archivists and professional colleagues throughout the world. Every effort has been made to keep its cost low so that it can be purchased and used in every repository, no matter how small its budget. It has been published in looseleaf form so that pages and sections can easily be added or updated.

With the International Congress on Archives in Seville in September 2000, the Committee on Architectural Records will officially be transformed into a new Section on Architectural Records, open to any archivist interested in contributing to the continuing effort to improve care and knowledge of architectural materials. Among its other activities, the section will continue to monitor developing standards and methods. We encourage it to up-date and add to this present publication as needed.

We hope that this publication and the continuing work of the new section will help ensure that architectural records throughout the world are increasingly recognized as irreplaceable elements of mankind's cultural heritage, and will be cared for ever more effectively.

Project Group on Architectural Records:

Robert Desaulniers, *Chair*

Louis Cardinal

Maygene Daniels

David Peyceré

Cécile Souchon

Mariet Willinge

Preface

This manual is the result of contributions from many archivists, both those whose work is represented here, and the many colleagues who have generously shared their ideas and experiences with the authors. Its goal is to provide basic information concerning the day-to-day care of architectural records. It is intended for use by archivists who may not be familiar with the particular requirements of architectural records and by other colleagues who may not be uninformed concerning the basic principles and techniques of archives administration. Its recommendations are valid for the care of modern architectural records in all institutions, whether archives, libraries, museums, or even modern architectural offices.

Each of the chapters of the manual provides essential information on a defined aspect of the subject. All have been reviewed by the other authors and by members of the committee to ensure that the best international practice is represented.

Because this is truly a work of international cooperation, each of the authors based his or her explanations on personal experiences and presented them in ways familiar within his own national and linguistic context. Each of the authors also was encouraged to design a presentation appropriate for the subject. As a result, some of the chapters are heavily footnoted and others are not. Some refer extensively to published literature and others focus instead on practical experience and accepted professional practice. We believe that this variety is the strength of a combined effort of this nature.

In any international venture, establishing definitions for specialized terminology must be a major concern. Recognizing that terminology for architectural archives is often used imprecisely, we have chosen to prepare a glossary which defines terms broadly and gives alternatives where appropriate rather than attempting to limit usage within the text. Thus within the guide, computer programs for creating architectural records are described both as CADD (computer-aided design and drafting) and CAD (computer-aided design) systems, depending on differing national usages. Similarly, the terms sketch

and design drawing are used to define the same concept in different contexts. We concluded that this variety of vocabulary enriched the presentation of this manual and ultimately would aid the reader, who would be likely to encounter these same terms in other contexts.

The selective bibliography of additional readings on each chapter or subject also varies considerably depending on the interests and concerns of its author. Generally, only literature that is reasonably accessible around the world has been included; however, in some cases, less readily available works are included if these were considered by an author to be particularly germane or significant to a particular topic. Because the authors of the guide worked in French and English, readings cited in the bibliography are generally limited to these languages.

Each author initially wrote his text in his native language, whether French or English. The texts were professionally translated due to the generosity of the National Archives of Canada. The editors then reviewed and revised the texts extensively to reflect colloquial usage and familiar archival terminology. David Peyceré was responsible for the French text and Maygene Daniels for the English. Any errors in translation or in the use of archival terminology are theirs.

This guide presents the best elements of international practice as it has been generally defined and accepted through discussions within the Committee on Architectural records. We hope that it will help guide and serve archivists and others caring for architectural records throughout the world.

The authors and editors of this guide also recognize that it must be revised and up-dated regularly as architectural records and archival practices evolve in the coming years. The increasing importance of computers in creating and maintaining architectural records and electronic technologies for reproduction, storage, and study, in particular, will require future study and discussion.

We view this manual as a living text, and encourage others to amend, revise and add to it in the years ahead.

Maygene Daniels
David Peyceré



The Opéra-Comique in Paris, drawing by Charles Girault, 1893. Centre historique des Archives nationales, Paris, 285 AP 9/1/842.

Introduction

Cécile Souchon

This publication is the result of international discussions concerning management of architectural records, which began more than a decade ago. The manual does not claim to solve all the practical problems associated with the care of architectural records caused by the circumstances of their origin and their volume, size, and other physical characteristics. Nonetheless, by bringing together contributions of archivists who work with architectural records daily, it seeks to provide a better understanding of the nature of these historical materials and to provide practical information for their care.

Since the middle of the nineteenth century, the volume of architectural records and those of related fields such as civil engineering has grown explosively. The ever-increasing complexity of building practices and the emergence of large architectural firms has affected the quantity, nature and organization of the records. The number of architects and others involved in the building industry has continued to grow in the contemporary world. At the same time, new copying technologies including photochemical processes such as blueprint and diazo, photostatic machines in the mid-twentieth century, and more recently electronic technologies, have lead to an ever-increasing volume of architectural documents.

Without question, the massive physical destruction of the built environment caused by this century's wars and natural disasters has created an acute awareness of the fragile nature of seemingly-permanent human achievements. The quickness with which

information concerning this destruction has been transmitted throughout the world — by the black and white vision of early photographs, the grey images carried by television screens, and now the instant data conveyed by computers — has made this awareness of the potential for destruction almost universal.

Architecture is an omnipresent companion for mankind. The spreading urbanization on all five continents has increased the world's awareness of its impact on human lives.

Throughout the world, buildings have unique design characteristics and distinctive materials; nonetheless, no building is the product of a single environment. Conceived, designed, commissioned, copied, built, paid for, traditional or new, lasting or temporary, architecture is the cumulative work of mankind.

This manual is intended for use in archives throughout the world, including institutions responsible for caring for records created by private individuals and organizations, as well as government archives. Because of the substantial changes in the organization, physical characteristics and contents of architectural records beginning in the mid-nineteenth century, documents created in this modern period are given primary attention here.

The history of building styles, urban development, and civil engineering projects through the centuries has been amply studied. These subjects are documented by maps and plans, engravings and paintings or models and other visual materials, which may depict buildings or urban settings which have been destroyed or substantially altered over time. These documents may be valuable as individual, often beautiful objects, treasured by collectors for their unique interest, rather than because of the information they contain as part of a larger archival group. Such documents are often bought and sold, and, once out of the hands of private collectors, may be preserved as individual items in museums, libraries, or sometimes archival collections. They typically are managed in accordance with library or museum methodology rather than following archival practices.

In contrast, this guide emphasizes the care of groups of architectural records created in the course of the modern practice of architecture. These records provide evidence concerning the relationships of architects, contractors, and clients of every social level, and reveal the new reality created by the accelerating tempo of modern times. Recognizing that in modern times architects have been transformed from solitary artists or masters into participants in the corporate and collective process of modern construction, this guide seeks to focus attention on bodies of records created by architects within the context of their firms and the business of architecture. Architects, the aristocratic heirs of a longstanding tradition, have responded to the desires of a new clientele. The records they have created reflect this new situation.

Although records of modern architectural offices as we know them now seem to follow established patterns, it is unrealistic to believe that they will remain unchanged in the future. The various media

in which architectural records are created closely mirror technological developments in the field of architecture as well as evolution in the way that buildings are planned, financed, and constructed.

The world wars and the long years spent rebuilding destroyed cities from ruins, especially in Europe, the efforts to restore a familiar framework to life, and frenetic technical competition all have broken the continuity of the intellectual traditions of architecture. Greater industrial standardization in building materials has continued to nourish the old debate between quantitative and qualitative values and between artistic creation and industrial accomplishment. At the same time that these forces have affected architectural practice, they also have had a profound influence on the character of architectural records, which themselves have become more uniform and less personalized, a trend that is likely to continue.

This manual largely concerns the records maintained by architects and their offices as evidence of their work, in contrast to the records of clients or government offices, which document other aspects of the building process.

In the modern practice of architecture, the time between design and construction of a building and debate and discussion concerning its qualities continues to shorten. Modern architectural records are therefore of ever greater interest to researchers studying shifts in ideas and cultural trends of the recent past. Just as researchers studying scientific breakthroughs seek to come as close as possible to the source of the concept, so researchers studying the built environment seek modern architectural records as a contemporary mirror to the still mysterious and fascinating act of creation.

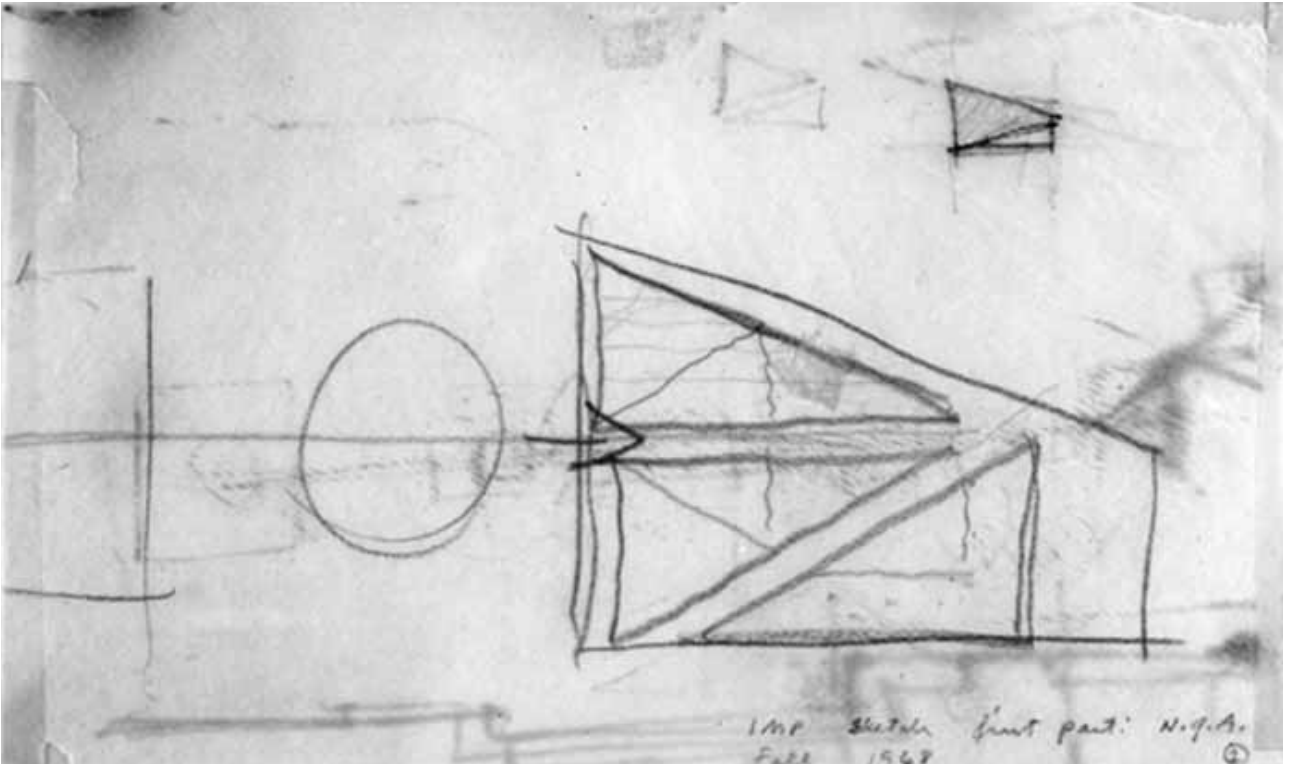
Archival collections or fonds which now are entering archival institutions sometimes come from firms involved with technical design and construction but often are from architects or architectural firms. The architects whose work is represented in archives may have had brilliant careers or they may be less well known. Their impact may have been as teachers of generations of students, or as masters who trained disciples in their ateliers. In every case, they will have tried to respond to requirements of their times and will have left their mark on the field of architecture, on the cultural life of their era, on the visible environment, and on the lifestyles of their contemporaries and of successive generations.

Whether architectural records were created by well-known architects or came from the drafting tables of the less-known, care of these documents will present similar problems for archivists. The problems become especially discouraging if the knowledge and experience of other archivists responsible for similar records is not available.

- After the architect's legal liability has ended, assuming that architectural documents have been well cared for by their creators and owners, their long-term physical conservation is directly related to their quantity, their size and their overall volume; the graphic media or materials of which they were created, and their resistance to handling, environmental conditions, reproduction, folding and successive use.

- After the architect's efforts to establish his local, national or international reputation have ended, the scheduling, selection, and potential destruction of architectural documents depend on resources and interests of archival repositories and on their ability to receive and maintain the documents as evidence of the work and thought of the architect or of techniques and types of construction, or indeed the art of the time.
- After the end of the architect's era, furthermore, there is no guarantee that architectural records, regardless of their value, will even be legible, regardless of whether they are on paper, have been annotated or reworked by hand, or are highly technical. The life-span of digital documents especially is unknown and may be dependent on specific technologies, which may not exist in the future. Archivists do not conserve records for the sake of keeping them. They keep them to serve various users: architects, architecture students, sociologists, historians of art and thought, exhibition visitors and others who may learn and benefit from the materials.

These observations have led the authors of this manual and the others with whom they have worked through the years to develop a publication which will serve as a reference for all archivists who are seeking to improve the conservation of architectural records in response to the concerns of researchers. From this point of view, the interests of all institutions responsible for architectural records are the same. There are no blind walls in the house of knowledge. This manual is thus intended as a guide to principles and essential practices for the care of modern architectural records, a task which few archival custodians will be able to avoid in the coming years.



Preliminary Sketch.

I. M. Pei, preliminary sketch for the East Building of the National Gallery of Art, Washington, D.C., 1969.
Gallery Archives, National Gallery of Art, Washington, D.C.

Chapter 1

Types of Architectural Records

Andrée Van Nieuwenhuysen, David Peyceré

Architectural records as they are considered here include not only records of architectural offices, which will be described in detail below, but also architectural documents preserved in the files of clients and administrative offices.

Sources of Architectural Records: Government Offices and Other Organizations

A variety of government offices and other public or private institutions have architectural functions or hold architectural records.¹ Some national, regional, or local government bodies, including departments of public works, urban planning offices, and bureaus responsible for classifying and maintaining historical buildings and monuments are directly responsible for architectural projects. Large municipalities often have building construction departments established to design and supervise building construction.

Professional associations of architects also may hold architectural documents or influence the creation or preservation of these materials. The Royal Institute of British Architects (RIBA), for example, collects architectural records,² as does the American Institute of Architects (AIA), which has published a pamphlet giving advice to architects on how to preserve their records.³ In Spain, regional associations of architects (Colegios de arquitectos) review all architectural projects submitted in their areas of jurisdiction. On the other hand, it is worth noting that in France, the professional association of architects is not involved either in architectural decisions or in preserving the history of architecture.

Architectural documents preserved in public depositories also may come from other sources. Examples include:

Andrée Van Nieuwenhuysen prepared an unfinished draft of this chapter before her death in January 1995.

The text was revised and completed by David Peyceré.

1 See presentation given by Pedro López Gómez, *Normas descriptivas para documentos arquitectónicos: la práctica en España*, at the meeting of the International Council on Archives Working Group on Architectural Records, Washington, D.C., September 1992.

2 A. Mace, *The Royal Institute of British Architects. A Guide to its Archive and History*, London, New York, 1986. The Institute has some 400,000 plans and drawings dating from the fifteenth century to the present.

3 Nancy C. Schrock, *Architectural records management*, Washington, D.C.: The American Institute of Architects Foundation, 1985.

- building records of palaces, castles and royal estates (accounts and plans), councils of government, provincial governments;
- archives of abbeys, ecclesiastical institutions and parish councils;
- archives of prominent families, containing plans or other documents relating to buildings, castles, gardens, farms, houses, factories, churches, chapels, or subdivisions;
- notaries' records, which sometimes include building plans appended to deeds⁴ (Although lengthy⁵ research may be needed to locate such plans, the detailed information found in the deeds sheds light on real estate transactions (subdivisions of land, property lines, construction) in a variety of ways); and
- legal records, which include site surveys or reports by architects, surveyors and engineers. (The archives of the court of first instance in Brussels, for example, contain a series of site surveys made in the nineteenth century in connection with public utilities. These reports always contain an architectural description and often include plans. They are particularly significant for study of the character of older parts of cities before the major construction projects of the nineteenth century.)

Sources of Architectural Records: Architects' Offices

For many years, architecture in Europe was a liberal profession practiced by individuals. Architects as we know them, that is independent professionals practicing in cities with private clients, began to appear during the eighteenth century, with their numbers increasing during the first half of the nineteenth century.

Architects today generally work in teams for corporate offices or partnerships where they may be salaried or may receive a share of the profits. In modern architectural offices, the work is often distributed among specialists, including urban planners, architects, draftsmen, engineers and others, who each is responsible for an aspect of the building that is being planned.

In the United States, the trend toward corporate architectural practice emerged with the construction of skyscrapers and large commercial buildings toward the end of the nineteenth century.⁶ In Europe, it developed after World War II, precipitated by the emphasis on reduced cost at the expense of aesthetics during the period of post-war reconstruction. Under the control of developers, architects may essentially become technicians, with their involvement in a project limited to its pre-construction phase.⁷

Archives of architects are rarely complete. The preservation of an architect's records depends on many factors, including the course of his career and the degree of independence of his work. In general, architects have systematically retained records for legal purposes, to discharge their liability with regard to the construction of a building. Beyond this, attitudes and practices have varied widely. Few architects have subscribed to Le Corbusier's belief that architectural records have

4 The relevance of notaries' records from the nineteenth century to the study of architecture has been highlighted by Werner Szambien, "Les archives de l'architecture au minutier central des notaires," *Archives et histoire de l'architecture*, 1990, pp. 53-56.

5 *Ibid.*

6 Alan K. Lathrop, "The Provenance and Preservation of Architectural Records," *The American Archivist*, vol. 43, no. 3, summer 1980.

7 See the texts published in *Architecture, une anthologie* (under the direction of Jean-Pierre Épron), vol. II and III, Paris and Liège, 1992 and 1993; also the essays collected in *Les architectes, métamorphose d'une profession libérale* (under the direction of Raymonde Moulin), Paris, 1970.

artistic value in themselves. In fact, many, like Belgian architect Victor Horta, have taken the opposite view: that only the constructed work is worthy of attention.

At present, given the varied and flexible structure of architectural firms, the situation is complex. Partnerships often are created for the duration of a competition or project. Depending on the law in different nations and the corporate or organizational structure of partnerships, either the corporate body or firm may own an architect's records or, in some instances, the architect may own the records personally.

An architect's records may contain various types of documents:

Professional correspondence with clients, contractors, colleagues, consultants, administrative units and professional associations. Such correspondence is often used to study the economic and social aspects of the profession's history, the relationships between architecture and politics, or architects' involvement in real estate transactions. Private correspondence, when attached to professional correspondence, may provide important complementary information on networks of personal friendships.

Project files pertaining to construction, bids, competitions, and related matters consist of correspondence and other written documents, plans, models, and photographs. These are the core of the documentation of the architect's work and will be dealt with in detail below.

Management records of the office or firm pertain to such matters as fees, payments made to partners and accounting.

Documentation of current legal and technical information needed for building design is gathered by the office as source material for its work. Architects also may assemble dossiers on their own work, including photographs and press clippings. Other files, such as Albert Laprade's files on the nation of Morocco,⁸ strictly speaking may not be about architecture yet still are of interest to architectural history. The private libraries of architects and architectural firms also may be significant when studied in conjunction with archives, on which they shed further light. Le Corbusier's library, preserved at the Le Corbusier Foundation, is an example. A list of the books contained in a collection, such as the inventory of Étienne-Louis Boullée's library, created following his death, can compensate for the loss of the books themselves.⁹

Architects' records also sometimes contain documents relating to the architect's professional activities outside the office such as teaching, lecturing or writing; attending conferences or official functions; or serving on professional committees. Some of the architect's graphic documents such as academy or school drawings, plans used as teaching material, and measured drawings may be derived from these activities.

Sources of Architectural Records: Contractors, Engineering Firms, Engineers

Other records also may document the construction process. Even though builders existed long before architectural firms, few established



An architect's office around 1922.
Architect Michel de Klerk (1884-1923)
in his office in Amsterdam.
Netherlands Architecture (NAI), Rotterdam.



Architectural Office. Architects of the
Atelier de Montrouge in their office near
Paris, ca. 1965.
Institut français d'architecture/Archives nationales
(IFA/AN), Paris, fonds Atelier de Montrouge

8 French architect Albert Laprade (1883-1978) worked in Morocco for the architecture division of the Résidence générale de France from 1915 to 1918. His papers are preserved in the Archives nationales, Paris.

9 Jean-Marie Pérouse de Montclos, Étienne-Louis Boullée (1728-1799). *De l'architecture classique à l'architecture révolutionnaire*, Paris, 1969, p. 253 ff.



Engineering Firm.

The engineering firm of François Hennebique, Paris, ca. 1905.

Institut français d'architecture/Archives nationales (IFA/AN), Paris, fonds Hennebique



Blueprint. Auguste Perret, Concrete plan for typical floor, building at 25 bis, rue Franklin, Paris 16^e.

Institut français d'architecture/Archives nationales (IFA/AN), Paris, fonds Perret

meaningful archives which have survived them. On the other hand, firms involved with fine crafts have tended to preserve preliminary graphic documents. Detailed design drawings, some of which were produced by established artists, survive for some art glass and metalwork businesses, for example. Conversely, a masonry or plumbing contractor is not likely to attach much value to his archives beyond their practical use or the period of liability. Such records may well be destroyed.¹⁰

During a building project, contractors receive a number of documents from the architect, especially copies of construction drawings. Contractors also may make their own drawings and give them to the architect. Accordingly, the files of a contractor and an architect on a given project may be very similar. The archives of Auguste and Gustave Perret in France are a striking example of this. The two brothers¹¹ were architects as well as reinforced concrete contractors who built some projects and designed and built others. The archival files of projects they built and those they designed and built are similar in nature.

At the turn of the century, the emergence of new structural materials — steel and reinforced concrete — and the increasing complexity of legal standards for construction, especially fire codes, led to the emergence of engineering firms. Among the first was that of François Hennebique,¹² who began his career as a contractor. In 1892, Hennebique established an engineering firm which did calculations of reinforced concrete requirements and controlled a network of licensed businesses, first in

¹⁰ In France, the period of liability applies jointly to contractors and architects for 10 years or for 30 years for certain structural flaws.

¹¹ The records of Auguste (1874-1954) and Gustave (1876-1952) Perret, French contractors and architects, are preserved at the Institut français d'architecture in Paris.

¹² François Hennebique (1842-1921), French contractor and subsequently director of an engineering firm. The firm's archives are preserved at the Institut français d'architecture in Paris.

France and then throughout the world. The firm's construction files consist of plans, either tracings or blueprints, prepared by architects and calculation worksheets prepared by staff engineers, who rarely prepared new plans. These materials are of less interest than the architects' records of these same projects, which unfortunately have often disappeared.

Today, an important component of every architectural project is the design of structural and mechanical systems. This work has largely become the responsibility of specialized engineering firms. Such firms have grown substantially in the past decades, and many now are even larger than major architectural firms.

Types of Contemporary Architectural Documents: The Project File

Architectural archives largely consist of project files, which may include a variety of graphic documents created in the process of designing or constructing a building project. They may document an architectural competition or a proposal that does not go past the design phase or they may be files for completed buildings. These dossiers, which may consist of a few isolated documents or several shelves full of records, merit a detailed description.

Project files can be divided into sections, each reflecting a project phase and documenting a particular aspect of the architect's work. Since the end of the last century in France and elsewhere, project files have been categorized in accordance with these project phases, which are the basis for the following overview.¹³ Either to study or to classify and inventory architectural records, it therefore is necessary to understand the various phases of the architect's work and the methods and techniques of graphic representation.

Project Design

Architects begin their work on a building project by carrying out documentary research by collecting information relating to the site, including plans, cadastral maps, surveys, zoning plans and lists of easements, many of which are provided by the client.¹⁴ The architects also may take or receive photographs of adjacent buildings, of the site before construction begins and aerial views of the area. The architect also conducts research as needed on technical issues and regulations that may affect the project, including specific safety standards or instructions for using particular building materials.

Next, architects explore design options for a building project using free-hand drawing, computer-aided design and drafting (CADD systems), preliminary models made with cheap materials such as paper or cardboard and tape,¹⁵ or even by recording their thoughts in narrative form. Drawings in particular exist in a variety of different forms:¹⁶ free-hand sketches, which express a simple idea or provide a visual explanation; conceptual drawings, small-scale, free-hand representations, through which the design concept can be fleshed out; and schematics, which simplify forms or express them in symbolic terms to aid in



Computer Created Drawing.
Aerial view of the National Gallery of Art, West Building, Washington, D.C., ca. 1995.
Gallery Archives, National Gallery of Art, Washington, D.C.

¹³ The study carried out by Françoise Hildesheimer for UNESCO describes these project phases. Analyses of project phases also have been prepared by architects and sociologists. Françoise Hildesheimer, *Le traitement des archives des architectes, étude de cas: La France*. Paris: UNESCO (RAMP study), 1986. Raymond Moulin, *Les architectes*. Paris: Calmann-Lévy, 1970. Julien Guadet, *Eléments et théorie de l'architecture*. Paris, 1894-1904, vol. IV, book XVI: "La profession d'architecte," 1904. (This volume contains very specific information on the situation in France around 1900.)

¹⁴ Françoise Hildesheimer (*op. cit.*) notes that this preliminary phase is essentially up to the client.

¹⁵ As in the case, for example, of French architect Christian de Portzamparc (many of these preliminary models were presented at the exhibition of his work held at the Centre Georges Pompidou in Paris in 1996).

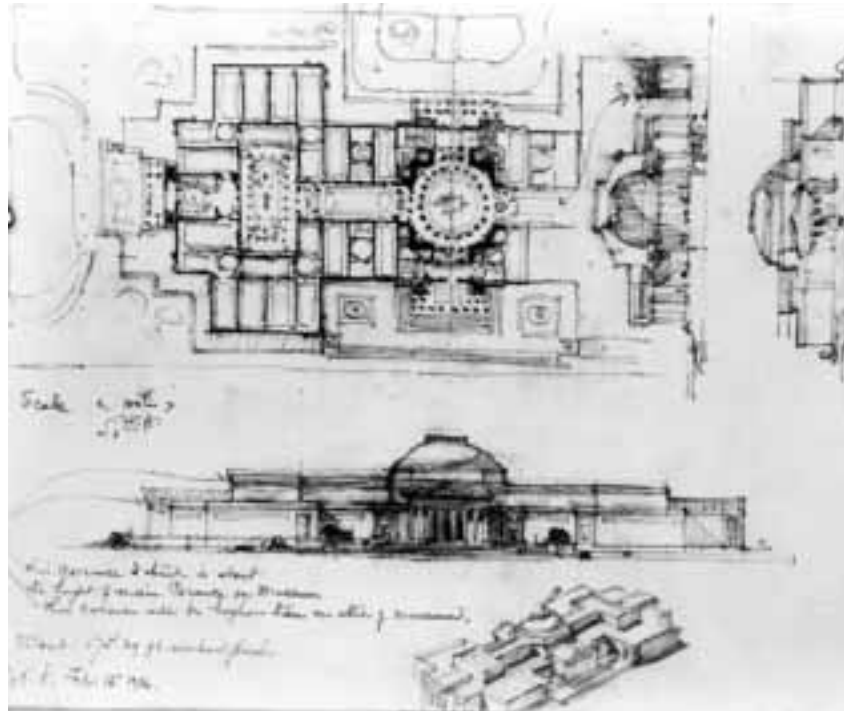
¹⁶ According to B. Dubuisson (*Dir.*), *Encyclopédie pratique de la construction et du bâtiment*, vol. II. Paris, 1968; and Fr. Hildesheimer (*op. cit.*).



Preliminary Model.

Atelier de Montrouge (Pierre Riboulet, Gérard Thurnauer, Jean-Louis V  ret), project of new town near Rouen, 1968-1971.

Institut fran  ais d'architecture/Archives nationales (IFA/AN), Paris, fonds Atelier de Montrouge



Parti or Conceptual Drawing. John Russell Pope, Parti or Conceptual Drawing for the West Building of the National Gallery of Art, including a plan and perspective elevation. Gallery Archives, National Gallery of Art, Washington, D.C.

understanding the design. It should be noted that none of these terms has precise or universal definitions. The distinction between conceptual drawings and schematics, for example, is generally of little relevance to archivists.

Design drawings are generally prepared using instruments and serve to refine conceptual drawings and further define the design concept. Lastly, renderings are presentation drawings, which usually imagine the appearance of a completed project to win the client's approval. These drawings are prepared with shading, color, and perspective, and often suggest vegetation, people, and vehicles to bring the image to life. Some architects, like Antoine Pompe,¹⁷ have specialized in renderings prepared at their colleagues' request.

Sketches or preliminary drawings made during the design phase highlight the architect's creative vision and are the form of architectural document most sought-after by historians. Although renderings generally have the greatest visual impact, sketches are the closest to the architect's original conception and also were used by some architects such as Le Corbusier to communicate their ideas to clients.¹⁸

After completing the design and discussing and modifying its elements in cooperation with the client, the architect has a general idea of the building to be constructed. Still, this design is likely to change substantially during subsequent work. Based on the preliminary design, the architect next prepares the first precise documents for the project: the preparatory development or working drawings. These drawings give a complete graphic representation of the architect's plans at a scale that is readable but that still shows little detail. A site plan¹⁹ at a scale of

17 Belgian architect Antoine Pompe (1873-1980) was a pioneer of the modern movement in Belgium and responsible for Van Neck's clinic in Brussels (1909).

18 G  rard Monnier, *L'architecture en France, une histoire critique, 1918-1950. Architecture, culture, modernit  *. Paris: Ph. Sers, 1990, p. 239 ff.

19 The site plan, mandatory in contemporary projects, situates the building on the parcel of land and indicates public access roads, water and electrical distribution systems, electrical systems, sewage disposal systems, geographical contour lines, the nature of adjacent buildings, easements, and the footprint of the proposed building. Current French regulations also require that a landscaping plan be produced for any urban project.

1/1000 or plans for a house or building of modest size at a scale of between 1/500 and 1/200 would be examples. Other sets of plans follow, with each being closer to a final version. Final drawings commonly include overall representations at a scale of 1/100 and large-scale detail drawings at a scale of 1/10.

In France, practices have gradually become standardized over the past fifty years, resulting in a theoretical succession of construction documents: conceptual drawings followed by preliminary designs, final designs, and two stages of construction drawings. In some cases, changes in the design concept may result in a number of different versions of each design document. Conversely, in many instances when there is little design change, architects may eliminate several drawing stages and may create only two or three phases of drawings between the preliminary designs and the final construction documents given to the contractors.

Since printing came into use (see below), architects have been able to produce sets of virtually identical documents for similar buildings by changing only a few details and the information in the cartouche.

The primary set of construction plans is commonly referred to in Europe as the building permit file, because it must be submitted to government authorities for permission to begin construction, a regulatory step of central importance in a project's history. This requirement came into effect gradually, depending on the nation: starting in the Renaissance in a number of Italian and Flemish cities and at the end of the nineteenth century in French cities, although it was not systematized in France until 1943.

Authorities that issue permits have established a series of building application files containing the relevant documents: sets of plans, detailed information on the owner, the architect, the site, and the nature of the project. Such series may be of fundamental importance in researching the history of architecture.

During the design phase, in addition to drawings, architects also prepare a number of important written records, including specifications with detailed explanations of requirements for building systems. Depending on the type of construction and local practices, specifications may include cost estimates based on the estimated quantity of each material, the



Site Plan. Ernest Cormier, Site plan for the University of Montreal, 1941.
Canadian Centre for Architecture, Montreal, 01 Arc 220N



Shaded Mass Drawing.
Jean Dubuisson, Housing project in Pierrefitte-Stains (Paris Region), 1960s.
Institut français d'architecture/Archives nationales (IFA/AN), Paris, fonds Dubuisson, 224 IFA 2126



Plan. Office of John Russell Pope, Plan of the main floor of the National Gallery of Art, Washington, D.C., 1937.
Gallery Archives, National Gallery of Art, Washington, D.C.

unit cost and the resulting estimated total cost. These estimates must be as detailed as possible for a project to proceed successfully.

Bid Documents and Submissions

The final set of design drawings is intended to initiate the second phase of the project: the selection of suppliers and contractors. With regard to materials and the execution of the contract, the project is divided into segments: building structure, windows, plumbing, ventilation, and so forth. The larger the scale of the project, the more segments into which the contract may be divided. For some aspects of the bid process, the architect prepares specialized detailed plans for the contractors. The architect also provides them with compilations of requirements and specifications, which state precisely what is expected of each contractor. Progress schedules²⁰ indicate the order in which the various contractors will work on the project and their time requirements.

The methods used to select contractors and suppliers vary according to the location and the scale of the project, although selection of the lowest bidder is a common practice that often is mandatory for public buildings.

The client ordinarily selects the contractors who will build a project, although on some occasions this responsibility is assigned to the architect or performed with his assistance. All interested contractors (or in some cases only those invited to participate) are permitted to consult the plans before submitting a bid for the project. The bids are opened together and are compared in order to determine which one is most advantageous. This procedure takes place at a meeting which, in the case of public contracts, takes on an official character. The results of such a public process are recorded in the report of the bid opening. Proposals which are not selected generally remain in the client's offices but are rarely of historical value.

Construction

The architect prepares the largest number of working or construction drawings during the construction phase of the project. These plans have increased in number dramatically during the twentieth century. In the order in which these are used, they include:

- excavation site plans, foundation plans;
- structural plans which pertain to the building's skeleton, whether steel or reinforced concrete, and which may include concrete reinforcement plans;
- plans for interior work, including plumbing and mechanical systems such as water, electricity, heating, ventilation, and air conditioning;²¹
- framing or carpentry plans for doors and windows;
- finishing plans for interior design and decoration, floor and wall covering, including the precise arrangement of stones and tiles; and
- in some instances, furniture plans.

These plans are provided either by the architect, who may have a small temporary office at the construction site or by a sub-contractor.

²⁰ Documents that appeared in France sporadically around 1930 under the influence of architects who had apprenticed with American firms.

²¹ Commonly used abbreviations: HVAC (heating, ventilating and air conditioning); in French CVC (chauffage, ventilation, air conditionné).

If the drawings are produced by a sub-contractor, they usually are known as shop drawings. Architectural plans and contractors' plans can easily be recognized in the files by their different annotations and by the type of information they present.²² Copies of plans in the contractors' archives generally bear a notation by the architect indicating that they should be used for construction, while plans in an architect's archives may bear the original signature of the contractor who accepted them.

Throughout the project, the architect manages the dealings between his or her client and the suppliers or contractors,²³ communicating change orders, the client's complaints and the contractor's comments. In many instances the architect also prepares the reports on the job meetings, which are held weekly for major projects. When architects do not prepare these reports themselves, they receive copies prepared by the general contractor. Files containing the correspondence generated during the course of the project often constitute a large part of the records of the construction project.

Acceptance of Work

When work is completed, it generally is accepted by the architect on behalf of the client. This is the time he would ask for any final corrections that need to be made before final payment is issued. Partial payments would have been issued throughout the period during which the contractor was present on the job site.

Before approving payments, the inspector, who may be a member of the architect's firm or, in recent decades, part of an independent firm, verifies the list of work performed and the charges for this work prepared by the contractor. As supporting documentation, contractors submit as-built drawings showing the work in its final state, especially everything that will be impossible to check when the inspection is carried out because of the progress of the work, for example internal components of a wall that will subsequently be covered over and hidden.

Architects' fees are set by the client in agreement with the architect before the work begins. These may be an agreed-upon percentage of the building cost or they may be based on a number of different rates, depending on the complexity of the work. Like contractors, architects may receive payment in a number of installments before the project is completed.

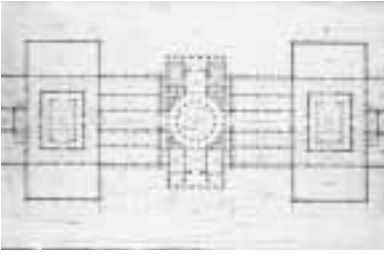
Upon completion of the project, architects theoretically are required to provide or obtain a number of documents from contractors or suppliers, some of which are of great importance:

- operating instructions for mechanical systems;
- as-built drawings (in many instances these are not prepared, although they would subsequently be extremely useful); and
- the certificate of completion of work, or certificate of compliance, indicating approval of the completed building by monitoring authorities.²⁴

22 Accordingly, an architect's electrical plan indicates only the location where the contractor will need to place light sources, power outlets and switches, while the contractor's electrical plan shows where the wiring goes.

23 Except in cases in which the architect does not oversee the construction of the project. In such instances, a general contractor is responsible for hiring the other contractors.

24 In France, architects prepare the certificate of completion of work, which they submit to the prefecture; following inspection, the prefecture issues the certificate of compliance, which safeguards the architect and client from the possibility of subsequent legal action by future owners.
See R. Moulin, *op. cit.*, p. 49.



Plan. Office of John Russell Pope, Plan of the main floor of the National Gallery of Art, Washington, D.C., 1937. Gallery Archives, National Gallery of Art, Washington, D.C.

Life of the Building

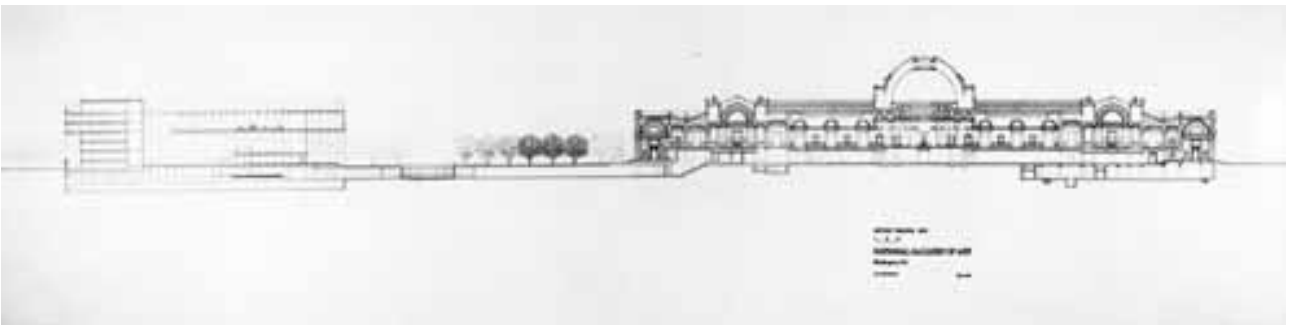
Architectural work often does not end with acceptance of the building and the final payment, as projects often require subsequent attention. Such work may involve rectifying details which were poorly executed or correcting design or construction flaws, or it may involve continuing maintenance or major repairs, renovations or extensions. While there is no rule to this effect, often the original architect is invited to perform later work on a building. Legal action also is not uncommon in the building industry and generally involves the construction contractors as well as the architect. In the event of a lawsuit, architects create files of supporting documentation for their defense. This often includes dismembering their archives to form a new file relating to the legal action.

The final portion of a project file may thus include legal files and files on maintenance or on building repairs or extensions. These files are generally much more limited than the initial file.

Material Aspects of Graphic Documents: Types of Representation

Construction drawings almost always follow certain graphic conventions and are drawn to scale (see below). Conceptual drawings, which are used in preliminary exploration of design concepts, and presentation drawings intended to seduce rather than inform, are among the few exceptions.

Graphic documents drawn to scale use one of four basic types of representation, each of which has numerous variations: plans, sections, elevations and perspective drawings. In common usage, all graphic documents produced by architects are typically called plans. Strictly speaking, however, this term designates a representation of an entire building or a portion of the structure at a given horizontal level. It is in effect a horizontal section, typically taken at about one meter from the floor level, showing window and door openings. Often one plan is prepared for each level (basement(s), ground floor, other floors, attic). For buildings with more floors, common floor plans may be created. These are used, with a few minor differences, for all levels between the bottom and the top of the building. For example, for very tall structures such as skyscrapers, a few different plans can be used for several dozen floors.



Section. I. M. Pei & Partners, Section showing both buildings of the National Gallery of Art (East Building at left), ca. 1978. Gallery Archives, National Gallery of Art, Washington, D.C.

During the 1930s, the architects of the modern movement involved in the International Congress for Modern Architecture, developed conventions for representing the interior of apartments. After the war, these residential unit plans played a key role in efforts to establish standards for low-cost housing.

The word section designates a vertical view through a building. Sections can be longitudinal (through the longest side of the building) or transversal (through the shorter side). Architects determine where it would be most appropriate to run the section line in order to show as many details as possible based on the internal structure of the building.

Elevations are the conventional representation of a visible (not fictional, as with sections) vertical plane of the building. These documents are easily understood by the layman and most closely resemble non-architectural drawing. They are drawn to scale, however, and thus show true dimensions instead of the deformed perspective seen by an observer, which typically is present in a traditional drawing. Accordingly, in an elevation, the roof line, for example, is always much more visible than it would be in reality when it is sometimes entirely hidden by the cornice. Only a view from afar, such as one might have when looking at a building from across water, is close to this form of graphic representation. Skilled architects are able to work with this discrepancy between the impression given by the elevation, which is thought to be close to reality, and what is actually seen.

By their nature, elevations do not show the recessions or projections of a building facade. To correct this limitation, in the seventeenth and eighteenth centuries classical architects developed the skiagraphic technique (from the Greek *skia*, for shadow), whereby the shadows shown on the drawing, generally rendered using a wash of ink diluted with water, give an idea of the building projections.

Almost all architectural details are either plans, sections or elevations. All three sometimes appear together on the same document. It is only in combination that a complete and explicit representation of a building is produced. It was partly in order to combine the benefits of all these types of drawings that the various types of perspective representation and axonometry were developed.

In perspective drawings, lines which are in reality parallel converge at a vanishing point, in keeping with what the eye perceives, thus revealing several surfaces of a volume at once. Perspective may be frontal (consistent with what a spectator who is standing in front of the building at some distance would observe) or oblique, that is, seen from an angle. (Oblique perspective views of buildings began to appear in the nineteenth century.) This approach tends to diminish the importance of a project's axiality and symmetry. After World War I, under the influence of aviation,²⁵ aerial perspective, that is, the view of the building as it might be seen from an airplane, also became popular. Aerial perspective represents several different faces of the building as well as the roof. If used properly, such perspectives can provide information from several different elevations. They also can provide even more information if exploded, that is, if the lines of the outside walls are interrupted to show the building interior. These rather specialized drawing techniques, which are closely related to the work of engineers, were brought to the field of architecture by the modern

²⁵ See *Les constructions du ciel, 1900-1958, et Panamarenko*. Brussels: Fondation pour l'architecture, 1995.



Aerial Perspective.
Danger Brothers, the grand plaza in the new city of Bône (Annaba, Algeria).
Institut français d'architecture/Archives nationales (IFA/AN), Paris, fonds Danger, 32/01



Axonometric Drawing.
Theo van Doesburg, house at Meudon near Paris, 1929-1930.
Netherlands Architecture Institute (NAI), Rotterdam

movement, to which they in turn have contributed. The aerial perspective, for example, is the best way of representing the accessible roof-deck, emblematic of modern architecture.

Axonometric perspective or axonometry²⁶ also is associated with the modern movement. Although it was initially presented in treatises on military architecture and finally through *Histoire de l'architecture* (1896) by Auguste Choisy, its use coincides with the appearance of Henri Focillon's theory of architecture as space and with Adolf Loos's Raumplan. It became popular among architects after the Paris exhibition of the Dutch De Stijl group in 1923. The use of axonometric perspective was facilitated by the invention of the articulated parallelogram, a drafting tool developed for industrial drawing.

Axonometry is a perspective representation without a vanishing point, in which parallel lines remain parallel and distances are not altered, but in which the angles are distorted so that the plan and certain elevations and sections can appear on the same drawing. It can be used to represent a building from above, which appears more natural to the eye, or from below, which has the advantage of showing the plan in its entirety. Axonometric perspective is particularly suited to showing a building's structural framing or internal arrangement of spaces; however, ornamentation is difficult to represent and understand on this type of drawing. Like all perspectives, axonometric drawings can be exploded so that building interiors can be seen. Axonometry also has a strong visual impact due to its effective use of geometry.

Scale and Dimensions

Scale is the constant relationship between the size of an object and its representation, which is fundamental to architectural drafting. It is expressed in the form of a more or less elliptic equation:

1/1000 or 1:1000	One unit on paper represents 1,000 equivalent units of the structure being represented. For example, one centimeter represents 10 meters.
0,02 p.m.	0.02 m on paper represents one meter of the structure being represented: 1/50. Such scales are used for detailed plans.
3/4" = 1' 0"	Three-quarters of an inch on paper represents one foot of the structure being represented: 1/16.

The choice of scale for a drawing depends both on the level of detail to be presented and on the particular circumstances in which the drawing is created, such as the size of the paper or the practices of an architectural office. However, recent building regulations have tended to require a particular scale for each type of drawing. Today, computer software permits the user to enlarge or contract the scale of a drawing at will, tending to make the idea of differentiating drawings by their scale obsolete. Using the computer, details can be specified from the moment of the earliest design drawing, and scale need not be determined until the information is printed in the form of a drawing.

²⁶ Gérard Monnier, *L'architecture en France... (op. cit.)*, pp. 253 ff.

Details, particularly ornamental details, are sometimes represented using a 1:1 scale. These are sometimes referred to as life-size or full-size drawings.

A plan drawn to scale is all an architect needs to visualize a building. Careful calculations are needed to establish the dimensions of the various components of the building, however, and the risk of error is great if the plan does not indicate actual measurements. That is the purpose of the dimensions, an indication of actual measurements in centimeters and millimeters or in feet, inches and fractions of inches in accordance with drafting conventions. Dimensions are even more necessary on documents intended for duplication. Paper may be distorted during the printing process so that the dimensions on the plan are no longer precise. Plans intended for contractors generally indicate very clearly that measurements must be taken again on site.

Cartouche or Title Block

During the twentieth century, increasingly all the information needed to identify a plan has been gathered in a standard rectangle placed in a corner of the plan (often the lower right-hand corner), known as the cartouche or title block. If the plan is folded, this cartouche or title block appears on the outside.

The trade name of the general contractor, the name of the architectural firm, the names of the architects and draftsmen who worked on the plan, and the name and location of the real estate transaction (possibly in the form of a code), are indicated in the cartouche, which also shows the date of the plan and any subsequent updates, the type of plan (preliminary design, contractors' consultation file), serial number and lastly, the title of the plan itself ("second floor," "common floor plan," etc.). A complete cartouche provides invaluable identifying data for architects, archivists and historians.

Before cartouches were used, information appeared in no particular order all over the plan, with titles such as the name of the transaction or the description of the series of plans generally appearing in the upper left-hand corner, and the architect's signature in the lower right-hand corner. Unfortunately, a great many earlier plans also are without identifying information.

Traditional Media and Materials

Traditionally architectural drawings are created on three different types of papers; heavy paper specially made for ink and pencil drawings; standard paper, possibly with a coated surface, intended primarily for prints of plans; and translucent tracing paper, the composition of which varies widely in quality.²⁷ Other materials such as coated linen for prints intended for heavy use during construction are not found as frequently.

Since architects' files generally are intended to be retained for a limited period, usually no longer than twenty years, the original choice of paper is rarely influenced by its longevity. Tracings have a tendency to acidify rapidly, while prints on special papers undergo chemical reactions and

²⁷ Regarding tracings, see Ms. Mercier, "Le papier calque." *Arts et métiers du livre*, March-April 1996, pp. 44-51.

quickly fade and become illegible. More than anything else, however, the on-site use of plans during the construction process may lead to their premature deterioration. In the office, plans are handled carelessly, often tacked up, rolled and folded. Tracings are reproduced using machines that fold or tear them. Many documents are taken to the construction site, where conditions are even more hazardous. Accordingly, in the twentieth century original drawings often are retained in the architect's office, and only prints are permitted to circulate.

For many years, the most common measure used in architectural offices to protect drawings has been to tape a special adhesive strip around the outside edges of the paper. This opaque, colored border prevents tearing but over the long term also creates uneven tension on the document, resulting in wrinkles and folds.

Since the 1970s, original drawings often have been created on a transparent plastic film such as mylar, which is easily reproducible and is much more resistant to handling than is paper. Recently, high-quality translucent paper (sometimes known as paper vellum) has become increasingly available for reproducible drawings.

Traditionally hard pencils and India ink have been used for drawings and printer's ink for certain prints. India ink diluted with water (wash) and water-colors are used to enhance renderings and especially to indicate shading in some types of representation. Colored inks and colored pencils also have been used, especially starting in the 1910s, to color the thickness of walls on plans, complementing the system of codes used in the drawing.

*Reproduction and Prints*²⁸

Because construction projects involve architects, clients, contractors, government agencies and many other parties, all of whom must have a copy of certain plans for varying periods of time, multiple copies of architectural drawings are always needed during construction. Accordingly, since the eighteenth century, new duplication processes have continually been invented.

Reproductions or prints of drawings also are required because of the frequent need to modify existing plans. Much time is saved if only a portion of a document is redrawn. Tracings can easily be reproduced because of their translucence and can easily be altered by scraping to remove ink markings without doing too much damage to the fabric of the document. For a particular tracing therefore there are often a number of different prints which vary in their details and their dates.

For almost a century, the blueprint or cyanotype process was used most frequently to reproduce architectural drawings. Discovered around 1725 and perfected in England in 1842 by Sir John Herschel, the method consists in exposing the plan to light over paper that has been sensitized with a solution of ferric citrate and potassium ferrocyanide. The sensitized paper is placed on a drawing board covered with one or two thicknesses of felt and the tracing to be reproduced is then spread out and set in place under a piece of glass, so that the light can interact with the chemicals. The exposure time depends on how bright the day is. The paper is then washed in cold water for one or

²⁸ Concerning prints: Éléonore Kissel, "Duplicatas des dessins d'architecture: techniques, identification et stockage." *Conservation-restauration des biens culturels*, n° 6, 1994, pp. 40-48; Judith Reed, Éléonore Kissel, Erin Vigneau, "Photo-Reproductive Processes Used for the Duplication of Architectural and Engineering Drawings: Creating Guidelines for Identification." *The Book and Paper Group Annual*, 14, 1995, pp. 41-49. Alan K. Lathrop's article, "The Provenance and Preservation of Architectural Records," (*The American Archivist*, vol. 43, no. 3, summer 1980) describes the situation in the U.S., which seems to be fairly different from that which can be observed in France.

two minutes until the paper background turns blue, while the lines of the drawings, which protected the paper from the light, appear white. It should be noted that moisture in the process causes the paper to expand and may create distortion.

Starting in the last century, blueprint paper was sold ready-to-use. At the turn of the century the process became mechanized through the use of a drum which fed the tracing and the paper together and depended on artificial light. The resulting blueprint was almost identical to that obtained using the manual process. By using an intermediate print, a positive blueprint can be obtained with blue markings on a white background.

A similar process (brownprint, maduro print), invented in 1901 by Van Dyke (whose name it also bears), became widely used in the United States despite the much longer exposure and wash time the process requires and the fact it was much more expensive than blueprint. Often referred to as sepia out of confusion with another process, a brownprint is an intermediate print which has the advantage of being able itself to be reproduced, thus helping to protect the original drawing. Prints made using this process have a short life, however.

Classical engraving processes (such as lithography) and printing have also been very useful in printing sets of plans in multiple copies, innumerable examples of which can be found in historical archives.

Diazo duplication was developed through a process used for dyeing textiles based on the destruction of diazo compounds by ultra-violet light. This process produces documents similar to blueprints but which appear as positives. The lines on the original appear in blue on a white background. The properties of diazo compounds had been demonstrated around 1860 in Germany. Their use in architectural plans, developed around 1880, spread to the United States between 1894 and 1915. Dry diazo copying, patented in 1920, minimized distortions of scale, with the result that diazo prints soon were used more than blueprints. Many new reproduction processes also began appearing after World War II.

Photostatic copying was invented in 1948 and gradually became widespread in architectural offices. This process continues to be popular and is currently used for many prints of plans. Increasingly, electronic scanning technology also is being used to reproduce large drawings. At the same time, reproduction methods for written documents (specifications, etc.) are also evolving. These methods, however, are better known by archivists and other and need not be discussed here.²⁹

Models

From as early as the fifteenth century, major commissions have involved the creation of architectural models. Beginning with the isolated case of the church of Saint-Maclou in Rouen and continuing with the great sixteenth century Italian projects of Sangallo and Michelangelo for St. Peter's in Rome and Bernardo Buontalenti for the cathedral of Florence, many great architectural models survive. They were created for many purposes: to develop plans for the project, to contribute to discussions with the client and to assist with the construction of the work itself.³⁰

Three-dimensional models began to be a common device for contemporary architects when they began using axonometry, that is,

29 See Bruno Delmas, "Révolution industrielle et mutation administrative : l'innovation dans l'administration française au XIX^e siècle." *Histoire, économie et société*, vol. IV, no. 2, 1985.

30 Henry A. Millon, "Les Maquettes dans l'architecture de la Renaissance," *Architecture de la Renaissance italienne, de Brunelleschi à Michel-Ange*. Paris: Musée national des monuments français/Flammarion, 1995, pp.19-74.

31 Gérard Monnier, *L'Architecture en France... (op. cit.)*, pp. 259 ff.



Building Model. Plaster model for the National Gallery of Art designed by John Russell Pope, ca. 1937.
Gallery Archives, National Gallery of Art, Washington, D.C.



Models of Architectural Details. Office of John Russell Pope, Plaster models for architectural details of the West Building, ca. 1939.
Gallery Archives, National Gallery of Art, Washington, D.C.

in the early 1920s.³¹ The modern models which predate this period are rather the products of engineering studies. In the first decades of the twentieth century, plaster architectural models were intended for exhibitions of modern architecture, and highlighted the entirely new concept of prismatic volumes devoid of ornamentation, giving no indication of structure. It was not until the end of the 1920s that models became more elaborate and detailed in France, Germany, the Netherlands and the Soviet Union. A variety of materials was used (including cardboard, wood and plexiglass) and specialized workshops soon appeared.

Models are now, above all, a tool for architects to use in communicating their ideas. Less complete than a set of plans, they are easily understood by clients and by the public. Models thus have served as instruments for discussion or persuasion from the 1930s to the present. Different types, such as interior models and urban planning models showing the building or group of buildings in a wider environment also reflect different aspects of the project.

Finally, in some architectural offices models are becoming design tools, similar to conceptual drawings. Created within the office using cheap materials and often changed, such models are rarely kept after the final design concept is chosen.

Architectural offices also often create or maintain other types of objects which may be extremely useful for architectural history or the restoration of buildings.

Photography

Photography did not take its place among the architect's tools until the twentieth century. In response to the needs newly created by the development of specialized architectural journals, photography is first and foremost an instrument for capturing information about architecture.³² Through oblique viewing angles, shadows and depth of field, photographs of completed buildings often emphasize the new quality of space in modern architecture. Sometimes the modern, "fashionable," aspect of a building is emphasized by including props such as sports cars that make a statement about the design. Photography of architectural models also can sometimes be very elaborate with carefully chosen lighting and viewpoints. Photo montages make it possible to assess how the building will fit on its site and may be used in the design process or in discussions with the client.

Firms that specialize in architectural photography often take on-site views of building construction. Many examples of photographs that document specific building techniques also can be found in architects' files. Photographs also are often incorporated in written reports.

Between the two world wars, the first photographers and photography studios specializing in architectural subjects began appearing in Europe, including France's Chevojon, Albin Salaün and François Kollar. Today these firms have impressive photo libraries. Moreover, many architects have an interest in photography, which they practice — on their own projects or elsewhere — as enlightened amateurs. Thus their archives often contain important series of images of their buildings.

³² Gérard Monnier, *L'Architecture en France...* (*op. cit.*), pp. 262 ff.



Photograph. Construction view of the National Gallery of Art, Washington, D.C. showing the steel superstructure, 1939.

Gallery Archives, National Gallery of Art, Washington, D.C.

New Technologies

Computers have been used in architectural offices since the 1980s. CADD systems are increasingly replacing traditional architectural design and drafting practices.

Computers were used initially to simplify the preparation of technical plans. They have many advantages: ease of drawing, rigor in establishing scale and codes, enormous simplification in making corrections, and automatic calculations. Today, the great majority of construction plans are produced by computer, with significant implications for the organization and functions of architectural offices. Software also has been developed to perform many other functions, such as creating simulated building walk-throughs. Today it is possible to use a computer image for a simulated visit to a planned building. These images, which started out as geometric representations of relatively simple volumes, can now be used to create a convincing illusion. Software even exists for creating models from plans or numerical data.³³

At the opposite end of the spectrum, the appearance of computers in the realm of architecture has led to a thorough re-examination of the design process, culminating in the development of tools capable of assisting architects in this essentially intuitive phase of their work.³⁴ Some architects no longer do any drawing by hand whatsoever.

As in other fields, computers in architecture seem to be challenging traditional practices. The fact that young architects can move so easily from their first vague idea to an apparently completed design may be perceived as a problem, since they no longer have time to mull over their ideas. Computer synthesized images offer an infinite number of possibilities for presenting projects in a flattering way, and the exploration of this process by architects is evocative of the exploration surrounding the use of models in the 1920s.³⁵ Many professionals deplore the loss of the human touch which infused the most insignificant of

33 Without the use of such techniques, Frank O. Gehry's firm would apparently have been unable to design the extremely complex surfaces that are its specialty. These, such as Disney Hall in Los Angeles, would be practically incomprehensible without models. See Carol McMichael Reese, "Una rosa sobre el cielo resquebrajado." *Arquitecturas dibujadas*, Proceeding of the first international conference on conservation of architectural sources, Vitoria-Gasteiz, May 1994.

34 Jean-Charles Lebahar, "L'analyse cognitive du travail de conception en architecture." *Cahiers de la recherche architecturale, Architecture et informatique*, special edition, vol. 23, nos. 2 and 3, 1988, p. 38-42.

35 Concerning this subject, see the comments of twelve French architects as collected by Odile Fillon and published in *Architecture et image de synthèse*, video and book, Brussels: Éd. Architecture et perspective, 1996.

hand-drawn plans and which thus far computers (fortunately) have not attempted to reproduce.

As archivists, we must focus on the opportunities for preservation afforded by electronic memory. Even though most final documents exist in the form of prints on paper, many stages of the project development process may be preserved only in the form of computer files. Many of these records are already inaccessible even within architectural offices themselves because of rapidly changing technologies. A number of architectural offices and archival organizations have adopted the solution of systematically saving electronic files as microforms.



Perspective Drawing.

S. H. Maw, Perspective drawing of the Royal York Hotel, Toronto (Ross & Macdonald, architects), ca. 1927.

Canadian Centre for Architecture, Montreal, 13 Arc 031N

Chapter 2

Acquisition Principles, Criteria and Methodology

Louis Cardinal

Architectural archives should be acquired as the result of definite decisions based on an established policy. They should not be brought into an institution's holdings simply due to accidental circumstances. This chapter offers guidance for establishing an archival policy to help guide decisions relating to acquisition of architectural documents.

Public and Private Records and Institutions

Most national archives acquire architectural records due to the government's activities as the builder of airports, railway stations, housing projects, harbors and dams, office buildings, custom houses, post offices, fortifications, embassies, military colleges and hospitals, legislative buildings, experimental farms, and other structures. Records relating to the government's activities in landscape architecture also would be acquired by the national archives. State, provincial, county or municipal governments also often create similar records.

Architectural and landscape records should be transferred to the archives as part of the general records management process for all official records. Nonetheless, government offices often do not give architectural records the attention they should receive. Records creators, managers and archivists often lack the knowledge, resources, space, and storage equipment needed to care for architectural records.

Although many government archives acquire only official architectural records produced by their own governments, others may also collect architectural records from non-governmental sources.

Many private archives, museums of architecture, or other architectural repositories also preserve non-governmental architectural records. Such organizations may be associated with universities that also include schools of architecture or art. Architectural repositories also may vary widely in organizational status.

The first specialized archives, museums, libraries and centers devoted to collecting architectural records were established after World War II¹. The current ICAM (International Confederation of Architectural Museums) register includes eighty-nine institutional members in twenty-seven countries representing a complete array of institutional possibilities ranging from large specialized architectural centers to archives with small architectural programs. Still, valuable architectural records are lost every year for lack of repositories and concern.

Acquisition Goals Defined by ICAM

Acquisition programs must meet certain criteria and principles. In its 1979 charter the ICAM provided the following goals to its institutional members:

- to raise the quality of the built environment;
- to stimulate and receive public response in the appreciation and understanding of architecture and its allied fields in the creation of the human environment;
- to foster critical attitudes towards architecture and its allied fields;
- to act to protect the quality of the built environment when it is threatened;
- to monitor and record the whereabouts of architectural records and aid in their preservation, and to share this information;
- to expand understanding of cultural continuity and its environmental context through the knowledge of history as a source of information and inspiration in the field of architectural practice;
- to exchange information by means of publications, exhibitions, films and other media, on matters concerning the whole history and practice of architecture and allied fields;
- to support and encourage the exchange of scholars, architects and members of allied professions with the intent of fostering a mutual understanding of common issues;
- to seek the co-operation of all interested groups in the efforts to achieve these objectives.

Some of these goals and purposes are common to all institutions acquiring architectural material, and others are shared to various degrees. Archivists responsible for the care of architectural collections thus serve not only as custodians of records but also as important partners in the preservation of the national and international architectural heritage.

¹ For a brief historical background see *Canadian Centre for Architecture: The First Five Years, 1979-1984*. Text in French and English. Montréal: Canadian Centre for Architecture, ©1988. ISBN 0-920785-02-6, p. 8 and p. 110.

In establishing an acquisition policy for architectural archives, an organization responds to various factors. The archives might realize internally that this important field of human activity is not well documented and that too few institutions exist to care for architectural records. Alternatively, an institution that has haphazardly accumulated architectural material over the years might come to realize the richness and utility of the documents and might decide to commit resources to systematically acquire related materials. Researchers and the scholarly community might provide the impetus needed for an institution to begin collecting architectural materials. Architectural programs have been initiated in a number of institutions with the encouragement and support of national groups of architects. In recent decades the awakening of public interest in historic preservation and the promotion of good architecture have also played a role in convincing various archives to add architecture to their collecting interests. Sometimes archival institutions that serve a particular region might choose to collect architectural records because no other institution in that area was accepting that function. Academic programs in universities might also encourage the establishment of an architectural archives within the institution.

Acquisition Principles

As for other archival materials, all acquisition activities for architectural records must be in keeping with the archival principles of provenance and respect des fonds to ensure the integrity of the group of records. Complete fonds or groups should be acquired, not simply the finest drawings of the fonds. At its 1992 meeting in Montreal, ICAM approved a set of principles for acquisition of architectural archives as follows. (See ICAMNews, February, 1992. The principles were later included in the introduction to the ICAM Register.)

1. In the interest of research and the better understanding of architecture, all ICAM members agree that it is of the utmost importance to respect the integrity of archives.
2. ICAM members should as far as possible avoid collecting architectural archives in other members' countries, which are known or believed to be of national interest to members in those countries, without first consulting them.
3. When an ICAM member has acquired an archive known to be of national interest to another member and acquired inside that other member's country, or has an acquisition policy which includes the selective international collection of individual records, that institution will take all necessary steps to facilitate documentation or copies to relevant ICAM members in a country of source.
4. ICAM should as soon as possible generate a system through which the national interests, institutional aims, collecting policies, and holdings of members become known and can be disseminated.
5. ICAM members owning archives known or believed to be of national interest to other members should give those members reasonable access to those archives and should, where reasonable, facilitate temporary loans.

6. ICAM members should encourage non-member institutions in their countries to recognize the principles one to five set out above.

Because acquisition policies of various institutions may overlap, co-operation among archival institutions within a nation is essential. Although frictions do occur from time to time, these should be the exception, and a co-operative approach is recommended. Ultimately archivists and their institutions need to think of the larger scope of what is best for the records and for the researchers.

Defining an Acquisition Policy

A clear policy statement or mandate relating to the acquisition of architectural records will establish the geographic area that the records should represent, whether local or municipal, regional or national. The policy will state the appropriate time period for the records, whether covering the nation's entire existence or perhaps only the current century. The policy also will establish whether the institution is interested in a particular aspect of architecture, for example industrial architecture and engineering, or whether instead it is interested in all types of architectural records. In addition, the institution should establish criteria for acquiring and preserving architectural records based on, for example, the value of the records in illustrating the development of architecture in a selected area, in documenting the work of architects and architectural firms in the country or abroad, in recording architectural achievements or competitions of national importance, or in contributing to the overall architectural heritage of the country. The policy should establish whether the institution is interested in acquiring various types of records such as those relating only to buildings that have been destroyed or that remain intact as well, or to all projects submitted for a competition or only those that have been successful. Other criteria might include the value of records as evidence of government activities, of old or important structures, of national, regional, ethnic or local architectural style, of innovation and prototypes, of controversial architecture, or of buildings with a particular legal or historic status such as those selected by local, provincial, national or international organizations for inclusion in lists of historic buildings or UNESCO's Cultural Heritage of Humanity list. An institution also might consider a policy to collect early drawings and books on architecture to complement an art education program. An acquisition policy also might consider engineering or industrial design or building contractors records as well.

Once an acquisition policy or mandate has been established, the institution needs to identify the architects or firms or other sources who may have records of interest. Priorities should be established. This does not mean that only records of the best-known firms should be targeted for acquisition. To document the built environment there is a need to acquire not only the drawings of the prestigious buildings in town centers but also those of other structures. Records of local shopping malls, middle class residences, factories, gas stations, schools, churches, and other buildings that contribute to city and rural landscapes should be preserved on a sample basis. Many ICAM members and individual archivists believe that architectural archives should not only represent prominent buildings but also should document all types of structures.

Acquisition priorities should probably ensure that there will be a geographical balance in the selection of records so that architecture of the various regions within the institution's collecting sphere will be represented. Too much emphasis may easily be placed on the national capital area or the area closest to the institution. When only a few archives within a large nation acquire architectural records, too often large geographical areas may be poorly documented.

To help achieve sound acquisition decisions, the institution might consider establishing an advisory board composed of individuals from within the archives and outside. This might also help balance architectural acquisitions among various institutions.

An acquisition program should ensure that care is taken to integrate any architectural material previously acquired with new acquisitions in accordance with archival principles.

It also should attempt to forecast the volume of material that can be received and processed each year. Planning should consider appropriate processing, storage and reference space; proper equipment; growth needs; the availability of qualified staff; and the need for training in acquisition, processing and restoration of architectural records. Institutions with an interest in mounting exhibitions will need to plan for suitable exhibition rooms.

Acquisition Methodology

Some useful questions to ask when negotiating an acquisition with an architectural firm or architect include the following:

Ownership: Is the firm or architect with whom negotiations are underway the legal owner of the records. Have the records yet fulfilled their legal requirements in the architectural firm?

Value: What are the aesthetic qualities of the material? Its physical condition? Its rarity?

Scope: What is the scope and content of the entire body of records? Is it authentic, complete, and in order? Does the fonds or collection include only drawings, or are textual files, photographs, videotapes, computer disks and tapes, or architectural models also included? Do indexes exist? What are the outside dates of the records?

Significance: What is the significance of the group of material under consideration? What is the significance of the creator, author, collector?

Legal and Tax Status: Is this a donation for tax credit? Is it a sale or bequest?

Copyright: Does the donor own the copyright? If so, is copyright to remain with him or will it be granted to the archival institution? Will rights to exhibit the materials or moral rights be granted? If the donor does not own the copyright, who is the owner?

History: What is the historical background of the firm? Has its name or have partners changed over time?

Access: What are the terms of access? Are there restrictions on consultation and reproduction?

Management: What are the institutional implications of the acquisition in terms of space needed to house the materials, processing time, or conservation needs? Do the documents complement or supplement other groups of materials already held by the repository?

Future donations: Will there be future donations from the same source? If yes, when?

When considering the acquisition of architectural records, archives should always seek clear information on the volume, condition and order of the documents. This information allows planning for space and resources needed to process and store the material. If the material offered has or is thought to be infested with mould or fungi, expert conservation advice must be sought before the acquisition decision is made.

The archivist negotiating for an acquisition should be able to convey to the potential donor sound knowledge of the physical and intellectual conditions his/her institution can offer for the material, and should be able to explain the tax credit system that applies to the donation of cultural properties. If professional appraisers who are familiar with architectural records are not available, institutional staff may find it necessary to assist in informing the appraisers about these issues.

A file should be maintained for each actual or potential acquisition containing the following materials to the extent that they are available:

- research notes concerning the firm and its architects;
- news clippings including reviews about the architects and their projects;
- relevant obituaries;
- correspondence with the architectural firm or architects;
- notes to the file documenting meetings and negotiations;
- memos concerning the pick-up, processing, custody, conservation, storage and reprography of the acquisition;
- deed of donation or deed of sale for the records;
- list of architectural projects represented by the records;
- finding aids transferred with the records or created by the repository after the acquisition;
- appraisal notes prepared in relation to any appraisal for tax purposes;
- a checklist indicating the various control steps taken for a given collection since acquisition, which should be updated as needed.

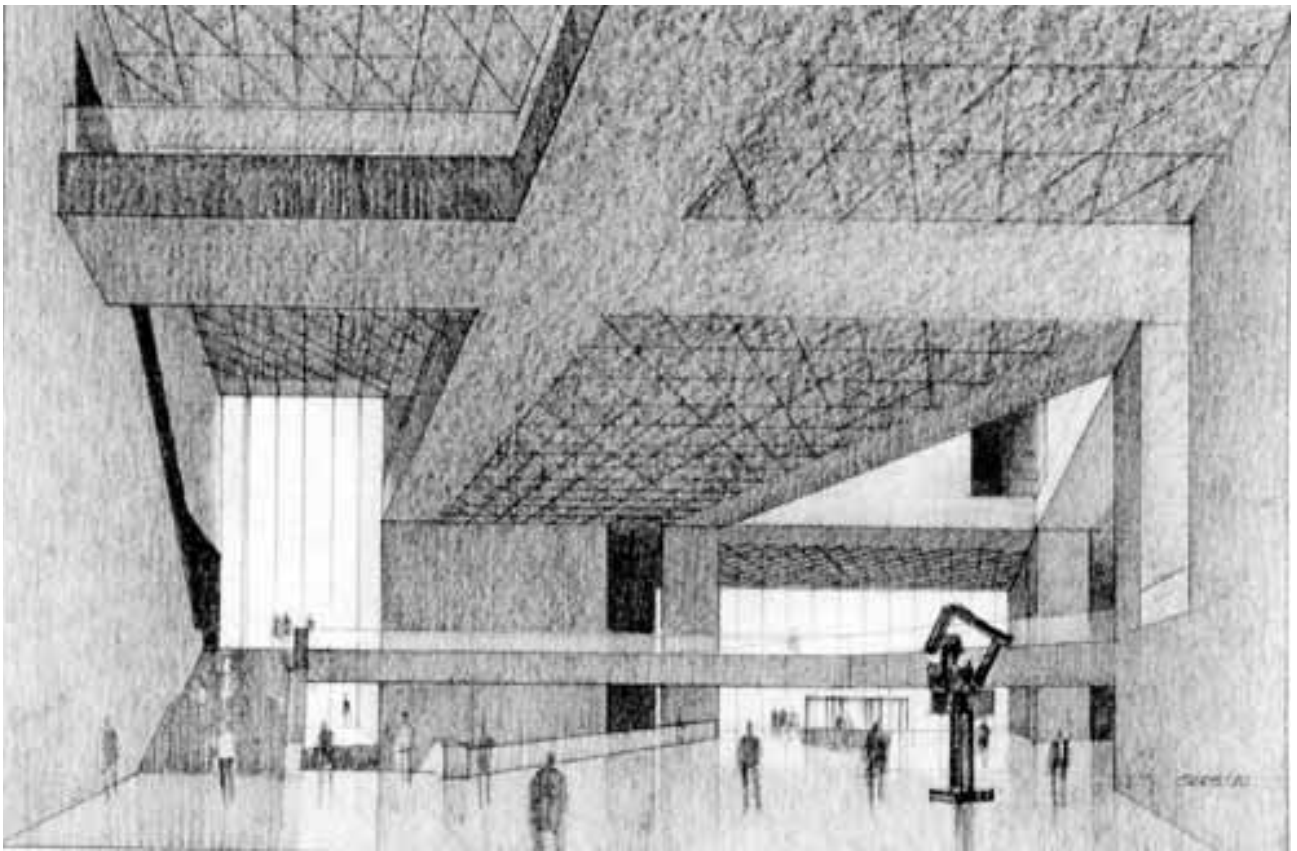
The acquisition case file represents the complete record of the transaction with the architectural firm or architect and may be kept alphabetically by name of firm or architect.

It is essential for the architectural archivist to be well informed about major architectural activities in his or her own country. Attendance at annual architectural conferences, subscriptions to national and international journals, and close contact with researchers in architecture all will help in gaining a better knowledge of the field. Numerous newspapers regularly feature illustrated articles concerning architecture,

which may be useful to read and keep. Many architectural archives and museums also offer well-developed web sites, and access to these is of benefit in evaluating acquisitions.

A selection of reference books on architecture, which also can be used by staff and researchers, also may be useful in background investigations relating to acquisitions.

Acquiring and managing architectural documents is not a difficult task. Once the particular nature of architectural records is understood, their care will not be more problematic than care of other archival materials. The beauty and usefulness of the records and their direct relationship with one of mankind's basic impulses — building and creating shelter — provide rewards and satisfaction for those institutions that choose to acquire and care for architectural records. It is hoped that more archives and museums on all continents will become involved in this work.



Architectural Rendering.

Paul Stevenson Oles, Proposed design for the atrium, National Gallery of Art East Building, Washington, D.C.
(I. M. Pei & Partners, architects), 1971.

Gallery Archives, National Gallery of Art, Washington, D.C.

Chapter 3

Appraisal, Selection, and Disposition

Robert Desaulniers

Appraisal is the process of determining which records should be preserved permanently within an archival institution.¹ The analysis at the heart of this process focuses on the value of the records in question and on what should be done with them,² whether disposal (either immediately or after a specified period of time), transfer onto a new medium for permanent preservation or permanent retention in the archives.³

Archivists and others who manage records view appraisal and selection as basic responsibilities of their professions. The choices these responsibilities entail have profound consequences. Once a record has been disposed of it cannot be recreated.

In architectural archives as elsewhere, selection and disposal are necessary. In architects offices as in archives repositories, uncontrolled accumulation creates clutter that hinders access to important records and useful information and jeopardizes the preservation of essential documents and those of historical or permanent value.

Appraisal thus is the process of assessing the value of given records in relation to the cost of preserving them before determining the necessary preservation or disposal measures. This chapter will therefore review the values of architectural documents and the selection criteria that apply to them.

- 1 Maygene F. Daniels, "Records Appraisal and Disposition," in *Managing Archives and Archival Institutions*, edited by James Gregory Bradsher. Chicago: University of Chicago Press, 1988, pp. 53-66.
- 2 Frank B. Evans et al, "A Basic Glossary for Archivists, Manuscript Curators, and Records Managers," in *The American Archivist*, vol. 37 (July 1974), p. 417. Quoted by Marilla B. Guptil, *Évaluation et tri des documents d'archives dans les organisations internationales: Une étude RAMP accompagnée de principes directeurs*, Programme général d'information et UNISIST, PGI-85/WS/4. Paris: UNESCO, 1986, p. 11.
- 3 Morris Rieger, "Modern Records Retirement and Appraisal Practice," in *Unesco Journal of Information Science, Librarianship and Archives Administration*, vol. 1, no. 3 (1979), p. 202. Quoted by M. B. Guptil, *ibid.*, p. 11.

The need for selection criteria stems from the fact that, because of their volume, not all architectural records can be preserved. In selecting records, it is necessary to take account of the relative value of various professional practices they document as well as the scale, quality, impact on the built environment, research and innovation, and degree of influence, of the buildings and facilities that they record.

The term "appraisal" ("évaluation" in French) applies to the process of choosing which records should be preserved: that is, to the choice or selection of records to be preserved from among those created by architects, architectural offices, developers, building contractors and those involved with technological innovations. In addition to design and construction, other aspects of architecture must also be considered in these decisions, including the source and dissemination of new architectural ideas, professional discussion and public debate, the process of commissioning works of architecture, competitions, criticism, teaching, and training.

Selection applies to the series and files in archives groups and involves the appraisal of records at various stages of their life cycle. Decisions are based on policies applied in architectural offices and archival institutions and on a comprehensive knowledge of the immediate administrative needs of firms, their legal and fiscal obligations, their potential requirement for maintaining and altering buildings, and any restoration or reconstruction work to be performed.

Records that indicate the structure, procedures, and operations of the firms responsible for architectural projects must also be identified and preserved. The informational value of the various records must also be subject to review within the firm in order to assess their relevance and uniqueness.

In recent years, some American archivists⁴ have strongly advocated the establishment of a records strategy developed not only at the institutional level but also at the local, regional, and national levels. The adoption of a common records strategy would make available an overall policy for collection, acquisition, and preservation developed with contributions from all organizations involved in preserving architectural archives. From the outset, this approach to appraisal raises a number of fundamental questions for the archival community, researchers, historians, and archival administrators. In situations in which choices must be made, what should be documented and which records should be preserved to that end?

This approach shifts the responsibility for appropriate preservation of documents of architecture to society as a whole: government organizations, institutions, universities, private archives, and museums. It requires that these institutions consider the totality of architecture within society both as art and technology and that they agree on the way in which the responsibility for preservation should be distributed or allocated. When this type of strategy is applied, records which merit preservation are not overlooked, forgotten, or neglected. In addition, no one individual or institution is forced to take on the enormous responsibility for all aspects of a field as vast as architecture.

Seen from this perspective, appraisal encourages institutions to define and communicate their acquisition policies. It also promotes

4 See also the special spring 1996 issue of *The American Archivist* dealing with architecture (vol. 59, no. 2).

collaboration and the sharing of resources for collecting, preserving, and making the best use of architectural records.

Archivists therefore must work toward developing records strategies in their own workplaces and toward coordinating acquisition policies and fostering communication between institutions.

This chapter considers appraisal of records of completed and planned architectural projects, competitions, and theoretical works. It also discusses the main criteria for archivists to consider during the selection process.⁵

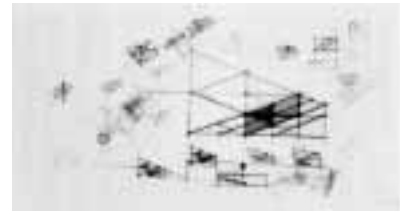
Aesthetic and Historical Criteria: Artistic Values

Many architectural drawings have an obvious artistic or aesthetic value due to the beauty of the drawing or the mastery of technique, meticulousness in composition, and skill of the draftsman. Such drawings are most often renderings, presentation drawings (including sketches), and drawings produced for publications. Often enhanced with colour — either gouache or water-colour — these drawings may be considered works of art. At the very least, they attest to the artistic talent of the architect or draftsman and the importance attached to the project or competition by those in charge of it. These representations generally influenced contemporary decision-making, public opinion, or the obtaining of government permits. Some became especially significant after being published in newspapers and magazines. For all these reasons and for their visual qualities for exhibition and for other purposes, such drawings should be systematically preserved.

Documenting the Creative Process: Sketches and Preliminary Drawings

When available for study, conceptual or preliminary design drawings provide researchers with an opportunity to learn about and understand the architect's creative process. Architects use such sketches or quick freehand drawings to explore in a schematic way the overall plan for a building project including the distribution of space, volumes, and traffic flow. These drawings contain the architect's spontaneous notations as he seeks to express an idea. By examining the various options roughed out in these sketches and by comparing them, architects are able to clarify their design concepts. After dismissing those that are inappropriate, they may keep the sketches that will best illustrate their idea for their colleagues and clients. Conceptual drawings including the "original idea" and the variations that were subsequently rejected thus shed light on the way in which architects' imaginations work and the particular methods they use during the creative process. Collecting and preserving these rough drafts is essential for the study of the genesis of a project and how it evolves.

In the past such drawings were often discarded sometimes as soon as an idea was rejected, and other times at the end of the project or later.⁶ Although traditionally not granted much importance by architects, who did not consider them of any use in the construction process, these conceptual drawings nonetheless remain the most eloquent testimony to the process whereby architects explore various options in their designs. For this reason, archivists today consider these drawings an integral part of the history and documentation of architectural projects. Archivists



Design Sketch.

I. M. Pei & Partners, East Building Design Team, East Building of the National Gallery of Art, ca. 1970.

Gallery Archives, National Gallery of Art, Washington, D.C.

- 5 Other helpful sources relating to archival appraisal theory and practice are Frank Boles in association with Julia Marks Young, *Archival Appraisal* (New York: Neal-Schuman Publishers, ©1991. 118 pp.); Terry Cook, *The Archival Appraisal of Records Containing Personal Information: A RAMP Study with Guidelines* (Paris: UNESCO, 1991. 94 pp.) and Barbara Lazenby Craig, *Archival Appraisal: Theory and Practice* (Bowker-Saur, 2000).
- 6 Nancy Carlson Schrock and Mary Campbell Cooper, *Suggestions for the Organization, Storage and Conservation of Architectural Office Archives*, 3rd edition, revised. Cambridge: MASSCOPAR, 1992, p. 4.



Development Drawing.

Paul Stevenson Oles, Proposed design for the atrium, National Gallery of Art East Building, Washington, D.C.

(I. M. Pei & Partners, architects), 1971.

Gallery Archives, National Gallery of Art, Washington, D.C.

should not hesitate to step in to make sure that architects and project managers are aware of the importance of these documents in order to ensure that they are collected, properly protected, and identified, in the sequence and order in which they were produced.

Development Drawings

Development drawings or preparatory construction drawings provide additional information to assist the client and municipal and other authorities understand the architect's design concept. More structured than sketches, these drawings incorporate technical and maintenance data and include input of engineers and other specialists.

Development drawings are the formal expression of the aesthetic and architectonic intentions suggested in the sketches.

Development drawings for all architectural options document the architect's creative process and should be preserved.

Construction Drawings

In the last stage of the conceptual phase of building design, the final architectural plans for the structure are expressed in technical terms. At this stage, construction drawings (known in France as the "building permit file") that will ultimately be used in realizing the building are created.⁷

Construction drawings include plans, sections, elevations, construction details, and perspectives drawn to scale with dimensions indicated. Originals of such drawings for significant buildings should be preserved as a testimony to the culmination of the creative process, for the information they contain, for their obvious usefulness during subsequent renovation or restoration projects, and for the purposes of historical research.

Architects generally prepare copies of construction drawings to obtain building permits and as attachments for specifications and bid documents. Modern reproductions of architectural drawings may be diazo or electrostatic copies or made by a laser printer. In order to document the history of a project it may prove necessary to preserve a complete set of reproductions.

In order to cut down on clutter, however, there should be no hesitation in disposing of identical duplicates of the reproductions.

It is not unusual⁸ for the client to ask the architect to produce a final corrected version of the construction drawings incorporating all the changes to the architectural plans that were required during project construction. These "as-built" drawings, created after construction has been completed, accurately represent the constructed work and therefore are very useful for historians and other researchers in the archives.

In addition to basic architectural plans, other construction drawings, including electrical, mechanical, plumbing, and structural drawings, are generally kept by the architect with the full project file. These technical drawings may be useful to architects who later undertake restoration work. Some authors maintain that microfilm can serve as a satisfactory substitute for this category of documents when they are transferred to

⁷ Ordre des architectes du Québec, *Manuel de pratique de l'architecture*, 1982, pp. 8-9.

⁸ It is even required by regulation in France, although rarely practiced.

archives,⁹ however other archivists note that building managers, engineers, and restoration architects may find them considerably more difficult to use in this form. In most cases such drawings can be disposed of when no longer needed to maintain the building.¹⁰

Various other types of working drawings or shop drawings for specialized aspects of the project design or interior decoration created by sub-contractors often also are made part of the main project design file. Such shop drawings may be reproductions which can be transferred to microfilm before being disposed of if this becomes necessary because of lack of storage space.

Initially, architectural offices relied on CAD (Computer Assisted Design) systems solely for the preparation of construction drawings. Now, however, the computer has become part of the creative process. Computers enable architects to explore and illustrate complex ideas quickly and accurately and also to manipulate their drawings or to save certain results and eliminate others. As a result, archivists now are wondering about the impact of these new practices on their ability to document the creative process. How will computer files be managed within project teams? Will the equipment used to access the information be available in later years? In the face of these uncertainties, archivists should endeavour to make sure that architects and their project leaders are aware of the importance of preserving paper copies of the sketches and preliminary drawings which they produce. They need such copies in order to look at drawings when they wish, to annotate them, modify them, and comment on them with colleagues. In this way, architects, records managers, and archivists must collaborate in the identification, collection, and preservation of CAD-produced drawings that attest to key moments in the development of ideas.

The activities which architectural archives document include, among others, the architect's profession, the built environment, social and urban history, and the history of building reconstruction. For the purposes of appraisal, archivists should work with historians, architects, and other records creators and administrators to determine which subjects should be documented. Methods and techniques for an effective record-keeping strategy can thus be created to ensure that appraisal criteria will be used to their best advantage.

Documenting the Profession of Architecture

The administrative files of architects' offices provide information on many aspects of operations: work flow, division of responsibilities, the roles played by the architects and others within the office, the creation of new partnerships, changes made to adapt to economic difficulties and successes, procedures used for soliciting contracts, client relations, and the architects' reactions and responses to architectural competitions. Such records contribute to the study of the professional status of individual architects and of architects' relationships with other professionals — engineers, decorators, urban planners — and with the world of politics and government.

Personnel files such as hiring contracts and time sheets, including those pertaining to the assignment of duties to office staff and their

9 Ralph E. Ehrenberg, *Archives and Manuscripts: Maps and Architectural Drawings*. Chicago: Society of American Archivists, 1982, p. 16.

10 National Archives and Records Administration, *Managing Cartographic and Architectural Records*, Instructional Guide Series. Washington, D.C.: NARA, Office of Records Administration, 1989, p. 19.



Preparing a rendering.
Paris, ca. 1950.
IFA/AN, fonds Denis Honegger, 230 IFA 154/5.

compensation, provide information on the economic status of the individuals, their mobility within offices, their salaries, and their specializations, including design, drafting, making models, supervising construction, and so on.

Files on the activities relating to the profession of architecture may be found in architects' personal files and very frequently in the archives of their offices. These may include teaching, architectural criticism, judging architectural competitions, attending conferences, participating in professional associations, promoting the protection and quality of the built environment, research, and marketing products and technologies. Such files are important sources of information about the profession and the development of the economic, social, and professional status of individuals.

Course notes and records of student projects, sketch books filled during study trips, notebooks, calendars, address books, and other documents pertaining to an architect's training provide the historian with information on important meetings and personal and professional contacts, some of which later turn out to have had a decisive impact on the direction of careers, partnerships, and the development of clientele. Moreover, these documents sometimes include references to exhibitions the architect visited, lectures he attended, and landscapes or monuments that impressed him. Through collections of postcards, slides, and photographs from study trips, researchers often are able to determine sources of inspiration, influences, and the development of new interests and activities of the architect.

The archives of architects' professional associations also help to enrich knowledge of their profession.

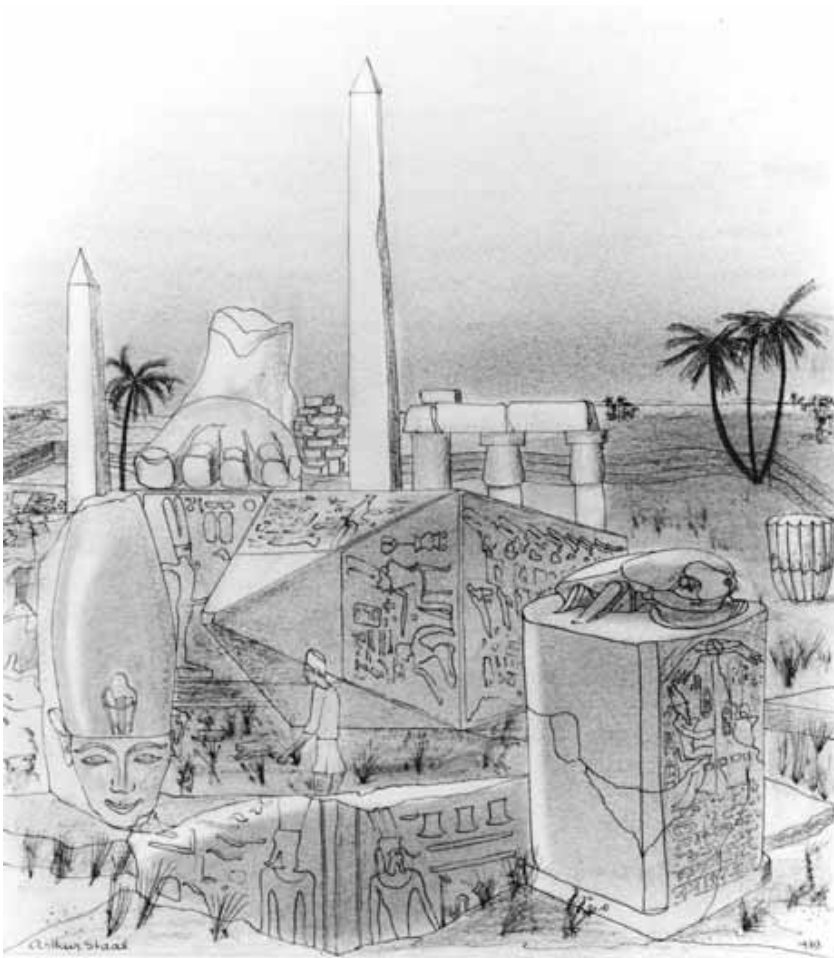
Documenting the History of the Built Environment

Records created and maintained by architects, developers, clients, and contractors are primary sources of documentation concerning the history of the built environment. Records of government agencies made in connection with the design and construction of buildings and the layout of city blocks and neighbourhoods and photographs of sites and projects by private or public photographers also are important sources of information. Such records make it possible to trace the development of projects and the changes made to structures over time. These sources are scattered among the file rooms of architectural offices, private and public institutional archives, the documentation centres of organizations dedicated to defending and preserving architectural heritage collections in architectural museums and specialized libraries, and government administrative agencies such as those which issue building permits.

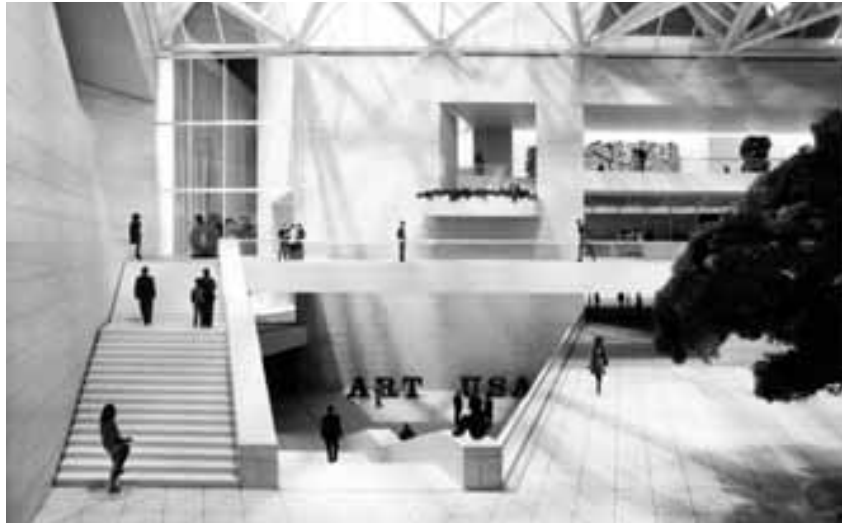
Records relating to the built environment in the holdings of municipal administrations and local government agencies for public works, housing, and urban development, public highways, and urban planning departments, task forces and advisory committees, and the like should be identified in order to ensure that valuable records are preserved. Archivists also should designate and protect national government archives - particularly those of public works departments or their equivalents - to ensure full documentation of the architectural record.

In many countries, government records attest to the increasingly larger role played by government as developer and regulatory authority in such matters as safety standards for buildings, highways, bridges, and public facilities; and infrastructures for business, transportation, and the distribution of goods and services.

In Canada, researchers have turned to notaries' records to find construction contracts from the seventeenth, eighteenth, and nineteenth centuries. Such records have enabled them to reconstruct the history of the built environment during a period in which for all practical purposes architectural records did not exist. These documents include construction specifications and plans for projects. (Today these often are physically removed for storage elsewhere). They contain references to the materials used in construction and information on building methods and the hiring of architects, tradespeople, and apprentices. In addition, bills of sale, leases, and inventories made after an individual has died make it possible to study ownership of buildings, to trace the way they have changed over time, and to analyze the impact of fire protection and other regulations.



Travel Sketch. Arthur Staal, travel notebook, Karnak (Egypt), 1936.
NAI, Rotterdam.



Interior Model. I. M. Pei & Partners, Model of the East Building interior, National Gallery of Art, Washington, D.C., ca. 1971.
Gallery Archives, National Gallery of Art, Washington, D.C.

Court records also provide invaluable information on building ownership, property lines, and zoning. Surveyors' records include valuable data on the siting of buildings.

Sometimes photographs of sites and projects record construction details or capture critical moments in the building process or the feats of workers. Such documents provide information on the art and science of construction, technological breakthroughs, and the architect's and client's taste for innovation. Photographs from the nineteenth century also provide interesting documentation of the art and science of photography.

Although architectural models present archivists with thorny preservation and storage problems, they nonetheless should be mentioned here. Preliminary models which are often made from simple materials of lesser quality do not survive the passage of time very well. When the importance of the project warrants, good photographic documentation can serve as a suitable alternative to preserving these fragile objects. Furthermore, architects now have the opportunity to digitize these three-dimensional objects and manipulate the images for study purposes using CAD systems. The significant results of these explorations merit documentation and preservation. Detail models and presentation models prepared using materials of better quality often were created to convince, explain, or produce admiration. These are of definite interest in the documentation of the built environment and are sought-after items for exhibition in architectural museums. Museums long-accustomed to caring for three-dimensional objects may be in a better position to preserve such models than are archives. Archivists who are unable to preserve valuable architectural models in their own repositories should endeavour to place them in another appropriate collection.

In view of the wide variety of sources for studying the built environment, archivists should be familiar with local resources. They should work with all custodians of architectural archives in their area

in order to prioritize the steps that must be taken to preserve documents essential for the history of the built environment, to share information and resources, and to avoid duplication of effort.

Documenting Urban and Social History

Archives pertaining to the evolution of the urban landscape, to the development and implementation of urban planning, and to urbanization plans attest to phenomena which have had an impact on a great many individuals. The discussions associated with these phenomena, the reactions of the public, and the efforts of lobby groups also provide useful information. Such materials therefore should be preserved on a priority basis.

In recent years, a number of complex urban phenomena have developed which can be understood only by examining archives from various sources. These include the problem of public housing in cities; the creation of industrial or mining cities in remote regions; adaptation of buildings to climates of excessive cold or heat; expressions of the "garden city" movement; increased awareness of urban sprawl; creation of suburbs and urban renewal; public transportation and the construction of subways; highway interchanges and the search for solutions to heavy traffic; and the proliferation of parking lots in cities. Information on social and urban needs is found in many documentary sources, including records in municipal archives; the archives of private companies and public agencies responsible for land and development; the papers of thinkers, theoreticians, professors and authors who have influenced public opinion during political, media, social, and other campaigns; the files of developers and financiers, and documents of engineers and architects attesting to technological progress, all are important sources of information.

Government task forces create records that are valuable for social and urban history. These are significant in studying aspects of housing, urbanization and transportation. Records of research carried out in universities and within the construction industry also provide important information on new building materials and new technologies. Private studies conducted in engineering firms and in collaborative projects involving engineers and architects also provide valuable data.

On some occasions, key exhibitions and/or important commissions also can have a significant impact on architects, society, and the built environment. These should be documented in architectural archives. They might include commissions of important buildings such as palaces, museums, libraries, or head offices for international organizations; buildings for world's fairs; construction for olympic games or other special events; decorations for visits of religious and political leaders; and facilities created to meet the needs of the electronic media mobilized for such occasions.

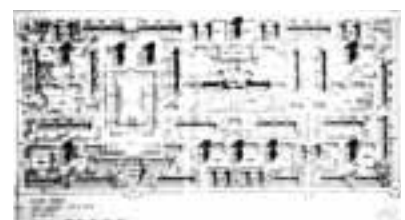
*Restoring Architectural Heritage*¹¹

The plans for a building and related documents are important resources for the architects and engineers responsible for restoration.



Urban Development Model.
André Lurçat, Model of the Fabien housing project, Saint-Denis (Paris Region), 1947.

Institut français d'architecture/Archives nationales (IFA/AN), Paris, fonds Lurçat, 081/P/33



Urban Development Plan.
André Lurçat, Plan of the Fabien housing project, Saint-Denis (Paris Region), 1947.

Institut français d'architecture/Archives nationales (IFA/AN), Paris, fonds Lurçat, 081/P/33

11 The passages quoted are drawn from the manuscript by Andrée van Nieuwenhuysen, *Les Principes de base de la conservation des documents architecturaux*, April 1994. Archives of the International Council on Archives Working Group on Architectural Records (ICA/P-AR).

Architects have many examples in which such archives have contributed essential information for their restoration work.

Not only historical buildings but also those that have been constructed recently may need restoration. The hasty use of new building techniques that have not been properly mastered and the ultimate fragility of steel and reinforced concrete buildings containing prefabricated elements of poor quality are particularly responsible for this phenomenon. One example of this is the church of Notre-Dame-du-Raincy in the suburbs of Paris, built out of concrete by the Perret brothers in 1922. Mechanical and structural working plans are especially useful in such cases.

Given the extremely high cost of restoring recent buildings such as this, many of which were not designed to last, it is obvious that choices will need to be made. Some buildings will need to be abandoned, to be preserved in memory alone by architectural archives.¹² Other buildings can be restored by giving them a new function so that they continue serving a useful purpose or become a public attraction. Such was the case with the transformations of the Washington, D.C., and St. Louis, Missouri, railroad stations in the United States, which became shopping malls and the Waucquez store in Brussels, which became the home of the Centre belge de la bande dessinée.

In other cases, modern buildings that have disappeared can be reconstructed. The now-rebuilt pavilion designed by Mies van der Rohe for the Barcelona exhibition in 1929 is an example of this.

Architectural archives are also essential to ensure that the history of reconstruction initiatives following wars and natural disasters is recorded. Such files are found primarily in the archives of the government departments involved in such initiatives.

Administrative Criteria

We have spoken at length about the aesthetic and historical criteria which guide archivists in selecting archives to be permanently preserved. Administrative and legal criteria must also be taken into account at least in determining the period for which non-permanent architectural records must be maintained.

Beyond their primary use in the construction of buildings, architectural plans and other related written documents such as specifications are essential for maintaining buildings and operating their various mechanical, electrical, and other systems such as heating and lighting, air conditioning and so forth. These documents are also useful to architects when the time comes to modify a building. For this reason, institutions benefit from preserving site and building plans in their archives and making reproducible copies available for building maintenance.

Correspondence, contracts, drawings, specifications, and site reports can be preserved for their evidential value before courts in resolving disputes, preparing a defence, and initiating legal proceedings.

To that end, most countries have legislation which sets out the terms of the professional civil liability of architects and which includes statutes of limitation (that is, the periods beyond which legal action cannot be

12 G. G. Simeone, "Patrimoine et architecture moderne: une course contre la montre?" in *Nouvelles du patrimoine*, no. 53, December 1993, pp. 14-15.

initiated). Architects generally keep project files until the statute of limitations has expired for use in preparing a defence should the need arise.

Architects' professional associations often inform their members as to the length of such periods. In some instances, such associations also have rules concerning the files of architects who have ceased practicing and rules concerning the retention of files. For example, l'Ordre des architectes du Québec (Canada) requires that architects keep records containing information on the agreements between themselves and their clients and a file for each contract in which they insert the documents they have received or have had to prepare. Architects' records and files must be preserved for at least five years. In the event the architect is notified of a construction defect within five years of the project's completion, the record and file must be retained for a period of five years following the date of the notice.¹³ Such documentation could be used to determine the quality of the product that was delivered, if necessary.

Archives pertaining to the construction of buildings also can be used later for restoration or reconstruction work. If, for example, a building's function is to be changed, such documents may be an important resource. Without construction drawings, new measured drawings must be made and this can prove to be a long and costly process.

Periods for Retaining Records in Offices and Archives

Since all archives groups are unique, the value ascribed to records varies from one office to the next. Moreover, the legal requirements for retaining records differs in different nations. Furthermore, the length of time certain records must be retained is not always apparent. It is therefore up to each office to establish its own retention policy on the basis of its administrative needs and legal and fiscal requirements.

This approach should lead to the creation of a retention schedule identifying various types of records and specifying how long they should be kept by the office. Heads of offices should assign this responsibility to a competent person involved in records management.

A records management program which includes the preparation of a retention schedule is the best guarantee that the office's historical records will be preserved, that the legal requirements it is subject to are complied with, and that the documents it may need to defend itself in the event of legal action are easily accessible.

The information regarding legal requirements that is needed to prepare retention schedules is sometimes difficult to gather and interpret, but archivists and records managers must endeavour to do so. They must learn about the legislation governing the practice of the architectural profession which serves as a framework for determining the architect's contractual and legal liability. They must also be familiar with rules mandated by professional associations of architects or engineers. In addition, archivists and records managers must be aware of tax and financial obligations of individuals and corporations and other guidelines pertaining to business records.

13 Règlement sur la tenue des dossiers du registre et des bureaux, Ordre des architectes du Québec, 1992.

As a general rule, architects retain whatever records they may need to defend themselves in the event of a lawsuit during the period in which legal action can be brought against them in connection with a specific project.

Archivists and records managers are thus advised to consult with an office's accountant and legal and tax advisors when preparing retention schedules for architectural records.

In all cases in which it is not possible to determine specific retention periods on the basis of legal and fiscal requirements, records managers must work with the office's directors to prepare a schedule in which time frames for retaining records are determined on the basis of caution, experience, common sense, and the ability to store records properly. This will mean that when necessary, the office will be able to prove to a court of law that records were disposed of according to a pre-determined and regular schedule as part of a records management program applied in the normal course of the business's operations.

As seen previously, there are no simple or firm legal criteria governing the time frame during which records must be retained. Architects themselves are able to determine which records constitute a source of reference because the documents hold the office's expertise in particular areas. Archivists should also consult with architectural historians in order to help them appraise the historical and informational value of the records or series of records that have been scheduled.

In general, older records that architectural offices inherit from preceding practices, documents pertaining to historic buildings, and the personal archives of individuals who have made a significant contribution to shaping an area's built environment can be transferred in full to an archival repository.

Another category of records to be identified and protected consists of records considered "essential," that is those which the office must possess in order to carry out its basic activities: articles of incorporation, insurance and tax papers, documents pertaining to the protection of employees' and clients' rights, accounts receivable records, documents which set out limits to the office's professional liability, and other documents depending on the circumstances of a particular office.

Records to be Disposed of Following Completion of a Project

At the end of a project, that is, after the architect has rendered all the services referred to in his contract, the project manager should gather project documentation, including written documents and drawings, in a central file. These records should be stored in an area for inactive records to make more room in the shop for the documentation to be generated by a new project.

At this stage, most records must still be retained. Even though the records may no longer be needed administratively, the information they contain might be needed if legal issues arise or if the architects wish to show the quality of their work. This generally will be the case for

five years, ten years, thirty years, or some other period depending on the warranty period in the area.

The question arises as to how to deal with print documents or library materials such as technical journals, official bulletins, or magazines collected during an architectural project. Because these types of documents are so readily available, they tend to multiply on an office's shelves during the active phase of a project. They then may be placed in cardboard boxes or placed in other storage supposedly for future consultation. However, like the flavour of the day, products tend to be quickly replaced and new documentation must inevitably be sought out and referred to. Do such print documents have any place in archives? They definitely must be sorted through and only those which are directly related to the history of the design and execution of the project and could be accurately cited in a submission should be retained. The question as to whether or not to keep catalogues and material samples should be looked at on a case-by-case basis with the same philosophy in mind.

Materials that might be destroyed immediately include identical duplicates of reproductions of drawings, personal working files retained for quick reference, documentation obtained for products that were not used, and product bulletins with information that has been outdated.

Documents to be Retained Throughout the Life of a Building

As was discussed previously, certain documents, particularly those which are construction-related, are needed for building maintenance and for alteration projects. In one sense, these documents are associated with the life of the building, but historic and even legal values attributed to them can continue beyond this period in some cases.

To cut down on the number of records in storage, certain authors¹⁴ have designated types of records whose value decreases with time and which can be disposed of after ten years. Drawings and files submitted in order to obtain permits or approval, those prepared for feasibility studies, and records used to prepare cost estimates or reply to requests for proposal, are examples. Certain accounting documents including invoices, statements of account, expense reports, accounts receivable, and accounts payable may be retained for shorter periods of time (from three to six years).

Records to be Disposed of After a Building is Destroyed

Here again, the records to be retained even after the structure has disappeared are determined by the building's importance from a historical point of view. The building's architect, its place in the history of architecture, its importance as a symbolic icon, and its social function all must be considered.

If the memory of a building is to be preserved, the following records should be retained: contracts and other documents which contain basic information about the project, preliminary studies, and documents pertaining to programming, design, construction, the building site and promotion.

14 Schrock and Cooper, *op. cit.*, Appendix E.

It is obvious that some sets of technical plans which were once useful for building maintenance may later be destroyed if the building no longer exists.

For buildings of lesser interest, it may be sufficient simply to retain approved plans and associated documentation through the life of the building and for five years after it has disappeared. Such documents may be used in other similar projects on the same site or elsewhere or may be important for legal evidence.



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Chapter 4

Arrangement of Architectural Records

Maygene Daniels

Architects are known for the order and precision of their work during a building's design and construction, not for the care they give their bulky, repetitive and complex files when the project has been completed. Architectural records of even the most significant projects often have been neglected. As a result, architectural records typically arrive at an archival repository in general disorder after long periods in crowded offices, leaky warehouses, or damp basements. Plans, blueprints and drawings from several projects may be mixed together. Office files, specifications, and change orders are often scrambled or unidentified. Duplicates are likely to abound.

In this chaotic situation, physical organization, or arrangement, of architectural records is essential so that documents can be found and used when they are needed. Proper organization is needed for safe, rational long-term storage as well. Most important, careful arrangement ensures that the identification and meaning of each item and group of materials is protected and revealed to users.¹

Principles of Archival Arrangement

Two straightforward principles provide the intellectual framework for archival arrangement of architectural records. These are the same essential principles that apply to arrangement of all materials in archives.

¹ See Fredric M. Miller, *Arranging and Describing Archives and Manuscripts* (Chicago: Society of American Archivists, 1990) for a thorough review of archival arrangement. "Aural and Graphic Archives and Manuscripts," by Ralph E. Ehrenberg (*Drexel Library Quarterly* 11 (January 1975): 55-71 reprinted in *A Modern Archives Reader*, *op. cit.*) provides a brief overview of arrangement concepts for graphic documents, photographs, and aural records.



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These practical concepts ensure that each document is firmly linked to the group of records of which it is a part, and that the meaning of each document enhances understanding of those with which it is associated. When these principles are followed, the relationship of each document to the larger whole is always evident, and their full meaning and significance can be preserved.²

Provenance

Provenance, or respect des fonds, is the principle requiring that groups of documents that an individual or organization created should not be mixed with materials from any other source. Applied to arrangement, this principle requires that archivists identify the organization or individual that assembled each body of records and organize the materials of each creator separately.

Often, for convenience, in keeping with the principle of provenance, materials within an archives from a single source will be assigned to a numbered record group which provides an umbrella shorthand identification for all of the materials that originate with the same organization or individual. Records of the Office of I. M. Pei & Partners, for example might be a record group in an archives. Thus as a book is organized in chapters, an archives is divided into record groups based on the organization or individual who created the records.

Original Order

The second simple concept that guides arrangement of archival materials, the principle of original order, suggests that, insofar as possible, the original organization of an integrated series of materials should be retained or recreated. Applied to arrangement, this concept requires that the original organization of records should be identified and then intelligently reestablished if practicable. It therefore provides a flexible, consistent intellectual approach appropriate for organizing all types of documents, including architectural records.

Arranging Architectural Records

Using these basic concepts, modern architectural records are among the simplest archival materials to organize, despite first appearances to the contrary. The careful discipline of modern architectural work processes and the rigid requirements of modern building codes, design reviews, and contracts mean that architectural documents must be clearly identified and easily distinguished from the very beginning. Architectural firms must be careful that their work is labeled, dated and annotated to accurately reflect status and approvals.

During much of the twentieth century, architectural offices typically have devised self-evident codes and numbering systems for their records so that the architectural project, date, and subject of each drawing, contract document, set of specifications or piece of correspondence is readily evident. This carefully laid-out system of records management,

2 See T. R. Schellenberg, "Archival Principles of Arrangement." *The American Archivist* vol. 24, January 1961, pp.11- 24, in *A Modern Archives Reader*, edited by Maygene F. Daniels and Timothy Walch, Washington, D.C.: National Archives Trust Fund Board, 1984, pp. 149-161.

essential to the efficient practice of architecture, also serves the archivist well. No matter how chaotic the order in which architectural records are received, internal evidence usually is available to reconstruct the source and original system of organization of the materials.³

Record Groups

Arrangement of architectural materials in an archives usually is a straightforward process. The archivist first reviews the records to determine the creator or source of the materials, that is, the organization or person who brought them together as a coherent whole. The files then are assigned to the record group that provides the organizational umbrella for all groups of materials from that source.

(10)

NATIONAL GALLERY OF ART - SPECIFICATION SECTIONS - 1/26/76		
TC Table of Contents	METALS	SPECIALTIES
CONDITIONS OF CONTRACT	1A Structural Steel	18A Toilet Compartments
GC AIA General Conditions	1B Steel Space Frame	18B Toilet & Bathing Accessories
SCC Supplemental Gen. Conditions	1C Misc. Metal - Foundation	18C Library Stack Casework
SC Special Conditions	1D Misc. Metal - Gen. Const.	18D Signs and Graphics
SCF Spec. Cond. Foundation	1E Architectural Metal	EQUIPMENT
GENERAL REQUIREMENTS	1F Metal Decking-Air Pl. Fins.	11A Trash Compactors
1A Procedural Requirements	1G Painting Steel Space Frame	11B Food Service Equipment
1B	CARPENTRY	11C Projection Screens
1C	1A Flat Carpentry	11D Levelator
1D Temporary Facilities	MOISTURE PROTECTION	11E
1E Testing & Inspection Services	1A Waterproofing Foundation	11G Window Washing Equipment
Concrete	1B Waterproofing, Roofing, Insulation & Flashings	11H Book Board
Structural Steel	1C	FURNISHINGS
Roofs	1D	12A Venetian Blinds
1F Alterations to Existing Bldg.	1E Coating and Sealants	12B Carpeting
A Foundation Work	1F Building Insulation	12C Auditorium Seating
B General Construction	1G Traffic Decks (Dev-O-Test)	SPECIAL CONSTRUCTION
1H Removal of Marble & Granite	DOORS AND GLASS	12A
FINISHES	1A Hollow Metal Stomach	CONVEYING SYSTEMS
1A Rough Grading	1B Window Walls & Entrances	14A Traction Elevators
1B Finish Grading and Levels	1C Glass and Glazing	14B E. B. Freight Elevator
1C Excavation for Foundations	1D Rolling Doors	14C Hydraulic Elevators
1D Exterior Finishing	1E Laylight Ceiling	14D Moving Stairways
1E Interior Finishing	1F Yacht Doors	14E Booklift
1F	1G Sliding Partitions	14F Moving Walkway
1G Exhaustion Ducting	1H Finish Hardware	MECHANICAL
1H Catch Basins Work	1I Space Frame Skylight	15A HVAC
CONCRETE	1J Foot Skylights and	15B E. B. HVAC
1A Reinforced Concrete	1K Study Center Stair Skylight	15C Plumbing
1B Superstructure Concrete	1L Interior Glass and Glazing	15D E. B. Plumbing
1C Reinforcing Steel	1M Fountain Skylight	15E Sprinkler
1D Architectural Concrete	1N Special Metal Panels, Frames & Elev. Entrances	15F Automatic Control System
1E Architectural Concrete-Site	FINISHES	ELECTRICAL
STONE	1A Lath and Plaster	16A Electrical
1A Exterior Marble	1B Acoustical Treatment	16B E. B. Electrical
1B Setting Exterior Marble	1C Metal Pan Collage	16C Security Work
1C Interior Marble	1D Resilient Tile	
1D Stone Firing, Floors, Borders, Stairs and Bases	1E Terrazzo	
1E Stone Cubicle Firing	1F Wood Flooring-Cafeteria	
1F Unit Masonry	1G Wood Flooring	
1G Granite Street Curb	1H Drywall Partitions	
1H Stone Work E.B. Alteration	1I Painting	
	1J Spray-on Fireproofing	
	1K Quarry & Ceramic Tile	

File Organization Scheme.

I. M. Pei & Partners file organization scheme for the East Building project, ca. 1971. Gallery Archives, National Gallery of Art, Washington, D.C.

All of the records transferred from a particular architectural firm, for example, would be identified as records of that organization and assigned to a group with other files from the firm. They would not be combined or identified with records of another architectural office or of a construction company even if both groups of materials related to the same building project, or even included duplicates of many of the same drawings and plans.

3 See Alan Lathrop, "The Provenance and Preservation of Architectural Records," *The American Archivist*, no. 43 (Summer 1980), pp. 325-328.

Records that were created and maintained by an architect in an individual practice similarly would be seen as a discrete “record group.” These materials would not be intermixed with the materials amassed by his clients or by the contractors who implemented his designs.

Similarly, an individual architect or engineer’s personal papers relating to private activities or interests would not be intermixed with the official records of his work for an architectural firm.⁴

It is important to recognize that the organization or individual who brought the group of documents together is not necessarily the author or creator of individual documents. The records of an architectural office, for example, will include architectural plans and blueprints, bid documents, and specifications prepared by architects on the office staff. In addition, however, the office records also will include drawings prepared by sub-contractors, letters from clients, and material samples submitted by vendors. The goal of the archivist is to identify the document group that the organization or individual brought together and to recognize it as an integrated unit, separate from the records of any other organization.

This process of identifying the creator or source of architectural records and retaining them, intellectually, as a group in accordance with the principle of provenance has important advantages. It ensures that evidence concerning events and processes remains complete and undisturbed within the body of documentation and that the origin and source of each document is completely clear. The source and meaning of an otherwise unidentified conceptual drawing, for example, can be instantly apparent and understood in relationship to related project files within the record group of an architectural firm. Mixed with drawings from other sources, removed from this context, this same drawing would be difficult, if not impossible, to identify.

By ensuring that coherent groups of materials are maintained without interference, the concept of provenance also ensures that evidence concerning events and processes remains complete and undisturbed. A researcher may wonder whether an architect participated in a particular public design competition, for example. If the records of the competition are intact, the presence or absence of a submission would be strong evidence concerning this question. If intermixed with materials of other competitions or divided according to some other criteria, an architect’s participation might be difficult to prove, and even more difficult to definitively disprove.

Record Series

The second conceptual stage in organizing any group of architectural records is to identify the smaller groups or series of related documents into which the larger body of documents naturally is divided. Usually these smaller groups or series are recognizable because they share a single coherent organizational scheme. Records of an architectural firm might include, for example, correspondence organized alphabetically by addressee from A to Z. This correspondence would be considered a series, which the archives would maintain together and organize in accordance with its original alphabetical arrangement. Similarly blueprints, drawings, or plans might be organized at one level by

4 The following might be examples of various record groups established for architectural records in an archives:

Record Group (RG) 1: Records of Smith, Jones & Perkins, Architects

Record Group (RG) 2: Records of Historic Redevelopment Partners

Record Group (RG) 3: Records of the City Design Review Commission

Record Group (RG) 4: Records of the Board of Zoning Appeals

Record Group (RG) 5: Papers of John A. Smith, Architect

Record Group (RG) 6: First Baptist Church, Building Committee Records

Record Group (RG) 7: Records of McDonald Building Contractors, Inc.

Record groups provide an umbrella organizing all the records in an archives. Record Group numbers usually are arbitrarily assigned and do not necessarily reflect any hierarchical or relational pattern between the materials in the different groups.

building project, and, within the project, by type of drawing (architectural or electrical for example), and by chronologically-assigned number. This group of organizationally-related documents also would be a series, arranged according to the existing project/drawing type/chronological-numerical scheme.⁵

The practice of arranging records in the archives in accordance with the original system ensures that the meaning of each document is clearly evident within the overall context of related materials. A construction progress report by itself might convey relatively little information. The same report in its original file location, in chronological order between reports for earlier and later stages of the work, would reveal important data about progressive steps in the construction process. The original file order also ensures that miscellaneous notes, unlabeled pages or unidentified drawings can be understood by the substantive context in which they are found.

Equally important, an original system of organization is in most cases the most expeditious and efficient option for long-term care of architectural records. Architectural firms, builders, clients, and others involved in the architectural process all must be able to retrieve documents quickly and efficiently for their own reference and use while a building project is underway. The same filing schemes that worked well in these offices also are likely to work well in the archives, with a minimum of effort or uncertainty.

Problems in Arranging Architectural Records

Although arrangement of architectural records is conceptually straightforward, in practice, archivists often encounter problems in this important process.

Partial Groups of Records

Because voluminous and awkward architectural records are exceptionally expensive and difficult to store, even the best-intentioned architect or architectural firm may lose track of materials in warehouses. Builders and government agencies also may be overwhelmed by large quantities of architectural documentation or unaware of its value. The result is often that partial, haphazard oddments arrive in an archives, instead of a complete, coherent grouping of documents.

The same concepts and practices should be used to arrange partial and incomplete groups and series as are used for more comprehensive documentation. When working with these materials, however, the archivist must be especially careful to evaluate and describe the materials so that, insofar as possible, the relationship of the surviving parts to the missing whole is clear. However incomplete, records should be arranged with respect for the original order of the materials. They should not be regrouped into new organizations that might obscure evidence concerning their original character.

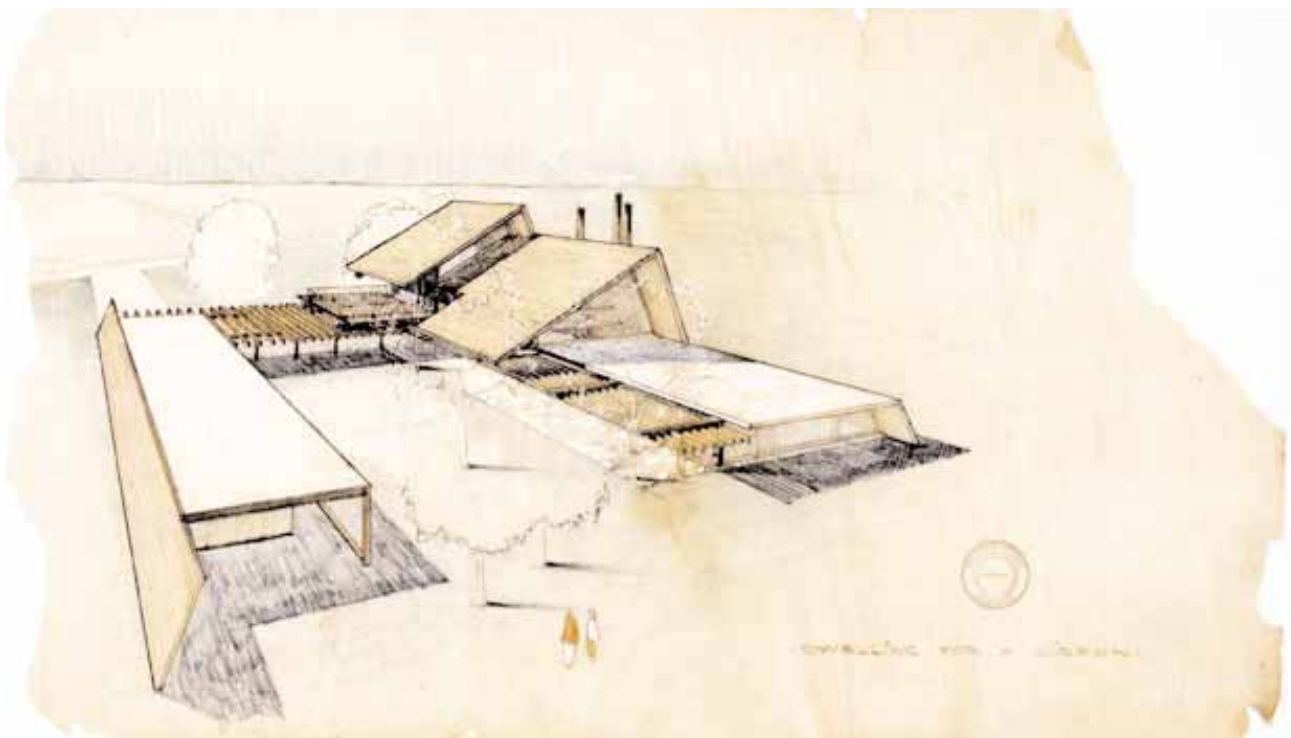
5 A record group, records of Smith, Jones & Perkins, Architects, might include the following series, each with its own organizational scheme:

- Series 1 Client correspondence files (arranged alphabetically by client name)
- Series 2 Architectural drawings (arranged by drawing type and thereunder by chronologically-assigned number)
- Series 3 Shop drawings (arranged by subject code)
- Series 4 Project photographs (arranged chronologically)

Architectural Renderings

Through the years, beautiful architectural renderings or “presentation drawings” commonly have been removed from bodies of related documents before the files reach the archives. In the first half of the century, these drawings, even though an important part of the architectural record, often were ignored and dispersed. More recently they have been valued and eagerly accumulated by private collectors or sought for by museums. In either case, archivists occasionally receive drawings from sources far removed from the original architect. If possible, a drawing should be returned to its original place in a series of related documents, provided that the source and history of the item is fully recorded.

An archives also may receive an entire collection of architectural renderings from a connoisseur who has brought them together through purchase or some other form of acquisition. Because the documents have no natural relationship to one another, no original order exists that can enhance an understanding of the documents. Such composite groups therefore can be arranged following an artificial organizational scheme, possibly the one used by the collector, without regard to the archival principles of provenance or original order. Often each drawing is classified simply with a consecutive acquisition or control number or designation. Such systems typically are used by architectural museums or architectural libraries which must manage important architectural drawings item-by-item.



Architectural Rendering. Roger d’Astous, house designed for H. Gibson, no location given, ca. 1960.
Canadian Centre for Architecture, Montreal, 60 Arc 005

Repetitive Copies

The large number of repetitive copies among architectural records also must be considered. Architectural drawings are purposely created in forms to allow easy reproduction and distribution among various participants in the design and construction process. Identical bid documents and specifications as well as multiple copies of drawings and plans often are found in files of the architect, the builders, and the client, and may be reunited in an archival repository.

If copies of architectural documents from different sources truly are identical without distinguishing annotations or approvals and without meaningful juxtaposition to files, notes, or other documents that give additional evidence or insight, the source of the documents probably is of secondary importance. In this case, to separately maintain multiple copies of the documents probably is an unaffordable luxury. The archives therefore might designate a single set of the materials as the key group for retention. Alternatively, groups from several sources might be combined into a composite master group. In either case, the original order of the drawings or documents would be retained. Extra, identical copies of drawings or other documents might be kept for loan or they might be destroyed.

Diverse Physical Forms

A single architectural drawing may be found in a variety of physical forms. An original drawing might be on a reproducible medium such as linen, vellum or mylar while copies of the same drawing might be reproduced as blueprints, or brownprints, or they might be hand-copied tracings. The drawing also might be found in a print at a reduced or enlarged scale. In such cases, as in others, archival arrangement should be based on the original context and function of the documents. If original drawings on a variety of subjects are brought together for some reason, they probably should continue to be kept together. If originals and copies are combined, they could be considered part of the same series.

Architectural records also often include documents in a wide variety of media. Materials as different as photographic prints, presentation slides, computer-produced videotapes, large exhibition panels and architectural models all sometimes are part of the documentation of an architectural project. If these materials are kept randomly, not as part of any coherent series of related materials, the archives may organize them as "miscellaneous materials" in any practical way. Typically an arrangement scheme for such items would place similar materials together and, when possible, recognize their chronological order, or some other organizing characteristic.

Physical Preservation

Because of the variety of materials and formats out of which architectural records are created, occasionally arranging them in their logical order may endanger their long-term preservation and contribute to physical deterioration of the documents. Photographic prints and news clippings,



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for example, might well be found together in an architect's files. An image on poor quality tracing paper might be next to a blueprint. In every instance, physical preservation must be ensured at the same time that intellectual arrangement of the documents is recognized.

This can be managed in several ways. If an original document is without aesthetic or exhibition value, a copy in a more physically stable form can be substituted in the proper location. A news clipping might be replaced by a xerox copy on acid-free paper for example. In other instances, the documents must be physically separated to ensure their long-term preservation. In such cases, the original arrangement of the files can be intellectually maintained through careful cross references. (See chapter 6 of this manual for a thorough discussion of conservation of architectural drawings.)

The Process of Arrangement

Even before a coherent organization scheme can be developed for a group of architectural records in an archives, they must be identified and understood. A thorough physical survey of the materials thus is an essential first step in the process of arrangement. The goal of this survey, in accordance with the principles of arrangement, is to determine the source or sources of the materials, to identify the groups into which they naturally are divided, and to ascertain their original organizational scheme. The size, volume, fragility and complexity of architectural records can make this a challenging task.

Ordering the Process

For convenience, it may be easiest to begin the arrangement process with office files. These often are the easiest records to open and read and may include folded or printed copies of final drawings which

provide a complete survey of each project. Photographs also may contain a visual record of the construction process which may aid in arranging other documents.

In contrast, drawings and plans are extensive, complex, and difficult to handle. Arrangement of these materials should be undertaken only after as much information as possible is known about the architectural project and related records, possibly even after arrangement of related records has been completed.

Physical Management

Architectural records must be physically accessible in order to be surveyed and identified. They should be removed from any packing materials or containers and placed so that they can be examined and identified. Many archivists find it most effective to flatten or unroll drawings in preparation for storage in flat files. Particular attention should be given to conservation problems during this process. Drawings that have been rolled for a long period or stored under adverse conditions especially may need conservation attention so that they can be gently humidified, unrolled and flattened.

Even if otherwise in good condition, many drawings after unrolling will tend to curl again to the form in which they had been rolled. Before extensive handling, these drawings should be gently held flat with weights (heavy felt-covered bars or bricks do well for this) until they remain flat when unrestrained. Although this may take several months, it is a necessary and easy first step in preparing the drawings for arrangement.

Some repositories find that storing most types of architectural drawings in rolls is an economical and practical alternative to flattening, especially for drawings that are referred to relatively infrequently. This is a practice commonly followed in France. Rolled drawings then can be stored in protective cardboard boxes or "coffins" shaped to fit them.

Presentation drawings almost always are stored flat, often within protective mat boards with windows cut for the images. Identifying such drawings and ensuring their physical protection is an important aspect of initial arrangement.

A large, flat table surface is best-suited for temporary storage and handling of oversized plans and drawings. Standard-sized storage cartons may provide effective temporary containers for office files and specifications.

Physical Survey

After the materials have been unwrapped or unrolled, they should be examined for their most obvious characteristics. What are the physical types of the materials? Are they all oversized drawings and plans, or are files of correspondence or specifications also included? Are the drawings and plans a consistent size or are several different types included? Each of these physical characteristics is a clue to help organize the materials into coherent groupings.

A preliminary survey form can be used to capture evidence quickly concerning the salient physical characteristics of a group of architectural records at the time they are acquired by an archives. A survey form should include the following information:

- Survey date
- Name of surveyor
- Location of records
- Source of acquisition
- Records volume
- Physical types of materials
- Projects or buildings represented
- Physical condition

Conceptual Organization

Based on clues and divisions suggested by this preliminary physical survey, the records then should be examined more thoroughly in order to identify the natural groups in which they can be divided and to determine the original file order of each group. Organization of architectural records should first be conceptual. After a clear arrangement has been devised intellectually, the documents themselves can be moved to their correct locations. Do files appear to be part of a single coherent system (for example, an alphabetical subject file) or are several systems intermixed? Do drawings appear to concern a single building project or several different projects? Do they come from one source or from several different sources?

The archivist must be a detective in weighing evidence and intellectual clues to determine the source, natural groupings, and file organizations of the materials. External information, including knowledge of the organization and history of architectural firms, dates and appearance of architectural projects, and functions and activities of offices and organizations can help unravel any mysteries the records present.

Careful attention to the information presented on the drawing itself can be particularly helpful in identifying groups of plans. The name of the architectural firm, the contractor or sub-contractor who has produced the document, and the contract number or name often are included at a consistent location on the drawing, usually the right side, lower right corner, or bottom, making it possible to bring together drawings produced for the same project. This block or cartouche usually also states the drawing series (for example, architectural; heating, ventilation and air conditioning (HVAC); electrical; or plumbing) and the number of the drawing within the series, making organization simple. Additional information on the drawings including dates, revision numbers and approvals will help identify the various different stages of the drawing.

Arranging the Records

Given the size and volume of architectural drawings, physical arrangement can be arduous. A phased process in which the drawings

are first divided into general groupings that are progressively refined may ease the effort. Like a deck of cards that is first dealt in piles by suit before the cards are organized by number, architectural plans may be placed in groups or folders by subgroup (HVAC, electrical, mechanical, and so on) before each grouping is placed in its final numerical or chronological order. Duplicates can be removed as they are identified (always making certain that the best copy is retained) to reduce the bulk of the drawings.

Teamwork also may speed the process, as large drawings can be moved more quickly and without danger of tearing if they are handled by two persons instead of by one.

To complete the process of arrangement, the files should be given a final review, to ensure that the organization is clear and complete.

Conclusion

Archival arrangement is based on the philosophy that each document is created for a purpose as part of a process which gives the document its meaning. By placing each document within this context and ensuring that it is assigned to its proper place in an organizational framework, archival arrangement is designed to protect all of the evidence that is associated with the historical circumstances of its creation, and to ensure that it can be interpreted and reinterpreted.

Although initially the process of arranging voluminous and fragile architectural records may appear complex, inevitably the very order and discipline required by the architectural process ensures that architectural records have an inherent, self-evident order. This inherent order is the basis for archival arrangement of architectural records.

Chapter 5

Description of Architectural Records

Maygene Daniels

Careful analysis of architectural documents in the repository is the basis for a successful description program. The process begins at the earliest moment that architectural records and drawings come to the attention of an archival repository. Notes, correspondence, and memoranda created during negotiations for acquisitions become the foundation for later archival control of the drawings and files. Existing file descriptions also can be a useful part of an archival description program. Architectural offices often create lists of drawings for a building project. Such lists are a valuable preliminary form of description and can be a useful foundation for later institutional finding aids.

The preparation of finding aids also can be seen as a process that continues as long as the architectural documents remain in the repository. Descriptions can be expanded, up-dated, or re-formatted to take advantage of new information should this be needed. (This differentiates description from arrangement, which must be definitive.) At the same time, however, archival resources are limited, and every description should be completed with the hope that later change will not be necessary.

No single system of description is appropriate for all graphic documents or architectural files or for every repository. Archivists must decide the extent and types of finding aids that are appropriate for a particular

group of documents, based on the nature of the materials and their probable uses and users. Construction or shop drawings that will be used by architects and building engineers probably would be controlled best as individual items. In contrast, files relating to an architectural competition, of interest to scholars and historians, might be most effectively described as a series in narrative form. Groups of architectural drawings or files that are consistent and predictable may require less explanation than complex series or groups with unexpected materials.

Each archival repository also must consider its resources and administrative requirements and the needs of its internal and external users. If resources are limited (as is almost always the case), a program that provides detailed data about a few drawings while leaving out the vast majority of a repository's records would be a poor use of institutional resources.

Recently, electronic technologies have radically affected the way finding aids are created and distributed, vastly simplifying the archivist's task. Data bases are available to link information that previously was available only in separate finding aids. Word processing technology makes it possible to readily up-date and revise finding aids. Every electronic document is searchable by index term. Internet and the world wide web create a medium for quick, inexpensive dissemination of finding aids throughout the world.

Finding aids appropriate for architectural documents can be divided into two categories, those that are needed for internal management and control and those that facilitate use of the records. The finding aids are interrelated and non-exclusive. Records can be described individually and collectively at several levels in both types of description, depending on the repository's needs.¹

Finding Aids for Internal Control

The first goal of any description program is to ensure that a repository has information needed to identify and locate materials in its custody. This is especially true for architectural records, which are awkward to handle and almost impossible to locate on repository shelves or in drawers by trial and error.

In a related task, written descriptions also must ensure that information concerning the source and history of the records is recorded and accessible. Given the complex uses of architectural records for legal purposes and building reconstruction as well as for scholarly research, this information may have exceptional importance.

Accession Registers and Reports

Accession registers or logs often are the first descriptions that an archival repository creates for groups of new materials it receives to ensure that records are accounted for and easily located from the moment they arrive at the door. In this respect, architectural records are no different from other archival materials. A repository can use the same systems for

¹ Chapter 9, *Finding Aids* by Jennifer Edgecombe (In *Keeping Archives*, edited by Judith Ellis. Port Melbourne, Australia: Thorpe, in association with the Australian Society of Archivists Inc., 2nd Edition, 1993, pp. 248-272), gives a good overview of the types of archival finding aids.

accessions of architectural records as it does for initial control of other materials.

Each group of records that is transferred as a body from a single source should be given a control number, typically recorded in a register. Such control numbers may be in a simple numerical sequence or they may use a more elaborate system in which the year and record group or fonds to which the materials have been assigned also are included. Materials received together, whether graphic, textual or photographic, should be given a single accession number to emphasize their common origin.

The date when the materials enter the repository, the quantity and types of containers (for example, folders, boxes or rolls) and temporary storage locations also should be indicated. Here, an indication of the approximate quantity of renderings, blueprints, reproducible and other graphic documents would be appropriate. As the records are processed, the accession register should be annotated.

Repositories also must record key information concerning the subject and creator of the records, the source from which they were transferred to the archives, and past owners. This information often is captured on a report form developed for the purpose, which later is included with other accession files created as records are solicited, acquired and transferred to the repository. This secondary information drawn from sources other than the records themselves can be particularly useful for finding aids prepared later to assist researchers and is essential for systematic double-level descriptions, as described below.

Location Registers

Repositories must ensure that at all times every group of architectural records, whether processed or newly-received, can be located within its storage areas. Because of the size and complexity of architectural records and the demands of changing staffs and emergencies, this information must always be recorded, easily-understood and accessible.

At their simplest, location registers indicate the numbers of storage containers, whether cartons, tubes, or boxes, and the room and shelf location or cabinet where they can be found. Recently, some repositories also have been experimenting with bar codes and associated software to track the location of containers or items within the repository. Any system that ensures that the location of records is clearly established is acceptable.

Finding Aids to Assist Users

The primary goal of most findings aids is to accurately characterize records so that their scope and significance can be understood by institutional staff and by other users. This is done by describing the documents and the information they contain. Although in concept simple, in fact, the creation of effective finding aids for architectural records depends on detailed study and understanding of the records,

a broad knowledge of the projects and purposes for which the records were created and, above all, an understanding of the architectural and scholarly uses for which they may be needed.

Repository and Cross-Institutional Guides

Finding aids must first assist users determine whether the records they are seeking are available in a particular repository. Repository guides are intended to accomplish this goal by providing general information about institutional holdings to a broad audience. They generally include a comprehensive description of the institution's collecting scope and key information about its holdings including project or building titles and names of architects whose work is represented. Knowing that the repository might hold records of interest, the researcher is able to seek further information directly.

Repository guides may be organized by record group or series, by architect, or by architectural project. They also may be limited to a subset of an institution's holdings of particular interest to researchers. A description of records relating to types of construction such as housing developments or to architectural projects in a particular geographic location also might be subjects of specialized institutional guides.²

Repository guides should be kept as up-to-date as possible. Electronic tools, especially the world wide web, now may make it possible to achieve this goal, and to make information instantly accessible internationally.

In some instances, several institutions may join to create collective guides to related materials in their separate holdings. Some focus on certain types of records, for example genealogical sources. Electronically-linked bibliographic utilities such as the Research Libraries Information Network (RLIN) include information on the holdings of a large number of repositories across regional and national boundaries.³ Since researchers often are interested in architects whose work is represented in the holdings of a number of different archives, such cross-institutional guides or networks have particular promise for architectural records.

2 Sharon Thibodeau provides insights concerning the costs and benefits of subject guides in *Archival Arrangement and Description* (In *Managing Archives and Archival Institutions*, edited by James Gregory Bradsher. London: Mansell Publishing Ltd., 1988, pp. 75-76.)

3 DigiNews, the electronic publication of the Research Libraries Group, which runs RLIN, is available at the following world wide web addresses:
<http://www.rlg.org/preserv/diginews/>
 (from North American and other world sites);
<http://www.rlg.ac.uk/preserv/diginews/>
 (from UK sites) or
<http://www.rlg.ohio.org/preserv/diginews/>
 (from most European sites).

Record Group or Fonds Inventories

Record group or fonds inventories describe in greater detail collections of documents made or received or maintained by a single records creator and controlled as a unit by the repository. The record group or collection inventory therefore highlights the relationship between groups of documents related by their origin.

In traditional archival practice, inventories include information concerning the source of the records and a biography of the architect or an administrative history of the architectural office or institution that created the records. Collection or record group inventories also include information on any limitations on access or reproduction of the materials and on copyright ownership. This information is equally relevant for

data bases of individual items as it is for records described narratively in series descriptions.⁴

Series Descriptions

Because series of architectural records often concern a single project, a common subject of inquiry, a narrative descriptive summary is often the most efficient way to describe integrated groups of architectural documents.

A series description ordinarily begins with a title to briefly identify the type of document and function of the records. A range of dates also should be included. Convention Center Renovation Specification Books, 1985-1990, or Georgetown Building Permits, 1879-1935, would be examples of series titles. Often a precise and accurate title provides enough information to indicate to a searcher whether a series of records would or would not be of interest. Evidently a researcher seeking



Archival Inventory. Description of the records of Louis Bonnier from *Archives d'architecture du XX^e siècle, Paris/Liège: Ifa/Mardaga, 1991.*

4 *Inventories and Registers: A Handbook of Techniques and Examples* (Chicago: Society of American Archivists, 1976) gives a wide range of examples of archival finding aids, which can be readily adapted to architectural records.

information on an auditorium, not a convention center, or on a Georgetown building constructed after 1935, would not find what he was seeking in series with these titles.

A series description also includes a statement of the quantity or extent of the records expressed in a consistent form, for example 1,075 electrical drawings or 75 cubic feet of project files. This information helps in managing the records and assists a researcher judge whether records are sufficient in scope to be of interest, or, in fact, whether they might be too extensive to be useful for his particular need.

A description of the arrangement of the records series, whether chronological, geographical, numerical, by drawing type, or by a combination of systems also should be included in a series description. This assists researchers develop strategies for approaching the records and helps them anticipate any problems they might encounter. It also facilitates retrieval of folders or drawings.

Descriptive analysis of the content of a series is the most important element of the narrative. This would include an explanation of the function for which the records were created, information they contain, and exceptional or unusual materials that might be included. If a building project was begun but not completed, or if the records themselves are incomplete due to accident or intent, this would be indicated. The series description establishes the essential content of the architectural materials and therefore is the key element of a description program.⁵

Folder or Dossier-Level Descriptions

Folder-title dossier lists often are used for description of textual files, including those associated with architecture. They may also be used for graphic materials, although item-level description may be more common for architectural drawings.

In modern architectural offices, correspondence, memoranda, and other materials documenting project administration are likely to be grouped in files on the basis of subject. Standard alpha-numeric filing schemes detailing each element of a complex building project have been outlined in treatises on the administration of architectural offices. Some offices have developed file organization programs based on their specialized needs. In either case, a folder-title list recreates these filing systems and provides important information about the location of documents relating to a particular subject. Folder-level inventories also can document the relationship of each part to the totality of the project, and can be especially helpful in understanding whether correspondence, specifications or other documentation of a particular aspect of a building project is available.

Graphic materials such as architectural drawings also are sometimes brought together as dossiers, tubes, or boxes by subject, type of drawing or alpha-numeric filing scheme. Although less frequently used than folder-level lists of administrative records, listings of these folders or dossiers can be an efficient way to indicate the contents of documents in the file, and especially their location, without the detail required of item-level listings.

⁵ Edward E. Hill gives a useful explanation of the various elements of the title and narrative contents of series descriptions in *The Preparation of Inventories at the National Archives*. (Reprinted from National Archives and Records Service Staff Information Paper 14, in *A Modern Archives Reader... op. cit.*, pp. 215-230.)

Item-Level Description

Although rarely used for textual files, item-level description is common for architectural drawings. At this level, finding aids provide information on individual items, within the larger context of related materials. Descriptions of individual items can be extremely brief, perhaps consisting simply of a document number and title. For particularly significant or heavily used materials, item-level descriptions also can include extensive information about the form, dimensions, materials, and appearance of the documents and analysis of their particular characteristics and significance.

In the past, item-level descriptions were almost always in the form of lists or catalog cards. Occasionally descriptions of particularly significant items were published in a reference volume. Electronic data base systems now are used extensively for this purpose, as described below.

To be most effective, item-level descriptions of architectural drawings should associate a visual image with the narrative description wherever possible. For oversize drawings, this has been accomplished for many years with 105 mm microfilm images in aperture cards. Thumbnail photographs also sometimes have been added to typescript descriptions. Most recently, data bases that can relate scanned electronic images to other descriptive data have shown great potential.

Surrogate or Copy Images

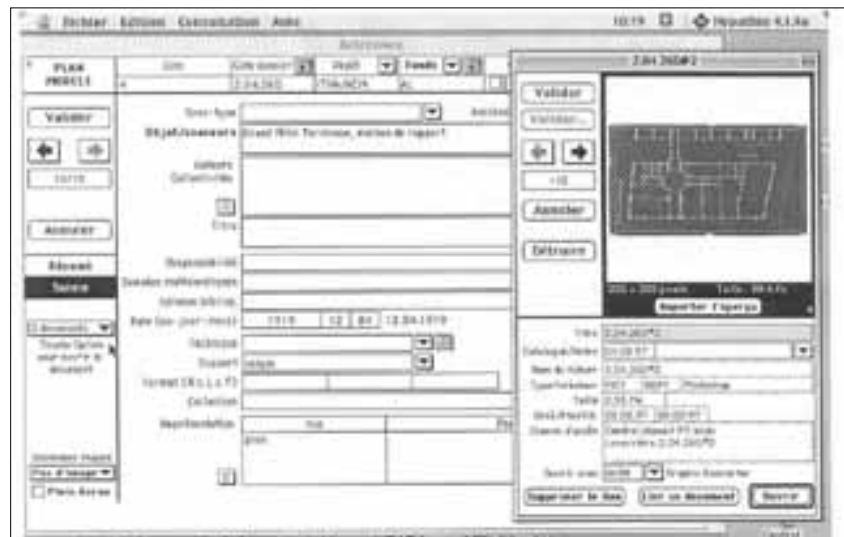
Archival institutions often accumulate extensive collections of visual reproductions of architectural drawings in the form of microfiche, photographs, or contact prints, or, increasingly, as scanned electronic images. Because copies of architectural drawings often are easier to examine than the oversize or fragile originals, these surrogates can be directly consulted and, in themselves, can serve as finding aids to important materials within the repository. To aid consultation, the copies are sometimes organized by subject, geographically, by architect's name, or by building type rather than in the order of the architectural records from which they are drawn. Although further written finding aids to such self-organized collections are unnecessary, data bases can be used to provide control and quick access to the images, as well as to any negatives available for duplication. In electronic form, carefully developed search terms also can multiply points of access.

To be effective as a finding aid to original records, each of the surrogate copies must be carefully identified and the record group or collection in which the original item can be found must be prominently noted.

Surrogate copies of documents from other archival collections also can enhance the research potential of a collection, but the source of such images must be identified with particular care.

Systematic Double-Level Description

Because the subject of an architectural drawing is of preeminent importance, some repositories including the *Institut Français*



The *Hypathie* data base includes a level of description of architectural projects. Archives de la construction moderne, EPFL, Lausanne.

d'Architecture in Paris and the *Archives de la Construction Moderne* in Lausanne, Switzerland, have developed finding aid systems that provide extensive information about the building or subject of the records in addition to information about the file or drawing itself. A typical archival inventory describes the character of a group of records, including its source, arrangement, function, and contents. In a double-level description, information about the subject of the drawing also would be extensively characterized, including data on the exact location and street address of the building; project or competition dates; whether the structure had been built, demolished or altered; contractors and subcontractors involved in construction; physical characteristics of the building, including size, materials, number of floors and so on; and other aspects of its history including its uses over time.

In contrast to simple description of records, which is largely drawn from examining documents, data for double-level descriptions can often come from reference sources. Finding aids of the *Institut Français d'Architecture* based on the concept of double-level description are arranged so that information about the buildings or projects precedes brief archival descriptions of the contents, organization, quantity and arrangement of the files. The *Hypathie* data base developed by the *Archives de la Construction Moderne* electronically links description of the records with detailed data about the buildings or construction projects.

Specialized Indexes

Because of the highly-specialized uses for architectural records, repositories also often have developed supplemental finding aids geared to specific needs of their users. Some repositories regularly assist researchers who are searching for architectural drawings of particular types of buildings, such as churches or schools. Other archives may frequently respond to inquiries relating to structures in particular geographic locations or to questions based on personal or family names.

Records relating to these inquiries might be found throughout the repository. For efficiency, building type, geographic, or personal names access by indexes (now typically in automated form) to all the records in the repository can be particularly helpful. The indexes, conceptually similar to card catalogs, lead a researcher to items within a number of different groups of records. They also can include data to assist the user in other ways, including information on whether the records have been published or could be consulted on microfilm.

Standard access terms must be established for such a specialized access or index system to be successful. The National Archives of Canada uses a table of terms for building types developed by the American Institute of Architects. Names for geographic locations, persons or institutions also must be carefully controlled for a specialized index to be effective.

Delivering Finding Aids to Researchers

Although some finding aids such as accession registers or location guides are intended only for administrative use, most descriptions are developed for a broader audience. The form in which the finding aids are created will have a major impact on how they can be used within the repository or distributed beyond its walls.

Within the repository, guides and inventories should be available to users in typescript or published form or electronically on a public computer terminal. Pages of the finding aids can be readily reproduced as photostatic copies for mailing or they can be transmitted by FAX or electronically.

Some guides and inventories traditionally have been printed for distribution to libraries and to other archives for ready reference. Recently desktop publishing software and inexpensive on-demand copying techniques have made this process more economical.

New technologies now also make it possible for repositories to distribute finding aids widely and inexpensively using the internet or bibliographic utilities. In electronic form on the world wide web, finding aids can be readily up-dated and distributed to an unlimited audience without the high cost of printing and reprinting.

Some traditional finding aids, especially index cards, are very difficult to reproduce and must be used on site. For broader distribution, these are sometimes copied on microfilm. More recently such finding aids generally have been replaced by data bases containing the same information.

Developing an In-House Data Base

Now that inexpensive computer systems are widely available, data bases are used extensively to create item-level finding aids to architectural drawings. Data bases can capture essential information about documents, architects, and buildings and can deliver this data effectively for administrative control and research. They are particularly valuable for complex double-level finding aids, which combine

information about the architect, the building and its history with descriptions of the records.

Data bases are specifically designed so that information can be searched and manipulated. This feature is particularly valuable to assist in locating documents needed for building maintenance, renovation or preservation, or for legal purposes.

Before implementing a data base management system, the archives must determine that such a system is the best, most practical alternative for gathering and disseminating information. Data bases are labor-intensive and require careful, controlled information entry, a time-consuming and demanding process. Furthermore, once created, fields or categories in which data is entered may be difficult to change.

The archives also must determine whether a different approach might be more successful and cost effective. If subject access is a repository's primary goal, full-text search software is readily available for any documents in electronic form and may be a practical alternative. Lists of specification books or office files, for example, can be readily searched in this way for access comparable to that provided by a complex data base.

Evidently, careful strategic planning is essential to success in developing a data base. Above all, the purpose and users of the system must be defined before work begins. Will the data base be for staff use only, or will researchers be expected to consult it? Is it intended to be accessible only within the repository or is there a plan to make it available at remote locations or via internet? Will it be a free-standing system, or is there an expectation that data might be exported for a cooperative cataloging program?

After needs have been assessed, many software options are available, including general application data bases or off-the-shelf products for archives or libraries. Institutions sometimes develop systems tailored specifically for their needs. This option is expensive and appropriate only for the largest institutions or those with specialized requirements. In selecting software, particular attention should be given to the product's ability to work with and manipulate text, and its search capabilities. Flexibility in preparing written reports, which should be clear, easy to read, and free of distracting typographical codes also is an important goal.

Given the rapid pace of technological change, if off-the-shelf software is chosen, attention also should be given to the strength and stability of the software company and its continued ability to maintain and service the software product. Software must be continually updated to keep up with new technological developments, and the software developer must be committed to ensuring that data can be transferred easily to new products.

Definition of data fields may be the most significant aspect of developing a data base for architectural records. Experience suggests that each field must be carefully and strategically delineated so that information can be accurately entered. Information in two fields can be combined in a later report, but data within a single field cannot be split without laborious effort. For this reason, each discrete piece of information, such as names of individual architects, buildings, and projects ordinarily

would be listed separately so that these data elements could be segregated and used in different ways. Unnecessary data also can sometimes complicate searches and reports. A field for notes and comments often can prove useful as a place for information that does not fit into other, highly structured, fields.

As a data base is created, its format, conventions and requirements should be documented in writing to ensure consistency in data entry. Clear rules for data entry are needed to ensure that all information is consistent and reliably retrievable. Requirements for format, punctuation and the like are quickly forgotten.

Exchange of Information: Centralized Data Bases and Internet

The development of new systems and technologies has opened the possibility of readily exchanging information about the holdings of archival institutions. Such systems include cooperative programs in which institutions submit carefully formatted data, which then can be accessed via a centralized system. The Research Libraries Information Network (RLIN) or the bi-lingual Canadian Heritage Information Network are examples of such cooperative programs. Such approaches require that institutions follow tightly-defined rules such as are specified by the MARC (machine-readable cataloging) format. MARC is a library-developed cataloging system in which data is placed in highly-defined fields in accordance with precise rules. These requirements are particularly helpful when working with descriptions in more than one language.⁶

Centralized data bases with information from a number of repositories require controlled thesauruses and tightly applied rules, but they have the tremendous advantage of allowing reliable subject retrieval, a particular advantage for the personal names, titles and sites associated with architectural records. Such cooperative programs that combine data from a number of institutions are particularly effective in alerting academic researchers to the existence of records in repositories of which they might otherwise be unaware.

Finding aids also can be internationally available on the world wide web, or they can be distributed via the internet. Emerging standards for encoding descriptions facilitate access to finding aids via the web, making this an effective alternative to traditional publication without some of the costs and requirements for consistency required by cooperative data bases.⁷ Interactive data bases also can be made available to users on the web, so that major categories of information that already have been produced by archival repositories can be delivered to researchers internationally with minimal additional cost.

The potential for access to information about architectural records via the world wide web is highly promising; however this technology presents intellectual challenges as well. The lack of standardized thesauruses for terms and proper names can contribute to confusion and misunderstanding. Perhaps most significantly, in order to know to search a web site, researchers somehow must be alerted to the possible presence of useful information. Broad-based search engines or bibliographic networks offer differing approaches. Evolving guidelines and international standards may provide consistency that will aid this

6 A useful brief introduction to the MARC format and a summary list of MARC fields are available in *Arranging and Describing Archives and Manuscripts* by Fredric M. Miller. (Chicago: Society of American Archivists, 1990, pp. 111-123.). Miller also provides an introduction to standardized descriptive rules and standardized vocabulary for archivists.

7 EAD (encoded archival description) is described and discussed extensively in *The American Archivist*, vol. 60, no. 3, summer 1997. Vol. 60, no. 4, fall 1997, is devoted to EAD case studies.

process in the future. In the next years, we can anticipate that strategies will develop — and in fact already are emerging — to make descriptions more useful and accessible on the internet.

Description Standards

In recent years, groups of archivists and architectural historians have developed norms, standards and guidelines for archival description of architectural records. Based on existing practices, these guidelines create detailed recommendations for description toward the goal of promoting consistent practice. Such guidelines eventually may make all finding aids easier to understand and will simplify sharing and exchanging information electronically. They now are used by some repositories but not by others.

Beginning more than a decade ago, the International Council on Archives Working Group on Architectural Records, a predecessor of the group that produced this manual, developed a descriptive fiche, which outlines types of information concerning architectural records that might be included in a data base of information.

In 1993, the General International Standard Archival Description ISAD(G) was adopted by the International Council on Archives Ad Hoc Commission on Descriptive Standards. ISAD(G) defines twenty-six elements of information that can be combined into archival descriptions, including information needed to identify the materials being described, the origin or source of the materials, their subject matter and arrangement, access and use requirements, and the availability of related materials.⁸ In the future, an international standard for archival description of architectural records is likely to be developed within the format of the ISAD(G)). In the meantime, national standards, such as Canada's Rules for Archival Description, offer significant guidance for description of architectural and technical drawings.

A Guide to the Description of Architectural Drawings by Vicki Porter and Robin Thornes also provides guidelines that apply specifically to architectural records.⁹ This publication summarizes the discussions and findings of the Architectural Drawings Advisory Group, which, from 1983 to 1991, brought together users and keepers of architectural records to develop consistent descriptive standards to facilitate access to information by scholars.

8 The General International Standard Archival Description, ISAD(G), developed by the International Council on Archives Ad Hoc Commission Descriptive Standards, is published in *Janus*, 1994.1, pp. 7-46.

9 Porter, Vicki and Robin Thornes. *A Guide to the Description of Architectural Drawings*. New York: G. K. Hall, 1994.



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Chapter 6

Conservation of Architectural Records

Louis Cardinal

The proper conservation of archival materials depends on every aspect of their physical management within an archival institution, including the location of the archives building; the direction it faces; the choice of its construction materials; its climate control system; its systems to protect against fires, floods and other disasters; its storage conditions; its rules; its archival methods; and the effort it makes to ensure that all of its staff, without exception, and its readers are partners in ensuring that records are protected under the best possible conditions. Archivists and conservators have important, specific roles to play as part of the institution's dynamic, comprehensive plan.¹

As for other types of archival materials, techniques and procedures for conservation of architectural records should be designed specifically for this type of document, a factor which many institutions do not recognize. At the same time, architectural documents have many of the same conservation needs as other types of records. The material and methodological factors contributing to their conservation will be discussed in this chapter both from the specific standpoint of architectural archives and from a broader point of view applicable in general to all types of records.

This chapter will consider conservation of architectural drawings on linen, paper, and plastic film, reproductions such as blueprints and diazo prints, and other types of non-textual documents sometimes found in

¹ Of the general works on conservation, Mary Lynn Ritzenthaler's *Preserving Archives and Manuscripts* (Chicago: Society of American Archivists, 1993) is perhaps the most complete, simplest and most concise. The text, illustrations and appendices make up a solid whole. There is an excellent bibliography broken down by subject. See also *Archive Buildings and Equipment* by Michel Duchein (Munich: K.G. Saur, 1988. International Council on Archives, ICA Handbooks Series, Volume 6, 2nd edition). *Preservation of Library and Archival Materials: A Manual*, Sherelyn Ogden, Ed. (Andover, Massachusetts: Northeast Document Conservation Center, 1999) is an excellent and complete work, which also is available on-line at <http://www.nedcc.org>. The National Preservation Office, a British Library body serving libraries and archives in the United Kingdom and Ireland also maintains a web site, <http://www.bl.uk/services/preservation> which offers excellent guidance and publications on conservation. The Internet site CoOL (Conservation OnLine) can also be consulted at <http://palimpsest.stanford.edu>. It is a diversified and complete conservation site offering a grouping of database information for the conservation of documents in archives, museums, and libraries. Included among the subjects discussed are digital imaging, disasters, electronic media, library binding, mass deacidification, mold, pest management, and supplies. The site also offers a detailed bibliography and dictionaries. Many links with other useful sites are also available from CoOL.

architectural collections. Text records in those holdings are not discussed, since established, precise, well-known rules are available for dealing with them. Computer-aided drawing files are touched on only briefly, as there are separate, very specific rules for archival management of computer records.

*Causes of Deterioration*²

Heat and humidity, exposure to light, air pollution, dust, chemicals, acidity, insects, worms, rodents, micro-organisms and handling are the primary causes of records deterioration. Fires, floods and other natural disasters such as hurricanes, tidal waves and earthquakes, as well as man-made disasters such as fires (again), vandalism, and theft can also cause deterioration and loss to records. Armed conflict is another major cause of the destruction of archives and works of art.

*Heat and Humidity*³

Heat and humidity are the two greatest causes of deterioration. Variations in temperature and humidity, especially sharp changes, are even more dangerous than an environment that does not have up-to-standard climate control. If architectural holdings are stored in a closed room, the temperature and humidity can be managed relatively well with a thermostat-controlled heating system and small air conditioning units and humidifiers (or dehumidifiers, as the case may be), preferably industrial-grade. The relative humidity must be checked every day using a hygrothermograph or sling psychrometer. Conditions should be constant; heating, air conditioning or the air filtration system in storage rooms should not be turned off after office hours. Installing wall-to-wall carpeting in storage rooms is not recommended, since carpeting retains water and humidity.

In general, it is thought that if a group of records contains items on several types of media and the institution can have only one climate control system, a stable temperature of 18°C with relative humidity of 45% provides good average storage conditions. If it is possible to have separate controls for different types of records, the following are the recommended temperature and relative humidity standards.⁴

Paper, Linen and Plastic Film

For records drawn on paper or linen, such as plans and drawings in ink, watercolor, charcoal or pastel, and for plastic media such as mylar, the recommended storage temperature is 18°C. The relative humidity must be maintained at approximately 35% to 45%.

Acetate films should be stored at a temperature of 18°C with 25% relative humidity.

*Photographic Records and Blueprints*⁵

For photographic documents (photographs, reproductions made through electrostatic and chemical processes, diazo prints, sepias, van

- 2 It is understood that it is more difficult to achieve and maintain adequate temperature and relative humidity levels and pest, rodent and mold control in tropical countries than in nations with moderate climates. On this subject, see Michel Duchein *op cit.*, Chapter 12, "Archive Buildings in Tropical Countries," pp. 131-133. See also Ted Ling, *Solid, Safe, Secure: Building Archives Repositories in Australia*. (Canberra: National Archives of Australia, 1998. ISBN 0 642 34403 5).
- 3 It would appear that in countries with moderate climates, air conditioning is not always necessary to achieve the recommended temperature and relative humidity levels. In certain archives and museums which have been built or renovated recently (for example, Staatsarchiv, Lucerne; Bundesarchiv, Koblenz; Archives de la Construction Moderne, École Polytechnique Fédérale de Lausanne) adequate control is obtained through the use of certain materials, such as terra cotta, and advanced insulation and ventilation techniques. Air conditioning is discussed in Michel Duchein's work, *op cit.*, pp. 104-111. Also interesting is "Natural Ventilation in Canada," by Denis Bourgeois and André Potvin in *Canadian Architect* 45:3, (March 2000), pp. 34-35.
- 4 Standards vary slightly from one media to the other and national standards also differ. The following sources of information should be consulted: Mary Lynn Ritzenthaler *op cit.*, Michel Duchein *op cit.*, American National Standard for Photography (ANSI), the ISO standards and those of the Canadian Conservation Institute and other national standards.
- 5 ISO standard 15660 deals with the preservation and storage of videos, photographs, films, sound recordings, gramophone disks and magnetic media.

dykes), it is recommended that the temperature be 18°C and that the relative humidity be 25%. If the holdings contain a number of types of photographic records (negatives, engraving plates, transparencies, slides, etc.), a relative humidity of 30% is recommended. Color film and photographic material should be stored at -18°C at a relative humidity of 25%.

Records on Magnetic Media

The temperature must be between 18°C and 22°C and the relative humidity between 40% and 50%.

Parchment and Vellum

Although rare, some groups of architectural records may contain records on these media. The current research recommends storing parchment and vellum at 18°C and at a relative humidity of 30% ($\pm 5\%$) for them to remain supple. A humidity level below 25% is not recommended, since there is a risk that suppleness will be lost, while a level above 40% may lead to the growth of micro-organisms and the chemical alteration of the media; however, some institutions recommend conditions of 20°C and 50% relative humidity.

Light

Light accelerates oxidation and certain other chemical reactions in documentary materials.

Ultraviolet (UV) light, the main sources of which are the sun and fluorescent lighting, can cause considerable damage since records exposed to it fade quickly. The light splits fibers in paper, causing the paper to turn brown or yellow and become brittle. It also has a photochemical effect on paper, cotton and ink causing documents to oxidize and fade. The advantage of such light is that it gives off little heat.

The infrared rays of the sun and incandescent lighting give off a great deal of heat and cause documentary media to dry out: thus paper may shrink, crack, roll up and tear. Incandescent lighting also emits some ultraviolet rays.

Photographic and magnetic records exposed to light deteriorate more severely and rapidly than other types of records. Paper records therefore should be separated from photographic and magnetic materials, which require different light, temperature and humidity conditions.

The preferred type of lighting for archival facilities is provided by incandescent bulbs covered by an ultraviolet (UV) filter. Windows should also be covered with this type of filter or at least with blinds. Because the light intensity at a work station can be 1,000 lux, only a single document should be exposed to light at a time while the others remain covered. Since photographic records may be extremely sensitive to light, they should be exposed only for brief periods, even in rooms protected by UV filters. In reading rooms, lighting at an intensity between 300

and 600 lux is recommended, possibly with stronger lighting as required at the reading table if it can be tolerated by the records being consulted. Storage rooms should always be lit with subdued lighting between 200 and 400 lux. Darkness should be avoided, because it attracts insects, worms and rodents and promotes the development of micro-organisms.

The lighting intensity should not be more than 50 lux when records are part of an exhibition. A document should be part of an exhibition for a maximum of six months at a time and should not be used in another exhibition for five years.

If use is made of fluorescent lighting, which is economical and easy to use, tubes must be chosen that emit few ultraviolet rays (high and low-emission tubes are available commercially) and they must be completely covered with filters.

Pollutants

Polluting gases in the air are very harmful, particularly for photographic records. Such pollutants (e.g. ozone, nitrogen oxide, sulfur dioxide, peroxides, hydrogen sulfide) are found mainly in urban and industrial areas, but also increasingly in rural areas.

Every possible effort must be made to protect records from these pollutants, which can stain and dull silver and black and white films.

The fumes of oil-based paint can also damage photographic records. Record storage areas should instead be painted using latex- or acrylic-based paints. If oil-based paint is used, it is necessary to wait at least six weeks before using the area for record storage.

6 See Canadian Conservation Institute, *CCI Notes 3/1*, "Preventing Infestations: Control Strategies and Detection Methods." Ottawa: Canadian Heritage, ©1996. Catalogue no. NM95-57/3-1-1988E, ISSN 0714-6221. This work includes a list of suppliers and their addresses, a good bibliography and information on ordering titles.

See also the bibliography in Mary Lynn Ritzenthaler, *op. cit.*, "Biological control," p. 165.

One of the most practical sources of information on this subject is the internet site, "Managing Pests in Your Collection," <http://palimpsest.stanford.edu/chicora/c hicpest.html>, directly accessible from the CoOL internet site (see note 1 above). The site is detailed, illustrated, and regularly updated, and offers a good bibliography. It discusses the various avenues available for pest control. There are a number of internet sites that provide helpful information on the control and elimination of insects and rodents. They can be found using the key words "disaster," "emergency," and "pest control." The CoOL site, which brings together resources on the conservation of records in archives, museums, and libraries, also can be consulted.

Insect traps can be purchased from pest control services, hardware stores, and archival materials suppliers.

*Insects, Rodents and Micro-Organisms*⁶

Insects, worms and mold may be present when records are acquired or may appear at a later date. They are attracted by the cellulose in paper, glue, animal substances such as leather, vellum and parchment, bindings, the mordants in paper, gelatin and the starch finish on some paper media used for architectural records. Insects are drawn to dark, warm, humid areas.

Rodents such as mice, rats, field mice and squirrels may eat paper and use it to make their nests.

Micro-organisms such as fungi, mold, algae, spores, yeast and protozoa are naturally present in the air and develop when conditions are favorable. High heat and relative humidity, darkness and a lack of ventilation must be avoided.

There are safe, non-toxic ways to minimize the presence of insects, rodents and micro-organisms. According to specialists in the field, a good control plan has five components: (1) avoid attracting of insects and pests by establishing a strict program of building maintenance and cleanliness and having a good temperature and humidity control system; (2) prevent them from entering the building by thoroughly inspecting both the outside and inside to find and repair cracks and fissures, replacing sills, insulation strips and seals around doors, windows and other openings, having adequate lighting, removing and

destroying garbage frequently, and examining newly acquired records in a segregated area; (3) take steps to detect and identify them (such as daily inspections, looking for signs of their presence, laying small sticky traps to find out whether they are present) and keeping a record of each case; (4) prevent the infestation from spreading by isolating the affected records, giving them the appropriate treatment and using the services of extermination and fumigation companies; (5) eliminate insects and pests through freezing or high temperatures, the creation of an environment that has no oxygen or very little, the use of ultraviolet light, drying, traps or ultrasound repellents.

Traps may be used effectively to catch pests and reveal their presence. In the early phase of control, numerous traps must be placed throughout infested areas. At first, traps must be checked at least once per week to note what has been caught and the size of the problem. A good knowledge of insects will allow their identification and their appropriate control through knowledge of what they eat, how they reproduce, and the environmental conditions they like. Mechanical traps, mostly for catching rodents, should be placed along walls, instead of in exposed locations. Poison baits should not be used to attract pests, as corpses will create serious infestation hazards, not to mention that such baits can be harmful to other animals and children.

Handling

Just like the other causes of deterioration, the handling of documents by individuals, whether archivists or readers, represents a considerable danger to the survival of records. This is particularly true for architectural records, which can be easily damaged by improper handling because of their size and a lack of space in the areas in which they are handled. Each institution should have strict rules for handling records, should update those rules regularly and should train its staff thoroughly concerning proper procedures. The archives should be designed so that it is easy to move around between work stations and in storage areas and the reading room, and so that the flow of work tends to eliminate the unnecessary movement of records. The following guidelines are the recognized standards for handling architectural records.

When documents are moved, they should first be placed in a properly-sized folder that is larger than the records. While being moved, the folder should be held gently but firmly by both ends. In the case of very large documents, two people are needed to move the folder safely. When rolls and tubes are moved, they must be transported horizontally and care must be taken not to damage the ends.

Touching records, especially their surface, should be avoided as much as possible. When documents are touched, clean pure cotton gloves must be worn. Such gloves can easily be purchased at moderate expense from specialized suppliers.

Records must be handled gently one at a time, using both hands. They should be lifted slowly and slid onto the work surface or the surface where they will be consulted. That surface must be clean and have no objects on it. Movements must never be sudden. It is best if there are two people to move large folders. Ideally, the surface of the cart or trolley⁷ carrying them should be at the same height as the surface of

⁷ Carts are discussed below under the heading "Transportation and Packing."

the work or reading table so that the records can easily be slid from one surface to the other.

If there is a sheet of tissue paper on the document, it must be removed gently by lifting, not pulling.

Using weights to keep records flat protects them and makes them easier to consult, especially if the documents tend to roll up. Small steel blocks that weigh about a kilogram and are padded and covered with soft, colorfast, archival-quality cloth can be used for this purpose. A number of blocks must be placed around the document to hold it down evenly everywhere. Use can also be made of large steel strips the same height as the record and about 10 centimeters wide. They do a good job keeping materials flat and are easily removed all at once, more easily than a number of blocks. There are also acrylic strips, which are practical but can cause conservation problems because of their static charge. Such weights, both large and small, are available commercially.

Paper clips, adhesive tape, post-it notes, elastic bands, ink, and felt-tip markers should never be used when handling and arranging records. All of these items can cause serious and often irreversible mechanical or chemical damage to records.

Nothing should be written on the front of documents so as not to alter their original appearance. The best practice is to note all identifying information in finding aids. Annotations can also be made on folders and other containers. If annotations must be made on the records themselves, this is done on the back, usually in the lower right-hand corner, using a soft lead 2HB pencil. Never press hard on the pencil.

Architectural records should not be photocopied except with extreme care on appropriate equipment. They are much too large for the commercial photocopiers commonly found in offices, and they can very easily be damaged when placed on the copying surface of the machine. The heat and intense light of photocopiers can also weaken records. A light table is a good work tool in a reading room, however, because it makes it easier to read faded records and, in the case of old records, allows for a better examination of the paper and its watermarks, if any. Watermarks can be important factors in analyzing and describing records.

Some institutions allow readers to trace certain records being consulted. When this is allowed, the records must first be completely covered with a sheet of thick transparent plastic on which the tracing paper is placed. The plastic protects the record from the pressure of the pencil.

The rules of the reading room and work places should be known by everyone, and officers responsible for service to the public should provide every reader with a copy of those rules and explain what they state. The rules must cover all aspects of handling, state that eating, drinking and smoking are prohibited and stress that the order in which records are arranged must be respected.

Disasters

No matter what efforts an institution makes to adopt better protection systems, disasters can still occur. Some have a natural cause, such as earthquakes, hurricanes, volcanic eruptions, floods, frost and in some cases fire and infestation, while others are caused by people, such as

water leaks from pipes, some fires, explosions, terrorism and armed conflicts. To begin with, the best protection is a building that has a good location, is well designed and well constructed on properly drained soil, is far from geological faults, is resistant to bad weather and fire, has a system for quickly draining off water and has all the proper conditions for storage, ventilation, lighting and the control of insects, rodents and micro-organisms.⁸

The best way to deal with the possibility of disasters is to have an emergency plan and to include all of the institution's resources every day in the effort to ensure that records survive under optimal conditions.

An emergency plan has three main stages: prevention, the response during the disaster and recovery.

Prevention

The institution must thoroughly assess the strengths and weaknesses of its buildings and systems and try to remedy any weaknesses, for example by installing water and fire alarm systems, reviewing its insect control standards and moving storage rooms into parts of the building where there are no water pipes in the ceilings. It must also assess its organization and its intellectual ability to deal with disasters.

The institution should establish the procedure to follow in an emergency based on the magnitude of the disaster.

It is important to identify records that the institution must try to save first, such as the most important or most vulnerable records, those whose colors and ink run easily in water. They may be stored in vaults that are especially resistant to fire, flooding or attempted theft. For records of national institutions, a link should be made with the government's program to preserve essential records. The program's standards, including those for identifying and storing records in high-security premises, should be applied. All the institution's records should be described in finding aids and microfiches should be made, if not of all records, at least of the most important ones. At least two paper or computer copies of those aids should be kept in separate high-security premises.

The creation of a response team that can be called at any time is essential: all employees can be part of it, in turn, under the supervision of an operations manager. Having on hand a list of the names, addresses and telephone numbers of other local archives and museums that can be called in an emergency and of companies specializing in disaster response (refrigeration, freezing, drying, cleaning, etc.) will also be of great help and will prevent time from being lost. Groups of friends of the institution (friends of history and architecture) can also be formed to take part in the response and recovery effort. A method should be specifically established to save each type of record.

Materials to use in responding to a disaster should be stationed strategically throughout the buildings.

Daytime and nighttime monitoring of the premises helps ensure an immediate response when necessary. A quick and effective response is essential to minimize the scope of the damage.

8 See in particular Mary Lynn Ritzenthaler, *op. cit.*, and especially "Disasters," p. 49, and the "Disaster Preparedness and Response" section of the bibliography, pp. 163-64; Judith Fortson, *Disaster Planning and Recovery. A How-To-Do-It Manual for Librarians and Archivists* (New York, London: Neal-Schuman Publishers, Inc., 1992. How-To-Do-It Manuals for Libraries, No. 21); Sally Buchanan, *Disaster Planning, Preparedness and Recovery for Libraries and Archives: A RAMP Study with Guidelines*, bibliography by Toby Murray (Paris: UNESCO, 1988, PGI-88/WS/6); International Council on Archives, Committee on Disaster Prevention, "Disaster Prevention: Facing Up to Risks," including a bibliography of 168 titles, *Archivum*, vol. XLII (1996), "Memory of the World at Risk, Archives Destroyed, Archives Reconstituted," pp. 283-297. The following internet conservation sites may also be consulted: Conservation OnLine (<http://palimpsest.stanford.edu/>), Northeast Document Conservation Center-Disaster Assistance (<http://www.nedcc.org/tdisas.htm>), Disaster Research Center-Delaware (<http://www.udel.edu/DRC/index.html>) and Disaster Preparedness and Response (<http://palimpsest.stanford.edu/bytopic/disasters>).

The International Council on Archives and UNESCO are continuing with project Blue Shield to develop emergency programs for protecting archives in the event of armed conflicts. Information can be obtained by contacting the ICA or UNESCO or consulting the internet sites of those organizations.

The response plan must be written and distributed to all staff, and the staff must be given thorough training that is repeated regularly. Everyone must know exactly what to do if a disaster occurs.

In the last twenty-five years, a number of irreplaceable archives repositories and historical buildings have been destroyed, and with them countless records and works of art. Most of those losses could have been avoided if the institutions had been prepared to deal with the worst contingencies.

Response

The response methods must adhere to the established plan and not be improvised. The safety of the people present must be assured whatever the circumstances. While major fires often leave little room for any response, water leaks and flooding provide a greater chance to save records, or at least some of them, especially if there is good preparation. For example, the records should be left in water for as short a time as possible while keeping the water cold by adding ice if possible and freeing the soaked records as quickly as possible (a freezer truck may come to the premises). They can then be unfrozen when they can be treated.

Recovery

After the disaster, it is necessary to objectively and thoroughly analyze the extent of the damage, find the causes, and establish an emergency plan if none existed or change the existing plan on the basis of the analysis. The necessary corrections should be made to buildings, equipment, the organization of work, employee training, etc. The approach must always be a dynamic one and must continually be adapted to new methods of actively and passively fighting disasters and the deterioration of records.

Vandalism and Theft

The emergency plan must also encompass these two possibilities, which occur despite existing methods of protection. Those methods include monitoring reading rooms and keeping a log of readers and the records they have consulted. Briefcases should be examined when people come in and go out and records should be inspected before being returned to storage rooms. Readers must not be given too many records at a time and, as far as possible, must not be given the originals, except where a researcher needs them for his or her research. The use of pens, including ballpoint pens and felt-tipped pens, and scissors should not be allowed in the reading room. Bottles of liquid such as ink or correction fluid or even nail polish should also be prohibited.

It is important that the finding aids to records be detailed so the institution will know exactly what it has and can establish its rights and provide the police and the insurance company with a precise description. Finding aids could indicate watermarks, stains, tears, and other specific marks in addition to the usual descriptive information.

Having photographs or microfiches of all records or at least the most precious ones, especially those that have a high resale value or are especially sought by collectors, will be a very useful investigative tool. Detailed finding aids also provide documentation should any party seek to add documents to files in an archives without authorization.

The police, the insurance company and, where applicable, professional journals and institutions that have the same kinds of records must be informed of the theft. Contacting the community on the internet by giving a description of the records and the thief, if possible, may be a rapid way to prevent theft in other institutions, since thieves of old and precious records often steal from a number of places. Antique dealers and booksellers may also be informed and given a detailed description of the stolen records. Later, dealers' catalogues may be checked to see, whether the missing records appear in them.

A close network of contacts and information is of great assistance in reducing theft and the possibility of records being resold.

Storage Rooms

The areas where storage cabinets or shelving are located must be very large. Architectural records are generally quite large and take up a considerable amount of space. Storage areas should not be in basements, where the humidity level is naturally higher than elsewhere, or in attics because of the possibility of water and droppings coming in through the roof and birds and insects entering through cracks. Water pipes should be grouped in parts of the building far away from the storage rooms. Depending on the institution, the size of the holdings, the number of readers and the availability of photographic or microfilm copies, storing records in or near the reading room may be considered desirable. Large cabinets of drawings stored in the reading room have the advantage of also serving as work surfaces. If good reproductions of records exist, there is no need to store the originals in the reading room.

Whether shelving or drawer cabinets are used, the drawers or shelves must be larger than the records so that the records can be placed and retrieved easily. Too many drawings should not be put in one drawer or on one shelf to avoid creating too much pressure and to make retrieval and storage easier. This means that more cabinets are needed, however. There must also be enough space in front of the cabinets or shelving so that drawers can be completely opened and folders and boxes can be removed from shelves. The need to be able to put a large cart up against the drawers or shelves so that folders taken from storage can be placed directly on it must also be considered.

The bottom of the cabinets or shelving should be 15 cm off the ground and 2 cm away from the walls. This is a good distance for adequate ventilation and protection against flooding. There must be at least 60 cm between the top of the storage cabinets or shelving and the ceiling to discourage the rapid spread of flames if a fire breaks out.

Storage rooms must be thoroughly dusted, swept and cleaned on a regular basis, since dirt, dust and soot are mechanical and chemical agents of deterioration. Such particles may be acidic or contain polluting gases.



Reading room for architectural and cartographic records at the National Archives of Canada.
National Archives of Canada, Ottawa,
photo Denis Gagnon. ©



Architectural drawings and map drawer filing cabinets, stacked. Note the cabinet bases; the offset handles; the drawers containing one or two side-by-side piles of folders; the movable flap at the front of each drawer.

National Archives of Canada, Ottawa, photo Denis Gagnon. ©

Storage Categories

The storage categories described here are appropriate for most architectural drawings following appraisal and arrangement. There are often a number of different media used for drawings within a group of records. Some institutions have fine old drawings on paper made of pure textile fibers that have not been chemically treated, or sometimes on parchment or vellum. In the 19th century and a good part of the 20th, drawings were made on linen, which is a stable, supple, long-lasting material that causes few conservation problems, except that the starch finish on it may attract insects and rodents under poor conditions. The use of this material was gradually abandoned in the 1950s. Generally, the more recent the drawing, the more likely that it will be on material with lower quality and less certain permanence.

Another high-quality medium is vellum paper, which is a paper made of cloth fibers coated with cellulose acetate resin, a semi-synthetic plastic material. Vellum paper also causes few conservation problems.

For the past few decades, polyester film has mainly been used for reproducible drawings. It is a synthetic plastic material known mostly as mylar, a registered trademark. It has proven so far to be a stable, inert material that stores well. However, it may be weakened by ammonia fumes such as are often given off by diazo reproductions found in groups of drawings.

Most groups of architectural records contain blueprints and other reproductions⁹ made using electrostatic or chemical photographic processes, such as diazo prints. Those reproductions are usually on poor quality, highly acidic paper and the reproduction technique raises the acidity level still further by leaving many chemical residues on the paper. Such records are often brittle and fade quite rapidly when exposed to sunlight. They can damage other kinds of records stored near them through chemical contagion. As far as possible, this kind of record should be stored separately from other documents. Drawings printed from computer data are not always on good paper, and the printing

9 A recent work, *Architectural Reproductions: A Manual for Identification and Care* by Eléanore Kissel and Erin Vigneau (New Castle, Delaware: Oak Knoll Press, 1999, ISBN 1-8847182-62-0) gives excellent information on architectural reproductions and their handling and care.

ink may cause conservation problems. Drawings on paper coated with cellulose acetate should not be stored with drawings on polyester film.

As far as possible, architectural drawings should be stored flat. Drawings that are not already folded should not be folded. Folding and unfolding quickly weakens them. Records that are likely to be used often therefore should never be stored folded, even if they were received that way in the first place. A decision may be made to roll oversize records that are too large for flat storage, although not tightly, if they are supple enough and their composition allows for it. Since much is still unknown about the conservation of computer records, consideration may be given to printing the most important records on high-quality paper or even keeping paper copies of the entire group of records.

Records should be stored in non-acidic alkaline folders made of paper thick enough to properly protect the documents and make them easier to move. The folders must take up almost the entire surface of the drawer or storage box. Records may be damaged if the folders are too small in comparison with the storage area, since the extra space allows them to move around. For this reason, it is preferable to sort drawings by size and store drawings of similar size together. Putting small and large drawings together in the same folder makes finding and consulting them more difficult and increases the risk that the small ones will shift and get crumpled or torn in the large folder. The finding aid of the group of records will indicate the location symbols for large and small records, intellectually bringing them together.

There are contradictory arguments about which folders should be used to store blueprints. Since blueprints are highly acidic, some believe that they should not be placed in alkaline folders. All things considered, however, it seems that the alkalinity of the folders will not damage blueprints unless the humidity level is very high. The best solution is to store blueprints in folders with a sheet of polyester on the top and bottom, since the polyester will serve as a moisture barrier. Blueprints and diazo prints should not be stored in the same drawer as other drawings, however.¹⁰

A number of types of storage are available: cabinets with drawers, shelving, tubes, portfolios, and vertical cabinets. The institution's choice will depend on the furniture it already has and the space and budget available to it.

Steel¹¹ is the most highly recommended material for storage cabinets and shelving. Its surface should be coated with baked enamel with a very fine powdery finish. High-quality steel is clean, smooth and easy to clean, and it reacts well to changes in temperature and humidity. In addition, it does not retain humidity as wood and cardboard do, does not attract insects, worms or rodents and does not provide an atmosphere conducive to the growth of fungi and mould. The main disadvantage of metal is that it conducts heat quickly in the event of fire. This possible danger is greatly reduced if the building has good conditions for fighting fire and its causes.

If wood (whether new or used) must be used, it should be used only for shelving and a wood should be chosen that has a very smooth finish, is perfectly clean and has neither insects nor worms. A sealant must be applied to all of the wood first, which must be completely dry before the area is used for storage. Wooden drawer cabinets should not be used, but if this cannot be avoided, the inside must be brushed with a



Shelving for the storage of boxes, portfolios and rolls in the archives vault of the Canadian Centre for Architecture. Canadian Centre for Architecture, Montreal, negative 120-28-11, photo Michel Boulet.©

10 Mary Lynn Ritzenthaler, *op. cit.*, p. 88.

11 Aluminum cabinets are also available. These cabinets are light, rigid, can easily be moved, and present fewer floor-stress problems than to steel cabinets; however, they are considerably more expensive than cabinets made out of steel.



Storage for rolled documents.
National Archives of Canada, Ottawa,
photo Denis Gagnon. ©



© Bert Muller, Utrecht; NAI, Rotterdam.

sealant that can prevent the records from being damaged by acid from the wood and pollutants from its decomposition. Wooden shelving does not have the same drawbacks, since it is easy for air to circulate among the shelves. Polyurethane-treated wood should never be used, because the formaldehyde from which polyurethane is made releases very harmful acids.

Non-acidic paper folders must always be used to insulate records from the wood's acidity.

Plastic storage cabinets, folders and boxes are not recommended.

Drawer Cabinets

Many institutions have chosen to store their architectural drawings in drawer cabinets. Steel with a gauge of 20 for the frame and 16 for the drawers is recommended.

Cabinets measuring 121 cm x 95 cm x 42 cm are the most practical. They generally have five or ten drawers (inside dimensions: 112 cm x 88 cm x 2.5 or less cm), each of which can hold one pile of large records widthwise or two piles of smaller records side by side lengthwise. The institution should select the cabinets that are best suited to the average dimensions of the drawings it owns. The cabinets should have drawers that operate on ball bearings, since they are always easy to open. Drawers on glides are often difficult to open.

Cabinets with shallow drawers (about 2.5 cm) are preferable. Each drawer can hold some 60 records, depending on their value and fragility, the number of folders used and whether or not a sheet of (non-acidic) tissue paper is inserted between the records. There should normally be no more than 12 drawings in a single folder, although a folder may contain more or fewer records depending on their artistic value and thickness. Likewise, there should be no more than four or five folders in each drawer, but fewer folders and records may be placed in each drawer depending on the value and fragility of the drawings. Bear in mind that one person should be able to take a folder of records out of a drawer easily and safely.

Cabinets with deep drawers (drawers 5 cm deep or more are often suggested) are not recommended. With such drawers, there is too much pressure on records at the bottom and retrieval and filing are difficult. Drawer management is also more difficult.

For drawers to be opened more easily, the handles should be offset rather than aligned. The corners of the cabinets should be slightly rounded to avoid causing injury and tears.

The best cabinets have a movable flap at the front of each drawer to keep records in place inside the drawer and prevent them from being damaged when it is opened and closed. There must also be a small fixed horizontal flange projecting above the back of the drawer to prevent records from overflowing and falling out of the drawer. The cabinets should also have stops to prevent the drawers from falling out of the frame when they are fully open or being transported.

Cabinets often have ten drawers each and are stackable. Stacking two cabinets is considered a good idea because the top of the upper cabinet

can be used as a work surface. No more than five cabinets should be stacked; with any more, it becomes difficult to file and retrieve records and the height can present risks for the staff.

Oversize cabinets are not recommended unless required for exceptionally large drawings. The maximum dimensions of cabinets should be about 249 cm x 153 cm x 31 cm. Beyond those dimensions, a great deal of space is wasted. Such cabinets are also very heavy and make storage difficult (at least two people are needed to support documents during storage and retrieval). These cabinets, which usually have three drawers, are useful for storing a small number of very large, fine drawings. Beyond those dimensions, thought should be given to laying records flat in large portfolios on shelves or, if the nature of the records allows for it, rolling them.

Shelving

Open metal shelving is also an excellent solution. Some renowned institutions believe that it makes for a better use of space than drawer cabinets. Shelving also makes it easier to store and retrieve boxes of records. In general, the largest shelves are designed to hold boxes measuring 92 cm x 122 cm x 7.5 cm, there is about 2.5 cm extra around the sides and at the back and there is 15 cm of space above the boxes (5 cm if two boxes are stacked on each shelf). About 100 records can be placed in each box, distributed among ten folders. The boxes are stacked two per shelf, and two people are needed to handle them. The shelves should not be fixed so that their height can be adjusted if necessary. Once again, for very large records, consideration may be given to having even larger shelves on which records can be stored in portfolios made of non-acidic cardboard. Very large drawings should be stored in rolls if they are supple enough and their composition allows for it.

Rolls and Tubes

Architectural drawings are sometimes too large to be stored flat. Moreover, drawings are often received in rolls and institutions lack time, resources or space to unroll them and store them flat.

There are fairly safe ways to store rolled records. The rolls should always be stored horizontally, never upright, since in the latter case the lower end of the records is quickly damaged under the weight. As far as possible, the rolls should not extend beyond the edge of the shelves so that their ends are not damaged. Rows of rolls should never be stacked, since the records may be crushed and retrieval and storage are more difficult. A decision may be made to place several shelves very close together and place a row of rolls on each. Some institutions have opted for normal spacing between the shelves, with a number of rows of rolls on each shelf, the rows being separated from each other by sheets of stiff board supported at regular intervals by small blocks. There are also large square boxes divided into a number of compartments that open at the end of the box, with each compartment holding one rolled drawing. Such boxes are sometimes called pigeonhole boxes. There are also drawer cabinets designed to store small rolls.



Storage of rolled documents in drawers.
National Archives of Canada, Ottawa, photo Denis Gagnon. ©



Storage of rolled documents in tubes suspended from the wall.
National Archives of Canada, Ottawa, photo Denis Gagnon. ©

Only records on flexible media (linen, mylar, paper of high quality that has been properly stored) should be rolled. No attempt should be made to roll delicate records on brittle paper, records on thick, stiff or hard-bound paper or composite records.

The best way to store a large record¹² in a roll is to wrap it around a rigid alkaline (neutral) cardboard tube. The diameter of the tube should be about 10 or 12 cm so that the record is not rolled too tightly. Opaque, non-acidic paper is then wrapped around the tube and the ends are tied with pure cotton ribbon. A rod slipped through the tube and extending beyond both ends is used to suspend the tube from hooks on the wall.

Some institutions have chosen to place large rolled records, generally one record per roll, in inert plastic tubes. Very long tubes can be purchased and cut to the desired length. Before the roll is inserted into the tube, it is covered with non-acidic paper and attached at both ends to prevent it from unrolling once inside the tube. The ends of the tube are closed using caps that fit over the outside of the tube. The caps are perforated to allow air to circulate. The tube is then suspended from hooks on the wall.

Systems for hanging tubes on the wall can be found commercially, but the same result can easily be achieved using pegboard and long hooks obtained from hardware stores.

If tubes are not hung on the wall, they can be placed on large shelves with a high rim around them.

Vertical Cabinets

These cabinets allow records to be suspended, exposing them to permanent tension. While they make it fairly easy to file and retrieve records (at least in the case of the most widely available cabinet, which features a front panel that inclines outward and movable and fixed portions equipped with two long metal rods from which records are

¹² Based on Mary Lynn Ritzenthaler, *op. cit.*, pp. 90-91, and the practice of a number of institutions with large architectural and cartographic records.

suspended by means of attached perforated bands), there is a constant danger that records on the suspension rods will be scratched or torn. Such cabinets can hold hundreds of records and, when open, can easily fall over on the user if most of the records are on the movable portion. The cabinets must be attached to the wall to prevent a situation that is as dangerous for the staff as it is for the records. In addition, contrary to what has sometimes been suggested, these cabinets do not have a better use-of-storage-space coefficient than drawer cabinets, especially since their tops cannot be used as work surfaces. If vertical cabinets are owned, valuable records should not be placed in them, but only copies.

Storage of Fragile Drawings

While the vast majority of architectural drawings can be stored in large folders, the same is not true of more delicate drawings, which need to be protected by matting. The mat prevents the folder from touching the surface of the drawing. Among such drawings, watercolors and prints are sufficiently protected if they are matted in the conventional way, that is, with window mats 0.4 cm thick. The drawings can then breathe properly even if they are subsequently framed. Such mats are of museum quality and are made from top-quality textile fibers. If need be, mats can be made from strong, non-acidic board of a suitable thickness. There are some good texts that explain how drawings are secured to the back of mats using paper hinges to prevent them from moving.¹³ The mats are stored in cases (often called solander boxes), with a sheet of tissue paper on each mat. Depending on the thickness of the mats, up to 15 records can be placed in each box. The boxes have a maximum height of about 6 cm.

More fragile drawings, that is, drawings made from pigments that are not fixed and may shift on the surface of the medium (such as pencil, charcoal, pastel, graphite, plumbago, chalk, sanguine and ocher), drawings whose pictorial material is in relief (such as wax and gouache) and drawings with thick coats of acrylic varnish, must be protected by mats that have window mats deeper than those mentioned above. Those sink mats (back mat and window mat) are made from blue, corrugated, acid-free board, and the window mat is 0.6 cm thick. Several layers of the board used to make standard mats can also be used. The cover of the mat is made from two layers of corrugated board,¹⁴ laminated so that the corrugations of the two parts run perpendicular, which gives the entire cover greater stability. When made in this way, the cover will not sag in the center or come into contact with the drawing. The mats are stored in boxes. Again, the box can be completely filled, subject only to its weight, since a single person should be able to move it. Although such boxes are shaped like briefcases, they must always be transported flat. When the box is opened, its back folds out onto the table and the records can easily be slid out; they do not have to be lifted out of the box. Greater protection for pastels is afforded by framing them under glass (plexiglass should not be used due to its static charges, which attract pastel pigments) after they are matted.

Records that are too large to be matted can be stored alone in very shallow drawers or in folders on shelves, with one record per shelf.



A vertical file cabinet.
National Archives of Canada, Ottawa,
photo Denis Gagnon. ©

13 Regarding materials used in making mats, see also standard ISO/CD 15650. See also Canadian Conservation Institute, CCI Notes No. 11/5, "Matting Works on Paper." Ottawa: Canadian Heritage, ©1997. Catalogue number NM95-57/11-5-1986E, ISSN 0714-6221.

14 United States, National Archives and Records Administration and National Association of Government Archives and Records Administrators, *Digital Imaging and Optical Media Storage: Guidelines for State and Local Government Agencies: A Joint Report*. Washington: National Archives and Records Administration and National Association of Government Archives and Records Administrators, 1991; Nancy E. Elkington, ed., *Research Libraries Group, Digital Imaging Technology for Preservation: Proceedings from an RLG [Research Libraries Group] Symposium Held March 17 and 18, 1994, Cornell University, Ithaca, New York*. Mountain View, California: Research Libraries Group, 1994. Also based on the standard being developed by the National Archives of Canada.

Models

Models, which are three-dimensional records, will sometimes be provided by an architect or agency. They may be made of one material or several materials. The materials will dictate what climate they must have. Storage is problematic, since such structures are usually very delicate and fragile and damage easily when moved. Generally, only high-quality models with artistic value are acquired. If they are fairly small, they can be stored in large cupboards, but otherwise they are placed on shelves. A curtain may be used to close off the front of the shelves and prevent them from getting dusty.

Computer Records

Many architects today are using the computer-aided drawing software AutoCAD. It can convert a variety of file formats, including DXF, DXB, SAT, WMF and Postscript. However, it would seem that conversion to the DXF (drawing exchange file) format for the purposes of archival preservation is becoming the norm. The DXF format is an ASCII description of the AutoCAD drawing file that can readily be imported into a number of drawing packages.

The storage of magnetic disks and tapes must comply with the following principles: they must be completely protected from direct exposure to sunlight; two copies must be made of the tapes and each must be stored in a different place; the air in the storage room must be dust-free and filtered to 50 microns; and the tapes must be reproduced every five years and, where possible, rewound and cleaned every year using a special device.¹⁵

Frames

Drawings and other records (for example, presentation drawings or the architect's diplomas) are sometimes in frames when they are acquired by the institution. The document should generally be removed from the frame, the components of which are usually highly acidic and will damage the record and other nearby items. The archivist may remove the record from the frame if it is clear that there is no risk involved, but a conservator must do so if the item is stuck to the glass or is made of fragile materials, such as charcoal or pastel. There are good texts that explain how to remove a record from its frame. Most of the time, since framing does not add anything to the record's value and since the record must be stored flat, the frame can be thrown out if it does not have any aesthetic or documentary value. A decision may also be made to keep the frame, in which case an intellectual link must be made between the frame and the record if the two are stored separately. However, if a drawing must be stored in a frame (or shown in a frame at an exhibition), there are very specific rules for safe framing. The most important of them are as follows: the edges of the record must never be cut to make it fit the frame — it is the frame that must be made to fit the record; the record must never come into contact with the back wooden panel or the glass; the back of the frame must be sealed with acid-free corrugated board to prevent dust and insects from getting inside; the glass must not be cleaned by spraying cleaning liquid

15 Anne F. Clapp, *Curatorial Care of Works of Art on Paper. Basic Procedures for Paper Preservation*. New York: Intermuseum Conservation Association, 1987, pp. 111-18; Francis W. Dolloff, Roy L. Perkinson, *How to Care for Works of Art on Paper*, 4th ed. Boston: Museum of Fine Arts, 1985, pp. 25-30; Merrily A. Smith and Margaret R. Brown, *Matting and Hinging of Works of Art on Paper*, pp. 1-22; Mary Lynn Ritzenthaler, *op. cit.*, pp. 89 and 195-198.

onto it, because the liquid may get under the glass — instead, the liquid should be sprayed sparingly onto the cloth used to clean the glass. Frames must be examined periodically to determine whether the records are still in good condition.¹⁶

When a framed document is loaned to another institution, the loan agreement must provide that the borrower cannot remove the record from its frame without clear, specific authorization. However, when records are loaned to a renowned institution that has good conservation laboratories, they are sometimes loaned unframed and it is agreed that the borrowing institution will frame them in accordance with standards accepted by the institution that owns them.

Conservation

Archivists have an important role to play in the conservation of records. That role is limited to specific tasks, however, and archivists must know just how far they can go and where the conservator's job begins. Training and experience are essential to archivists, who must handle records and care for them with a view to conservation. Archivists may work with newly acquired records or records received by the institution a long time before. For such work, archivists must have a large, flat, totally clean surface on which a single document will be placed at a time. Archivists, particularly in a small repository, essentially can surface clean, rehumidify and flatten records. Staples, paper clips, paper fasteners and grommets may be removed first, but only if this can be done without difficulty. The removal of labels, stamps and gummed tape stuck on records is the responsibility of conservators, as is removing soot and grease and treating fragile and brittle media.¹⁷

Archivists must be very familiar with the composition of their holdings and must know the media used for the records (wood-based or rag paper? film? linen? paper with a high or low level of acidity?); their age (old? recent?); and the techniques used to make the drawings (India ink? wash drawing? watercolor? charcoal? pastel? wax? gouache? printing by photographic and chemical processes such as blueprints, sepia, or line printing? computer-aided drawing?). Records will be stored under different conditions based on the type of record and the possibilities available. Having a detailed knowledge of the holdings also enables archivists to know which records are most fragile, which need minor conservation treatment and which need thorough treatment. Archivists can thus decide whether damaged records must be stored separately from other records. They may also decide to have reproductions made of the records that are used most often so that the originals can be taken out of circulation. They will also be able to quickly select the most appropriate records when the laboratory says that it has several hours to treat them.

Archivists examine records when they arrive at the repository and when they are arranged and described. Later, they do spot checks of the condition of documents to see whether any need particular care. Other employees, including those responsible for service to the public and for preparing exhibitions, and readers too have a responsibility to report damaged records to the appropriate person.

Architectural drawings are often received in very tight rolls or in bundles of records folded a number of times after spending a long time in the

16 Good texts to consult on this subject are the following: Anne F. Clapp, *op. cit.*; Francis W. Dolloff and Roy L. Perkinson, *op. cit.*; Nancy Bell, ed., *Historic Framing and Presentation of Watercolors, Drawings and Prints. Proceedings of the Conference on Historic Framing and Presentation of Watercolors, Drawings, and Prints, June 1996.* Leigh Lodge, Leigh, Worcester, England: Institute of Paper Conservation, 1997; Mary Lynn Ritzenthaler, *op. cit.*, pp. 193-95.

17 Appendix D of Mary Lynn Ritzenthaler's book, *op. cit.*, pp. 173-77, should be consulted on this subject. The following articles are also very useful on the restoration of various types of tracing papers: Marina Bicchieri, Paola Brusa, Giovanna Pasquariello, "Tracing Paper: Methods of Study and Restoration," in *Restaurator*, 14, ©1993, pp. 217-233; Paul Cook, Julie Dennin, "Ships Plans on Oil and Resin Impregnated Tracing Paper: A Practical Repair Procedure," in *The Journal of the Institute of Paper Conservation*, vol. 18, 1994, pp. 11-19.



Conservation laboratory for architectural documents at the National Archives of Canada.

National Archives of Canada, Ottawa, photo Denis Gagnon. ©

architect's warehouse, where storage conditions are usually poor. There are steps that the archivist can take to flatten the drawings, but if the records do not respond easily to treatment, the archivist must rely on the services of conservators.

Before trying to unroll or unfold records, it is best to leave them for a few days in a room where there are good temperature and relative humidity conditions so that the documents can become supple again. Drawings on a flexible medium, such as linen, vellum paper, and polyester generally retain their suppleness despite poor storage conditions and can be unrolled without much difficulty. The same may not be true of other records on paper media. An attempt must first be made to unroll them very slowly while supporting them properly. If they resist or the paper tears, the archivist must stop this effort immediately.

If the institution does not have a conservation laboratory, a rehumidification chamber may be made using two large plastic garbage cans or dustbins¹⁸ or other watertight, non-corrosive, rustproof containers. One container is filled approximately 50 cm deep with pure distilled water. Holes are made around the top of the other container, which should be shorter and smaller in diameter than the first, and is placed within the larger container. Sheets of blotting paper are placed between the two to promote the dispersion of moisture in the chamber. A lid is put on the outside container and the smaller one is left open. The lid must not touch the records. After a maximum of 72 hours, the records are removed and unrolled very gently on a flat surface. A large sheet of blotting paper is placed on each record, a sheet of plywood is placed on the pile and weights are put on the plywood. The records then are left for three or four days. A rehumidification chamber may also be made using other containers and materials, as explained in the works referred to in the footnote.

Before rehumidifying, it is necessary to be sure that the records are not of a type that would be easily damaged by humidity (leather, watercolor, wash drawing, ink that runs in water, etc.). Composite records, linen with a starch finish, documents with adhesive tape, photographs and records easily attacked by micro-organisms also should not be rehumidified. Before treatment, the surface dust on the outside of the rolls should also be removed with a soft brush.

The same considerations apply to records that have been folded for a long time.

Records that are still quite supple when received may simply be unrolled, laid flat on the work surface and subjected to the pressure of a sheet of plywood and weights for a few days so the medium will lose its tendency to roll up on itself. Other rolls on a supple medium that are in good condition may simply be rolled the opposite way for a few days: they should no longer roll up on themselves afterwards.¹⁹

If the condition allows for it, the archivist may surface clean both sides of documents. Records that are too fragile and brittle, damaged records, and charcoal, pastel, wax, pencil and watercolor drawings should be cleaned only by experts. Surface cleaning should be done using soft brushes. It is necessary to have several on hand and to change them regularly during the process. Dirty brushes must be washed before being reused. The work surface and the entire room must also be cleaned often to prevent dust from being deposited on the records. Watches,

18 See in particular: Mary Lynn Ritzenthaler, *op. cit.*, pp. 184-89; Barry Byers, "A Relaxing Chamber for Rolled Documents: Some General Principles and Suggested Designs," and Dale Steele "Humidity Chamber for Flattening Maps at the Arizona Department of Library, Archives and Public Records," *WAML Bulletin* 28(3) (July 1997), pp. 139-55. (*WAML Bulletin* is published by the Western Association of Map Libraries. For information write Subscription Manager, Geology Library 100-23, California Institute of Technology, Pasadena, California 91125.).

19 A good discussion of how to flatten large records can be found in Mary Lynn Ritzenthaler's book, *op. cit.*, and in the *WAML Information Bulletin*, *op. cit.*

rings and bracelets should not be worn during the work to prevent scratching and tearing the records.

If the dirt resists soft brushing, the brushing should be stopped, because otherwise the dust may become permanently embedded in the fibers of the document and the record may be torn. A vacuum must not be used to do this work, even one with low suction power.

Erasers (vinyl only) can be used, if the condition of the document allows for it, to lightly clean the margins and surfaces outside the area in which information is found. After such treatment, the cleaned parts of the document should not contrast greatly with the rest of the surface. During this work, the sheet must lie on a flat surface and be held by weights to prevent it from slipping.

Photographs and negatives in good condition should be cleaned only by light brushing.

If the presence of insects or micro-organisms is detected when arranging or cleaning records, the work should be stopped and conservation services contacted.

Photographic records, like blueprints and diazo prints, which naturally have a high level of acidity, should never be deacidified. If they present serious conservation problems and have no legal or historical value, it may be a good idea to make reproductions of the records on a more stable medium — paper or microfilm — and to dispose of the “originals,” if there are sufficient resources.

Preservation Copying²⁰

As an institutional priority, archival institutions should seek to have high quality reproductions of their most valuable and/or most often used records, if not of all their records. The reproductions can be used by researchers, thus minimizing the need to access the originals. Negatives used to produce the reproductions can also be used to make copies for researchers. Reproductions are also useful in cases of theft or vandalism, accidental damage to records, disaster recovery, or insurance claims.

Even though image digitizing technology is more and more able to produce precise reproductions, it would seem that at this time microfilming remains the best method for producing quality copies. The image resolution obtained by microfilming is still far higher than that possible by digitizing or on videodisc. Architectural drawings or any very large records should be reproduced on 105 mm microfiche, one item per fiche. Such microfiche in black and white or in color reproduces the originals in precise detail. On the other hand because technology is fast evolving, literature on microfilming and digitizing should be monitored regularly to keep up with changes.

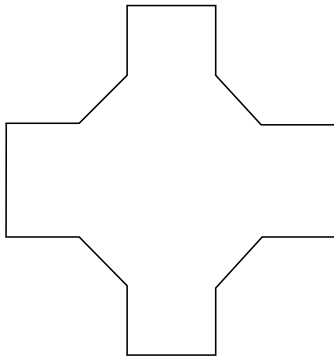
Work Stations and the Reading Room

Archivists' work stations and areas used for consulting architectural drawings must be large and meticulously planned to ensure the proper conservation of records and to enable employees and readers to use documents without difficulty. Planning must take into account the size

²⁰ Good texts to consult on the establishment of a sound microfilming program are the following: National Archives of Canada *Guidelines for Microfilming Records of Archival Value*. Text in English and French with French text on inverted pages. Ottawa, Minister of Supply and Services, ©1996, catalogue no. SA2-249/1996, ISBN-0-662-614887, and Mary Lynn Ritzentahler, *op. cit.*, pp. 54, 97-98, 125, 129-133.



Work station at the National Archives of Canada.
National Archives of Canada, Ottawa,
photo Denis Gagnon. ©



Work station in the form of a cross at the Koninklijke Bibliotheek, The Hague. Note that equipment is mounted on movable arms, freeing the work surface.
Koninklijke Bibliotheek, The Hague. ©

of the table, the dimensions of the records, movement in the rooms and around the tables, the space needed to write, the area needed for temporary placement of records that have just been consulted, and the size of the large cart used to transport drawings.

The experience of a number of institutions that have substantial holdings of architectural drawings or cartographic records shows that each reader should have a table with a surface of at least two square meters. This provides just enough space to place a folder of drawings on the table and to have a small writing surface; however, once the folder is open, its top will hang over the edge of the table making consultation difficult. A table surface of eight to ten square meters makes it possible to support the drawings and the cover of the folder and to place a large cart up against the table. A work surface of at least 12 square meters is recommended for archivists who arrange and describe records. Ideally, the surface used by both archivists and researchers should be 16 square meters so that drawings can be arranged and consulted without any difficulty and drawings that have just been arranged or consulted can be placed to one side. The table should be placed so that it is possible to walk around it so that the entire surface of the record can be read easily without risking damage to it.

A large rectangular or square surface may not be the best solution in every case, however. The geometry of the work surface should make it as easy as possible to work and consult records while taking account of the use of microfiche and CD-ROM readers, the computer and reference works.

A work surface designed as a cross-shaped island would seem to be a very good option. The island's long axis could be made up of large tables on which drawings are placed, while the short axis would consist of smaller tables for microfiche readers, CD-ROM devices, reference works and the computer. To make consultation and note-taking even easier, the computer can be mounted on a movable arm above the table, which frees the table surface and allows the machine to be positioned above the desired part of the drawing. This also allows for the easy simultaneous consultation of both electronic and paper architectural records.

The computer could also be placed on a small movable table that can be moved easily around the cross-shaped island. Researchers could easily read the center of the drawing and take notes at the inside corners of the cross. Lamps (and the telephone) could also be mounted above the table for better light conditions and space and movement possibilities.²¹

Individuals who are not accustomed to working with very large records will perhaps find that the consultation and processing space described here is too large in comparison with the norm for smaller records. If an institution has few large records, a space such as is recommended here is no doubt large. If the holdings of architectural drawings are fairly substantial and used often, however, a large space that is well laid out is a necessity. Unfortunately, very few institutions provide sufficient space for processing and consulting large records. Even recently built or reorganized map departments in highly respected institutions have not really given the necessary attention to the specific and obvious needs of large records.

²¹ Based on recent communications with Jan Smits, Map Curator, Koninklijke Bibliotheek/National Library of The Netherlands, The Hague.

Transportation and Packing

There are very specific conditions that must be met when transporting architectural records, whether inside a building or between buildings or cities. These requirements may vary depending on whether the records being transported are in poor condition or recently-acquired or are particularly valuable documents being sent for exhibition.

Carts designed specifically for large records should be used for transporting architectural drawings within a building. The carts must be large in order to support the entire surface of the records and must have a rim to prevent the drawings from sliding out of the folders during the trip. A rim perpendicular to the platform of the cart may damage the drawings and the folder, therefore, a rounded rim is preferable. In fact, the entire platform of the cart may be curved in a U-shape, which will keep the folders in place and prevent them from rubbing against the rims. Tubes can be transported well in a cart with a large concave horizontal cavity. The cavity may be covered with a straight platform for transporting books and other records. There are also carts shaped like artist's easels for transporting large rigid records or framed records. Carts on jacks or mechanical feet that rise to the height of the shelf or drawer provide even greater protection when records are being retrieved and filed. Specialized works²² provide illustrations of a number of types of carts. When visits are made to architectural archives and museums, it is always a good idea to note what kind of carts are in use. This information then can be used, like one's own experience, as a basis for having carts made for one's own institution.

Records that have already been processed can be transported quite well between an institution's buildings in large boxes that are U-shaped on the inside, like the carts. This type of protection should be provided if the storage rooms are far from the building where the reading room and offices are located.

Records must be transported by truck, train or, rarely, airplane, from the donor to the archival institution when they are first acquired. The records must be well-prepared for the trip. They must be placed in sturdy, well-made containers, the containers must not be overfilled or packed with too few records, and extra space in the containers must be filled. When transporting drawer cabinets, it is generally recommended that the drawers be removed and transported separately. If the drawers are left in, they must be secured with cords or straps around the cabinet to prevent them from moving. A ten-drawer cabinet filled with records can easily weigh more than 200 kilograms. As for other containers, the empty spaces in the drawers must be filled to prevent the records from moving. The value and fragility of the records in the drawers will determine what decision is made. Rolled records can be placed in large boxes or cylinders. No attempt should be made to unroll records that resist unrolling before they arrive at the archival institution, where the work can be done under the proper conditions. Any pieces that come off must be placed in envelopes with an indication of the records to which they belong. The containers must be labelled and numbered. The truck should go directly to the institution without any stops along the way and, above all, the records should never be left overnight unsupervised in the truck. On arrival, the truck must be unloaded immediately and a check done to ensure that all boxes are present. The boxes can then be put away temporarily in an orderly fashion and listed in the register of arrivals until they can be processed and placed in permanent storage.



Research room for architectural records at the National Archives of Canada. National Archives of Canada, Ottawa, photo Denis Gagnon. ©

22 Paige G. Andrew, "A Case for Moving Maps with Care: A Review of Map Trucks," *WAML [Western Association of Map Libraries] Information Bulletin* 28(1) (November 1996), pp. 15-23. The article provides several illustrations of large carts, some of which are tiered and adjustable, and describes the procedure to follow to make the most recommended cart. See also Mary Lynn Ritzenthaler, *op. cit.*, p. 69.



U-shaped cart for moving architectural records.
National Archives of Canada, Ottawa,
photo Denis Gagnon. ©



Cart with multiple shelves for moving large, flat boxes.
National Archives of Canada, Ottawa,
photo Denis Gagnon. ©

Before moving, thought must be given to having the necessary materials on hand, such as sturdy boxes (including large flat boxes), strong wrapping paper, bubble wrap, strong cord, strong gummed tape and tape gun, corrugated board, envelopes, folders, cylinders, writing paper and felt-tipped pens.

As far as possible, when examining records before they are acquired and when packing them for transportation, an attempt must be made to find any that have mold or insects. Such records must be packed separately, the boxes must be clearly marked and, on arrival, they must be placed in a segregated area to avoid any risk of contamination. Specialists can then treat and fumigate the documents.

Ideally, qualified staff from the archival institution should pack and transport the records, since this ensures that proper storage and handling standards will be applied. This is not always possible, and the services of transportation companies must often be used. As far as possible, a company should be chosen that has experience in transporting works of art or fragile objects, well-trained staff, appropriate containers and well-equipped trucks. The archivist should be present when the records are packed to ensure that the packing is up to standard. Whether the archivist is present or not, the contract between the transportation company and the institution should clearly set out the standards that must be met for packing, handling and transportation. The contract must take into account the safety of the records and the workers. If no transportation companies with a good reputation in the field are known, large museums, archives and libraries can readily provide advice on this subject.

The transportation and packing of valuable records loaned for an exhibition requires even greater care. It must be ensured that the records arrive at and return from the exhibition under optimal conditions, without sustaining any damage during the trip. Packing and transportation are of great importance, since problems may be caused by the large dimensions of drawings, their fragility, their value, vibrations on trucks, trains and airplanes and the different climates through which they may travel on the round trip. There are detailed, strict rules for packing and transportation, time limits that must be met between the arrival and unpacking of the records, and the examination of the records that must be done at each step. Carelessness or negligence cannot be tolerated under any circumstances.²³ What is at stake is the institution's reputation and its responsibilities towards its records and the heritage of the entire population.

Loans of Records

The appropriate conservation rules must also be applied when records are loaned to other institutions. There are professional, national and international rules governing loans, and the majority of institutions know about and comply with them. The rules are intended to ensure that records are transported and exhibited under the best conditions and return to the originating institution in the same condition in which they left, and to guarantee the rights of the lending institution and the obligations of the borrowing institution.

An institution that wishes to adopt a good loan policy must cover a number of essential points. In this process, many find it helpful to

²³ Marion F. Mecklenburg, ed., *Art in Transit. Studies in the Transport of Paintings, International Conference on the Packing and Transportation of Paintings, September 9, 10, and 11, 1991, London*. Washington: National Gallery of Art, 1991; Dorothy H. Dudley, Irma Bezold Wilkinson et al., *Museum Registration Methods*, 3rd rev. ed. Washington: American Association of Museums, 1979, pp. 95-114, 367-394; Mary Lynn Ritzenthaler, *op. cit.*, pp.103-107.

consult experts, legal counsel and specialists from other institutions who have sound experience in loans and exhibitions. Specialized works should also be consulted.²⁴

A loan agreement must be completed which generally indicates the name of the exhibition, the borrower and the lender; the title of the exhibition; the title of the record or records being loaned; their dimensions (including and excluding frames); their insurance value; whether permission is granted to photograph, televise or publish them for educational, publicity or research purposes; the date by which the works are expected at the borrowing institution; the method of shipping; and the return date. Explicit clauses exist for each of these points.

The facilities report is an essential document that must be completed by the borrower specifying the conditions in which the records will be displayed during the exhibition. The loan will be refused if the facilities do not meet the lending institution's standards. The report provides information on the number of visitors expected; the exhibition's opening hours; the name, title and qualifications of the individuals responsible for the records during the exhibition; storage and receiving areas; information about the exhibition galleries such as their size, whether or not there is natural lighting, the materials that the walls and floors are made of, the equipment (hanging techniques), whether or not display cases will be used and the lighting and climate conditions in the cases; the type of lighting; climate control; audiovisual equipment; security; the fire alarm system; public programs; and publications on the exhibition. The lending institution will have specific criteria in each of these areas and for each type of record.

Once the institution has agreed to loan the records, it must establish a work plan to guarantee that the records are delivered to the borrower on the agreed date. The plan must take account of the condition of the records, whether they need to be cleaned, restored or photographed and how much time and money are available. The loan must also take account of national legislation on the exporting of cultural property and of the time needed to obtain authorizations.

It is important to have detailed reproductions and precise descriptions of the records that are loaned. This will make it possible to compare them when they return and ensure that no alteration has occurred.

Insurance

When records are being moved from the donor's office or home to the archives, they must always be insured against potential damage or loss, no matter what method of transportation is used. If the institution cannot pick up the records itself, the donor may sometimes pay the cost of insurance and then be reimbursed by the institution if this has been agreed on in advance.

Insurance is even more essential for rare and precious records that are loaned to other institutions for exhibitions, whether in the same nation or abroad. Loans must be insured for the value indicated in the loan agreement. The policy must be a wall-to-wall, all risk policy, and all expenses must be paid by the borrower unless agreed otherwise. The lending institution is responsible for setting the value of the records.

24 See for example: Dorothy H. Dudley, Irma Bezold Wilkinson *et al.*, *Museum Registration Methods*, *op. cit.*, and Mary Lynn Ritzenthaler, *op. cit.*

If the parties agree, however, the borrowing institution may take out the insurance, subject to the requirements of the institution that owns the records. The borrower must provide proof that insurance has been obtained before the records will be sent. In most cases, it is the lending institution that takes out the insurance and is reimbursed by the borrowing institution. The insured value of each record is strictly confidential and can never be disclosed by the borrower. The borrower is liable for damage claims. Requests for waiver of subrogation must be specifically made and agreed to when the loan agreement is entered into.

An institution may also want to have insurance to cover loss of building and contents in the event of a disaster.²⁵ There are many types of insurance policies and an institution must take a close look at its financial assets, determine what is available on the market and then prioritize what must be covered by insurance. Although archival records are almost always one-of-a-kind and most often irreplaceable if destroyed, the funds collected under an insurance policy could perhaps cover all or part of the cost of restoring those documents that can be restored, acquiring documents similar to those destroyed, or replacing many of the books in a reference library. Should all documents be insured or only those which can never be replaced, or maybe only certain holdings or groups of documents in several holdings? Should an institution select a policy that will cover the real value of each document, the average value of each document, the value of the collection as a whole, or a combination of these options? The most precious documents should be evaluated separately by experts, while the others can be included in a more general evaluation. Insurance can cover all types of risks, including fire, flood, earthquake, or it can cover one or more of these risks. Regardless of the type of protection an institution is seeking, it should investigate the options thoroughly before making a decision. It also is important to remember that the institution must be able to prove that the losses included in any claim filed with the insurer are for documents that actually existed and were owned by the institution. Consequently, the institution must keep its instruments of title, examples of its records findings aids and, if possible, copies of the documents in its holdings in a secure but separate location so that they can be produced if required.

There are specialized works with detailed information on insurance.²⁶ In most countries, the major museums and archives, both public and private, have very complete directives governing insurance which can usefully be consulted. There are also recognized international regulations in this field.

25 Based on standard policies. See also Judith Fortson, *op. cit.*, pp. 97-109.

26 In addition to the book by Judith Fortson, *op. cit.*, consult Dorothy H. Dudley, Irma Bezold Wilkinson, *et al.*, *Museum Registration Methods*, *op. cit.*, pp. 139-150.

Conservation: a Bibliography

Specialized sources relating to conservation are presented in this bibliography. Readings concerning architectural records are included in the "Further Reading" section below.

- American Association of Museums. *Conserving Works of Art on Paper*. Washington, D.C.: American Association of Museums, 1977.
- Archives Nationales du Canada. *Lignes directrices sur le microfilmage des documents de valeur archivistique*. Texte en français et en anglais disposé en tête-bêche. Ottawa, Ministère des Approvisionnements et Services, 1996, catalogue SA2-249/1996, ISBN 0-662-614887.
- Archives nationales du Québec. *Archival Standards and Procedures of the Archives nationales du Québec*. 4th rev. ed. Sainte-Foy, Québec: Archives nationales du Québec, 1992.
- Bell, Nancy, ed. *Historic Framing and Presentation of Watercolours, Drawings and Prints. Proceedings of the Conference on Historic Framing and Presentation of Watercolours, Drawings, and Prints, June 1996*. ISBN 0-9507268-7-7. Leigh Lodge, Leigh, Worcester, England: Institute of Paper Conservation, 1997.
- Buchanan, Sally A. *Disaster Planning, Preparedness and Recovery for Libraries and Archives: A RAMP Study with Guidelines*. Bibliography by Toby Murray. Paris: UNESCO, 1988. PGI-88/WS/6.
- Canadian Conservation Institute. *CCI Notes 11/5, Matting Works on Paper*. Ottawa, Canadian Heritage, ©1997, catalogue no. NM95-57/11-51986E, ISSN 0714-6221.
- Canadian Conservation Institute. *CCI Notes 3/1, Preventing Infestations: Control Strategies and Detection Methods*. Ottawa, Canadian Heritage, ©1996, catalogue no. NM95-57/3-1-1988E, ISSN 0714-6221.
- Canadian Conservation Institute. *CCI Notes 11/2 Storing Works of Art on Paper*. Ottawa: Government of Canada, ©1995, catalogue no. NM95-57/11-2-1986E, ISSN 0714-6221.
- Canadian Conservation Institute. *Symposium 88. Conservation of Historic and Artistic Works on Paper: proceedings of a conference, Ottawa, Canada, October 3 to 7, 1988*. Edited by Helen D. Burgess. Ottawa: Government of Canada, 1988. ISBN 0-662-59418-5. Catalogue No. NM95-58/3-1988.
- Canadian Council of Archives. *Basic Conservation of Archival Materials: A Guide*. Ottawa: Canadian Council of Archives, 1990. ISBN 0929115007. Text in English and French with French text on inverted pages.
- Chapman, Patricia. *Guidelines on Preservation and Conservation Policies in the Archives and Libraries Heritage*. Prepared by Patricia Chapman for the Information Programme and UNISIST. Paris: UNESCO, 1990.
- Clapp, Anne F. *Curatorial Care of Works of Art on Paper. Basic Procedures for Paper Preservation*. New York: Intermuseum Conservation Association, 1987. Nick Lyons Books. ISBN 0-941130-31-2.
- Couture, Carol, and Jean-Yves Rousseau. *Les Archives au xx^e siècle*. Montréal: Université de Montréal, 1982.
- Dalley, Jane. *The Conservation Assessment Guide for Archives*. Ottawa: Canadian Council of Archives, 1995. ISBN 0929115112.
- Direction des Archives de France, edited by Jean Favier with the assistance of Danièle Neyrinck. *La Pratique archivistique française*. Paris: Archives nationales, 1993.

- Doloff, Francis W., and Roy L. Perkinson. *How to Care for Works of Art on Paper*. 4th ed. ISBN 0-87846-254-6. Boston: Museum of Fine Arts, 1985.
- Duchain, Michel. *Archive Buildings and Equipment*. 2nd revised and enlarged edition. Edited by Peter Walne, translated by David Thomas. Munich, New York, London, Paris: International Council on Archives, 1988. ISBN 3-598-20278-4.
- Dudley, Dorothy H., Irma Bezold Wilkinson et al. *Museum Registration Methods*. 3rd rev. ed. Washington, D.C.: American Association of Museums, 1958, 1968, 1979.
- Ehrenberg, Ralph E. *Archives and Manuscripts: Maps and Architectural Drawings*. Chicago: Society of American Archivists, 1982.
- Research Libraries Group, Nancy E. Elkington, ed.. *Digital Imaging Technology for Preservation: Proceedings from an RLG [Research Libraries Group] Symposium Held March 17 and 18, 1994, Cornell University, Ithaca, New York*. Mountain View, California: RLG, 1994.
- Fennelly, Lawrence J. *Museum, Archive, and Library Security*. Boston, London: Butterworth Publishers, ©1983. ISBN 0-409-95058-0.
- Fortson, Judith. *Disaster Planning and Recovery: A How-To-Do-It Manual for Librarians and Archivists*. New York, London: Neal-Schuman Publishers, Inc., 1992. How-To-Do-It Manuals for Libraries, No. 21.
- Hendriks, Klaus B. and Diane Hopkins, Public Archives of Canada. *PHOCUS: A Bibliographic Data Base for the Conservation of Photographic Materials*. Ottawa: Public Archives of Canada, 1985. Text in English and French with French text on inverted pages. ISBN 0662534530.
- ICOM and the International Committee on Museum Security. David Liston, ed. *Museum Security and Protection. A Handbook for Cultural Heritage*. London: Routledge, c1993. ISBN 0-415-05457-5 (0-415-07509, paperback).
- International Council on Archives, Committee on Disaster Prevention. "Disaster Prevention: Facing Up to Risks." *Archivum*, vol. XLII (1996).
- Lafontaine, R. H. *Environmental Norms for Canadian Museums, Art Galleries and Archives. Canadian Conservation Institute Technical Bulletin*, no. 5. Ottawa: Canadian Conservation Institute, 1979. ISBN 0662504003.
- Lafontaine, R. H. *Recommended Environmental Monitors for Museums, Archives and Art Galleries. Technical Bulletin, Canadian Conservation Institute*, no. 3. Ottawa: Canadian Conservation Institute, 1975.
- Lathrol, Alan K. "The Provenance and Preservation of Architectural Records" *The American Archivist*, vol. 43, no. 3 (Summer 1980). ISSN 0360-9081.
- Ling, Ted. *Solid, Safe, Secure: Building Archives Repositories in Australia*. Canberra, National Archives of Australia, 1998. ISBN 0 642 34403 5.
- Lull, William P., with the assistance of Paul N. Banks. *Conservation Environment Guidelines for Libraries and Archives*. Ottawa: Canadian Council of Archives, 1995. ISBN 0929115090.
- Macleod, Kenneth J. *Museum Lighting. Technical Bulletin, Canadian Conservation Institute*, No. 2. Ottawa: Canadian Conservation Institute, 1975.
- Mecklenburg, Marion F., ed. *Art in Transit. Studies in the Transport of Paintings. International Conference on the Packing and Transportation of Paintings, September 9, 10, and 11, 1991, London*. Washington, D.C.: National Gallery of Art, 1991. ISBN 0-89468-163-X.
- Michalski, Stefan. *Relative Humidity Control Module: Construction and Assembly Manual*. Ottawa: Canadian Conservation Institute, 1985.
- National Archives of Canada and Kathleen OWENS. *Managing Photographic Records in the Government of Canada*. Ottawa: National Archives of Canada, 1993. Text in English and French with French text on inverted pages. Catalogue no. SA2-244/1993. ISBN 0-662-59934-9.
- Ogden, Shereilyn, ed. *Preservation of Library & Archival Materials: A Manual*. Andover, Mass.: Northeast Document Conservation Center, 1999. 3rd edition. (Also online at www.nedcc.org).

- Ontario Museums Association and Toronto Area Archivists Group. *Museum & Archival Supplies Handbook*. Toronto: Ontario Museum Association and Toronto Area Archivists Group, 1985. ISBN 0920402054.
- Ramsay-Jolicoeur, Barbara, and Ian N. M. Wainwright, eds. *Shared Responsibility: Proceedings of a Seminar for Curators and Conservators*. Ottawa: National Gallery of Canada, 1990. Text in English and French with French on inverted pages. ISBN 0888846126.
- Ritzenthaler, Mary Lynn. *Preserving Archives and Manuscripts*. Chicago: The Society of American Archivists, 1993. ISBN 0-931828-94-5.
- Rubin, Rebecca. *The Conservation of Architectural Drawings: An Introduction. Chicago Architects Design, A Century of Architectural Drawings from The Art Institute of Chicago*. Chicago: The Art Institute of Chicago, 1982. ISBN 0-8478-0466-6.
- Schrock, Nancy Carlson and Mary Campbell Cooper. *Records in Architectural Offices. Suggestions for the Organization, Storage, and Conservation of Architectural Office Archives*. 3rd rev. ed. Cambridge, Massachusetts: Massachusetts Committee for the Preservation of Architectural Records (MassCOPAR), 1992.
- Smith, Merrily A., comp., and Margaret R. Brown, ill. *Matting and Hinging of Works of Art on Paper*. Washington: Library of Congress, 1981.
- United States National Archives and Records Administration. *Digital Imaging and Optical Media Storage Systems: Guidelines for State and Local Government Agencies: A Joint Report by the National Archives and Records Administration and the National Association of Government Archives and Records Administrators*. Washington: National Archives and Records Administration, National Association of Government Archives and Records Administrators, 1991.



Reading room at the Netherlands Architecture Institute, Rotterdam
Netherlands Architecture Institute, Rotterdam, photo Eric Bakker.

Chapter 7

Access and Dissemination: Research and Exhibitions

David Peyceré

Architectural records are of ever-increasing interest to archival institutions and other repositories, in significant part due to the large and diverse audience of researchers who seek to use them. Research begins with critics who consult recent records, which still may be in architects' offices, and continues after the records are deposited in an archival repository. In fact, researchers often hope to consult the most recent records without realizing that they may not be able to do so immediately due to restrictions on access.

There are no universal rules that govern access and research use of architectural records, whether in architectural offices, archival repositories, museums of architecture, or other institutions. Physical features of the documents, including size, materials, and market value often affect conditions of use. Moreover, each institution provides access within the context of its own particular interests and requirements.

It should also be noted that records created by architectural firms are private rather than governmental in character. Their use therefore is governed by rules different from those that control public records.

Architectural records also include numerous photographs, whose use is affected by specific laws such as copyright.

Researchers, Readers and Visitors

Architectural records can be consulted or viewed in a wide variety of ways by many different types of users. In fact, a far broader group of users is likely to be interested in them than normally is found in archival reading rooms. Architectural records may be useful to architects throughout the life of the building. Furthermore, a theoretically captive audience of historians, restoration architects, and members of the legal profession also must consult them. Beyond this, there also is another audience, the general public, that asks only to be interested in the documents to enjoy and benefit from them. While some institutions make it part of their mandate to seek out this potential audience, others prefer not to do so. Archivists therefore should determine in advance the usefulness of a particular group of architectural records on the basis of its specific contents for a given segment of the population and its commitment to serving them.

Professional Uses for Architectural Archives

The architects and architectural offices that created the records are often the earliest users of architectural archives. This obvious fact explains why, when many construction files arrive in the archives, they must be understood not in terms of their initial purpose but in relation to a subsequent use. They may have been rearranged in a lawsuit, or may be incomplete because documents were removed for a later project.

Architectural records may be used by their creators, especially for legal purposes, even after a considerable length of time has passed. This use, of course, may serve as an opportunity for an archives to put a file in order. In a somewhat extremist article,¹ James Nowacki comments on the legal reasons for consulting construction archives, the practices of large law offices, and what these offices consider to be the most useful records in legal matters relating to building construction. In the case of the United States, where there is a stronger focus on procedure than in European countries, he makes a distinction between legal action initiated for design errors, improper supervision of construction by the architect or job superintendent, schedule interference leading to cost overruns or shortfalls, or excessive changes to the project during construction. This last problem is increasing because of changing work methods, as calls for bids may take place much earlier in the construction process, prior to detailed design of the project.

In construction cases, defense lawyers must have access to all existing documents. This suggests the need for a precise filing system in which case files are numbered item-by-item and inventoried piece-by-piece. Data bases are often used for this purpose and the documents are sometimes even recorded in their entirety on CD-rom to facilitate hypertextual searches. This level of control might otherwise be unthinkable in an archives.

Mr. Nowacki emphasizes that practically all documents may later prove useful from a legal standpoint. Legal evidence can include minutes and personal notes from meetings, records of incoming mail, and even rough sketches and successive versions of contracts. Furthermore, given the increasing complexity of regulations, it is becoming more and more difficult to establish finite periods for records retention. As a result,

1 James N. Nowacki, "In Search of the Past: A Lawyer's Perspective." *The American Archivist*, vol. 59 no. 2, spring 1996, pp.186-91. During the conference, Nowacki's point of view was discussed as being very legalistic and alarmist, even for the United States.

some architectural offices have all files microfilmed when a project is finished. Architectural records also may be valuable for restoration projects. Alice Carey,² an architect engaged in such projects, used the example of the restoration of the San Francisco opera house to demonstrate the range of useful documents. For more than fifty years in the United States and for roughly the past ten years in France, restorations have been preceded by historic structures reports which include information on previous work, bibliographies, and information on sources of available architectural records. Carey notes that the needs of restoration architects are very selective: for example, only the first few pages of standard contracts are usually significant as the remainder of the contracts are boiler plate. However, specifications and all documents that indicate changes to plans (field orders, change orders) are of fundamental importance. As-built drawings for completed projects are too rarely produced but may be of the greatest importance. In many cases, photographs, especially rear and side views of buildings and views of functional areas such as corridors or stairs provide important restoration information. Unfortunately such photographs also are rare.

In France it is unusual for archives to be consulted for law suits. Similarly, architects of historic monuments or of heritage buildings and governmental departments who are carrying out studies of protected areas within urban centers rarely use the records or at most survey them quickly. It would appear that they rarely carry out a detailed exercise such as that described by Carey.

In fact, the existence of archives can have an impact on the very definition of the heritage of modern architecture. It is easier to have a building designated for historic protection if a set of supporting graphic documents can be shown, whether or not these documents add any concrete information to what is already known.

Thus far in France, major restorations of landmark modernist buildings have been rare. In accordance with legislation, those that have taken place typically have been carried out by architects experienced in the care of older historic monuments such as gothic churches or classical buildings. Because few records relating to these older monuments are available, the architects generally base their work on inspection of the building's condition. Architects therefore often prepare measured drawings for the projects, deducing the structure from exterior conditions. Documentary sources place the undertaking in a historical perspective, but only rarely provide additional information about the structure of the building.

Owners and managers of historic buildings also naturally need access to architectural drawings. In a great many cases, owners lack their own copies of drawings and come to the archives much later to obtain copies. In other instances, however, the owners may choose to make measured drawings without considering the possible existence of older documents.

Architectural Archives and History

The needs of historians are broader than the requirements of lawyers and restoration architects because historical research, by its very nature, is based on the premise that everything must be taken into account and nothing overlooked. Furthermore, in addition to archival resources,

² Alice Carey, "The Importance of Archived Construction Documents to Restoration Architects," *ibid.*

historians often consult secondary, published sources such as professional literature and architects' writings. They also seek to directly examine the buildings they are studying.

Researchers do not attach the same degree of importance to all documents.³ Because art historians are interested in the form of buildings, traditionally graphic documents, especially sketches and conceptual drawings, have been of greatest interest. Among textual materials, only correspondence between the architect and his client traditionally has been considered to be significant for design history.

Increasingly, however, historians have come to believe that the architecture of the nineteenth and especially the twentieth century can no longer be understood strictly in terms of the history of forms. Thus, study of other types of architectural records has become more important. Architectural periodicals and architects' writings have assumed greater significance in view of the importance of new building technologies. Paradoxically, as the quantity of graphic documents has expanded, other documents have become relatively more important for research as well. In addition, researchers studying periods during which very few buildings were commissioned — the 1930s in Europe for example — are likely to find writings and theoretical projects of greater interest than the relatively sparse documentation of construction.

Certain types of financial or administrative records are rarely used for architectural study. In France, historians seldom use accounting records of architectural offices, although financial records relating to public commissions may be used somewhat more frequently. New research methodologies and directions need to be developed and previously overlooked issues considered to take advantage of these resources. Alternatively, archivists should reconsider whether such records warrant long-term retention. (See Chapter 2, Acquisition Principles, Criteria, and Methodology and Chapter 3, Appraisal, Selection, and Disposition.)

Who are the scholarly researchers who consult architectural archives? Architectural records in both public and private archival institutions are consulted increasingly by those with many areas of interest, scholarly, professional and popular. Restoration architects and those specializing in refurbishment or renovation make use of archival material, both to understand the structures on which they are working and to ensure accurate restoration of layouts and decorative schemes. Social historians concerned with the development of institutions such as schools, hospitals and prisons see a close link between the design and structure of the buildings and the political, economic, social and religious theories of their founders. Use of archives of architecture and engineering also is increasing among industrial archaeologists and those in the broader field of construction history. And those exploring the history of a particular locality turn to archives for information, not merely about public buildings and grand houses, but also about smaller commercial and domestic developments.

It should be noted that users of architectural records may vary widely in different nations. In France, they consist primarily of a very small group of architectural historians with university backgrounds in art history and art historians or historians who prepare museum exhibitions. Schools of architecture have little involvement in these efforts to advance knowledge through use of architectural records.

3 On this subject, see *Archives et histoire de l'architecture, penser l'espace*. Proceedings of the conference of l'École d'Architecture de Paris La Villette. Paris, Ed. de La Villette, 1990.

Dissemination: Seeking a General Audience

Many institutions preserve and collect architectural archives with the primary aim of disseminating general information about architecture by displaying the records and providing the public with an opportunity to learn about the built environment. This form of use is difficult to evaluate (Is the audience truly expanding? Is the general public inquiring about architecture?), and is linked to the popularization of architecture that has been emerging in developed countries since the 1980s. The International Confederation of Architectural Museums (ICAM) was created to provide a forum for discussion of collection and preservation policies for display of architectural records.

Outreach to the general public naturally is not part of the mandate of all archives; however, because buildings cannot be brought into the exhibition hall, architectural records can be an effective part of exhibitions, publications and visual displays. Small and large architectural exhibitions focusing on architects, architectural movements, cities or urban developments are being held in many places. Over the past 15 or 20 years, national architectural museums have come into existence whose primary mission is to present architectural exhibitions. Conferences, symposiums and publications also contribute to the public understanding of architecture.

Architectural documents must be carefully protected during exhibition, even though this may be costly. (See Chapter 6, Conservation.) When originals are too fragile for display or cannot be properly protected, highly acceptable presentations can now be made at low cost with copies made with a color photocopier or other reproduction process.

Architects' work is understood differently in exhibitions than it is when the buildings themselves are viewed. The visual quality of drawings may be at least as important as the information they present in interpreting an architect's work. Their large size often makes them particularly interesting for exhibition. The physical condition of the documents, such as the absence of pronounced folds, also plays a role. An old or even antique-looking photographic print may give credibility to an exhibition, even though recent prints may be clearer. From this perspective, archival appraisal criteria for architectural drawings should recognize that keeping duplicates is often justified by the fact that each copy can be put to a different use. (See Chapter 3, Appraisal, Selection and Disposition.)

Exhibitions are the ideal time to use architectural models, which archivists often seek to retain even though their informational value for historians may be limited. Not all models are suitable for exhibition. Many are too modest or in such poor condition that they cannot be presented. Other models may attract attention but are not always relevant to the subject of the display. For this reason, major exhibitions may commission new models to highlight elements (building structure, for example) which those left by the architect do not necessarily reveal.

Some institutions also publish facsimiles of archival documents to make them more readily available to researchers. Because of the cost of publication and the limited potential audience, the financial viability of such endeavors may be uncertain. Garland Publishing in the United States has gambled on producing editions in the form of small black and white photographs of the complete graphic documents of internationally known



Exhibition.
 "The function of the form,
 Van den Broek and Bakema,
 architecture and urban design",
 Rotterdam, 2000. Photo G. van der Vlugt.

architects such as Mies van der Rohe and Le Corbusier. These can require up to thirty bound volumes for the work of a single architect. The uninteresting visual presentation of these works suggest that they are aimed more at facilitating research within the small circle of architectural historians than at seeking a wider audience among the uninitiated. Garland also has experimented with more limited editions such as publication in two volumes of the drawings of Henri Sauvage.⁴ These editions have highlighted the practical limitations of the more ambitious approach.

Another recent development has been the publication of works on architecture and architects, in which illustrations, including archival documents, have become increasingly prominent. By accompanying illustrations with a more accessible text, these works can truly claim to be aimed at a wider audience. The fact remains nonetheless that specialized French-language publishing houses are all walking a financial tightrope in producing such works despite various subsidies.

In recent years, CD-ROMs have been published which present the work of a number of well-known architects including Le Corbusier, Frank Lloyd Wright, and Louis I. Kahn. The target audience determines the editorial choices made, and the highly tenuous hope of financial profit has encouraged the publishers, who are counting on the flexibility of CD-ROMs to attract both researchers and a general audience. With the great capacity of these discs and the diversity of potential media they can reproduce (text, images, audio and film documents), an immensely valuable product can be offered that may well stimulate intellectual exploration.

Access Conditions

In a research institution, access depends on the status of the document, the status of the researcher, the rules of the archival institution, physical conditions of the document, and practical limitations of the place where it is to be consulted.

Document Status

The issue of a document's status can be addressed in two very different ways. Records of architectural offices are private and must be donated if they are to be deposited in a repository. On the other hand, records produced in the context of a government activity or by a public architectural office have the status of public archives and should be deposited in a public archives. This is the case even though the files of the project architect and those of the client administration may be essentially copies of one another. Public archives also include records such as building permits and municipal regulations pertaining to government activities monitoring all construction.

The archivist needs to be aware of the particular restrictions on access and use imposed by national law or by agreements with donors or depositors. The archivist also must communicate these requirements clearly to researchers. For example, rules governing access to public

⁴ Henri Sauvage (1873-1932) was a French architect and interior designer and one of the main practitioners of art nouveau and art deco in Paris.

archives are usually based on the age of the document, a specific period which varies depending on the nation and other circumstances. At present in France, in most cases this period ends thirty years after the closing of the file, that is, in theory, thirty years after the date of its most recent item. Other rules intended to preserve the privacy rights of individuals or state security may also apply to certain records. Accordingly, in France, the time period for an architect's personnel file in the records of a public agency extends beyond the individual's life expectancy.⁵ In most cases, the file is destroyed before this period has ended and researchers are never allowed access to the file. Furthermore, lengthy periods of restriction may apply to other public records in France. For example, construction records of military barracks and prisons in the public archives of the Department of the Interior can be consulted only after sixty years.

Even in private archives, in order to protect clients' privacy, extensive time periods may be established during which records are sealed. For example, the records of public administrative buildings may be made available for consultation sooner than those of a private villa designed by the same architect.⁶

Rules also may vary from nation to nation. In the Netherlands, in general, a collection of records given to a public institution is treated according to the same rules that would apply to a collection of public origin. In many nations, the rules governing access to the records are negotiated between donors and institutions.

Interestingly, records pertaining to existing buildings may be used by some researchers for purposes contrary to the interests of the owners, for example, to gain information for the purposes of trespassing, escape, or terrorism. It would thus appear that in some instances the status of the building may itself also be a factor — perhaps even the most important one — in determining whether records can be consulted. Yet even closing the records for a long period of time may not be sufficient to eliminate all security concerns, and archival management would become excessively complicated and restrictive if only records pertaining to destroyed buildings could be made available to researchers.

In contrast, immediate access may be appropriate for certain documents, such as those associated with urban planning. In France, cadastral plans, maps pertaining to comprehensive area development, and building permits, for example, are open immediately.

Many of the records in architectural archives are private in origin. The donor of such records — either the creator of the files or the person who subsequently owns them — may impose special conditions or even prohibit access altogether. In some nations, if other rules do not apply, restrictions for access to public archives may be applied to documents of private origin. This is typically the case in France, unofficially and out of habit. Naturally, it would not be appropriate to accept a donation of a set of documents to which access is categorically denied; however, donors may considerably restrict access to their archives should they wish.

It must be noted that architects typically do not tend to restrict access to their own records. Publicizing their work is a vital necessity from the outset of their careers. Furthermore, architects tend to donate to

5 Currently in France this is considered to be 120 years after the date of birth. In the future, this rule may be replaced by one based on the date of death, even though this may be more difficult to determine.

6 In France, for example, the departmental archives of La Somme restrict records pertaining to private buildings for a period of sixty years.

archives their firms' records, not personal materials. (This may be more true in English-speaking countries than in France.) As a whole, architectural firms are not secretive about their work, or its commercial and financial aspects. Until very recently, for example, no architectural firm imposed access conditions on records deposited at the French Institute of Architecture.

Architectural firms may be becoming more wary, however about allowing anyone, including other architects, to consult their records. If the original architect refuses to show his or her records to competitors, he retains *de facto* exclusivity on any further work.

On the other hand, contemporary architects now are more likely to value their archives as a means of perpetuating their legacy and ensuring their place in the history of architecture. They therefore may wish to know in advance what is being written about them based on research in the documents. Archival institutions should not become involved in reviewing researchers' conclusions, however.

The architects' continuing interest in the use of his records also may have certain advantages for archivists. If an owner's authorization or that of a representative is required for access, the risk of theft may be reduced since researchers are required to clearly identify themselves.⁷

In some nations, a third factor pertaining to a document's status is equally important. Moral rights belong to the creator of the documents, who, in the case of correspondence, would be the individual who sent the letter. The sender, of course, would not have been consulted when the archives were donated and might not have agreed to make his documents available for research. It may be prudent to reserve access to such materials if their contents are significant, although in France this is rarely done, particularly for architects' archives, which often already have been open to researchers before they reach an archival repository. Nonetheless, moral rights cannot be transferred and are passed on to the heirs of the original owner. (See below.)

In the United States and some other countries, the concept of moral rights does not apply at this time and rights of access to documents (as opposed to rights to reproduce them) reside exclusively with the documents' owners.

Status of the Researcher

In public offices, most records are open to all those who wish to consult them, as long as the researchers meet a minimum age requirement and can show proof of identity. This is not always the case in architectural archives. Somewhat like the collections of drawings in museums or special collections in libraries, researchers in architectural archives often must justify their requests to consult the records.

As noted above, in Paris there are essentially two types of researchers who consult architectural archives: art historians associated with university programs, who begin consulting archives with the writing of their master's theses, and a smaller number of architecture students working for their secondary school diploma or for projects starting in the second or third year. Young architecture students have proven to

⁷ The practice of marking a document with an inked stamp in order to prevent theft has not been followed in France for several decades, although some archivists still consider it valuable.

present a genuine risk to archival documents due to clumsy and repeated handling. Professors often give students assignments to work with the same files year after year. With few exceptions, they do this without giving the students any instruction concerning the techniques and responsibilities of archival research. As a result, the French Institute of Architecture and the archives of the heritage branch⁸ have reluctantly decided to prohibit students from consulting their archives before their fourth year. Until that time, secondary sources such as books and periodicals on architecture, which became so important after World War I, are generally able to meet students' needs. In order to address a similar problem, some archives have prepared master sets of copies which eliminate the need to consult originals.

Physical Condition of Documents and Conditions of Access

Certain physical conditions may affect whether architectural records can be used safely. The materials out of which the documents are made, tracing paper in particular; the size of documents and physical problems such as folds; the presence of fragile media such as pencil, charcoal and pastel; the inclusion of multiple formats in the same file; and preservation treatments the materials have received all should be considered.

The greater the extent to which individual documents in an archives are protected, the less likely it is that they will be harmed during consultation. The ideal would be to place each architectural drawing in a separate folder of clear, neutral plastic stored flat in a drawer to protect the documents and allow easy handling. This might isolate documents; however, and interrupt the natural order of the series to which they belong. It also requires extra storage space and can be costly.

Physical Conditions of Consultation

A great deal of space is needed to consult graphic documents, which are large and often need to be looked at side-by-side for comparison. Research rooms for architectural records thus have large tables for each researcher. Tables that are slanted or that allow users to stand assist users to manipulate documents more easily.

It may be impossible to consult rolled plans in a room that is not properly equipped for this purpose.

Consultation of Copies

In some cases, it is preferable to provide access to a substitute or surrogate copy of an architectural drawing (a photograph, microfilm, recent print, or digitized version). The choice of an appropriate method for reproduction is significant for the archives. If only a single, relatively small document is to be reproduced, a carefully made photocopy, possibly on acid-free paper, or photograph would be an appropriate

⁸ Archives du service des monuments historiques, since the nineteenth century.

choice. If many drawings in an archival group must be reproduced, however, the use of microfilm is the only proven option.

Microfilming is expensive, especially for holdings which contain many graphics of varying sizes and colors, which are time-consuming to film. However, the life span of silver halide microforms is well known: 100 years or more when kept in optimal conditions. Furthermore, if needed, additional copies can be readily made, essentially extending the life of the film images indefinitely. Copies also can be produced for consultation relatively inexpensively.

Digitization has emerged recently as a new reproduction procedure which seems to promise greater flexibility for less cost. The technology allows images of documents to be stored electronically after being read by a scanner. These procedures, when used in conjunction with a data base which permits electronic searching, make consultation remarkably easy. However, very little is known about how these electronic media will age and whether they will be legible for long. Technology may continue to change at a rate that is difficult to keep up with.⁹ Accordingly, for security, some repositories such as the Le Corbusier archives in Paris and the archives of l'École polytechnique fédérale de Lausanne choose to make microfilm copies as a preliminary step to digitization. (See chapter 6 for further information relating to preservation copying.)

Arrangement of Documents and Distribution of Inventories

The preceding comments are based on the assumption that the groups of records to be consulted already have been organized and prepared



Reading room at the Institut français d'architecture in Paris
IFA, photo Dominique Delaunay.

for research use. However, architectural records in archives may remain unprocessed for a long time. It is very difficult to deny access indefinitely on the grounds that records have not been prepared for research. Depending on the institution's regulations, researchers therefore sometimes are given the opportunity to look through unarranged groups of records. While proceeding in this way is inevitable if access is not to be blocked, it may lead to unnecessary handling and further deterioration of the documents. Some repositories consequently restrict such access.

⁹ Pierre Frey, "Le circuit de conservation des archives d'architecture," *Colennes*, no. 10, 1997, pp. 6-9.

Conversely, by numbering and describing each document individually, search time is reduced to a minimum. Item-by-item description is time-consuming, however, and produces extensive finding aids, including some that describe in detail files that have relatively little interest or importance. For this reason, detailed, item-level description should be limited to the most frequently consulted files. In most cases, other approaches are more useful in preparing an inventory.

Without going into great detail about methods of description (see Chapter 5, Description) it should be noted here that one of the main objectives of an archival repository should be to publicize as complete a description as possible of its holdings. This means that its holdings must not only be inventoried but that these inventories must also be published or made available to users in some other way. A number of limited distribution periodicals created by architectural archives associations and centers¹⁰ help to disseminate information about archival holdings to a specialized audience. Electronic technologies and the world wide web also hold much potential for this purpose.

In accordance with archival practice and international standards, inventories of archival holdings should be comprehensive and homogeneous. In fact, that is the very purpose of these standards. The inventory all researchers dream of, on the contrary, is fundamentally inconsistent. The overall structure of the archives or even the principle of provenance is of very little interest to these users. To them, descriptions of certain items should be far more detailed than others, depending on their own interests. That is why university researchers, when asked to design a classification system, think in terms of indexing to make it possible to immediately locate specific information. If inventories are intended for researchers as much as for archivists, this need for more precise access to certain documents cannot be ignored. This can be accomplished best by using a data base, possibly using a software program such as the Hypathie program developed by l'École polytechnique de Lausanne. Alternatively sections of an inventory can be indexed for improved access.

Inventories of architectural archives, unlike other archival finding aids, are likely to include graphic illustrations. In some instances these illustrations simply brighten up a reference tool that would otherwise be rather stark. In other cases numerous illustrations provide visual information that complements that provided by the text. With some data bases, images appear on screen along with text.

Using the internet, inventories, including text and images, can be made available on line as soon as they are completed. In doing this, it will be necessary to determine how best to protect copyright in the images. (See below.)

Other Rights to Documentary Materials

As discussed earlier in this chapter, access to archives is not entirely open, and their publication or presentation in exhibitions may be even more limited. Depending on the laws of various nations, architects, photographers, or even clients all have certain rights: the right to grant or prohibit access and publication and the right to collect royalties. A

¹⁰ In France, the guide put out by the AMAB architectural archives association in Brittany and *Colonnes* published by the IFA archives center are examples.

number of individuals may have rights to the same document. These rights and requirements affecting them vary widely from nation to nation. The situation in France is explained here as an example of issues that must be considered in this complex legal environment.

In France, since 1902 (legislation of March 11), architects' work has been subject to the provisions of copyright legislation, which includes moral and proprietary rights. Copyright now is governed by the intellectual property code (bill 92-597 of July 1, 1992), which incorporates the provisions of bill 57-298 on intellectual and artistic property (March 11, 1957). The principle adopted in France, which prevails in most countries (in the spirit of the Bern Convention of 1886), is that the existence of a document is sufficient to show the existence of copyright, with no declaration procedure. Other nations have different laws affecting copyright in published and unpublished materials. In the United States, a copyright procedure that includes use of the copyright symbol is required for all published works.

Architects in France also may file for patents or make deposits of their designs and models with the Institut National de la Propriété Industrielle under the terms of the legislation of July 14, 1909. The provisions of this legislation were incorporated in the intellectual property code of 1992.

Moral rights, that is rights to claim authorship and to require respect for the integrity of the work, are, under the laws of France and some other nations, perpetual and inalienable. (It also should be noted again that this concept is not recognized in certain other legal systems.) While the work of architects is taken to include primarily the buildings they have designed, it also clearly includes records they have produced in connection with any project. Although it may be necessary to determine which individual within a firm is responsible for a given document (the owner of the firm that donated the records? a designer?) some individual always holds these moral rights.

In France, proprietary rights enable authors and their successors to derive financial benefit from the use of the work.¹¹ These rights remain in effect during the author's lifetime and for seventy years following the author's death. According to this principle, the creator of a document controls all use beyond consultation or the making of individual copies.

In many nations, when architectural records are donated to an archival repository, it is appropriate to ask the persons who created the documents to assign exhibition rights to the institution receiving the donation. This serves as partial compensation for the costs the institution incurs in preserving and displaying the documents.¹² Some archivists now are noting that it is becoming increasingly difficult to obtain the agreement of the heirs of original owners to assign their rights, something which earlier was assumed automatically. In other nations, ownership of the documents may carry with it the implicit right of exhibition, but not of publication, which is governed by copyright.

Ownership of rights in architectural archives is especially important. Because graphic documents are frequently borrowed for exhibitions or used as illustrations in published works. The most sensitive issue, however, is the management of photographs, which are found extensively in architectural archives. The copyright in photographs is

11 This paragraph is based on Gérard Ermisse's "La communication des archives," in *La Pratique archivistique française* (Paris: National Archives, 1993, p. 410). See also: Michel Huet, *Le droit de l'architecte* (Paris: Économica, 2nd edition, 1990, pp. 90-142) and *Gérer une Photothèque, usages et règlements* (Paris: La Documentation française, 1992, 1994 updated edition, pp. 27 ff., pp 55 ff., pp. 98 ff. Text from the Berne Convention).

12 Here also, Gérard Ermisse in *La Pratique archivistique française, ibid.*, is the clearest on this point.

owned by the photographer, who may have assigned it to the person who commissioned the photographs (generally the architect) at the time of the commission or contract. In many instances, records of such commissions are simply not available to the archives, therefore if the name of the photographer appears in any way on the image, it may be assumed that he or she owns the copyright.

Although archival institutions provide access to documents for publication or display, they do not administer the copyright or moral rights in the documents unless rights or obligations are transferred to them. Nevertheless, when the owners of these rights are known, users should be encouraged to contact them. Institutions therefore should maintain an up-to-date record of the names and addresses of these individuals if possible. When this information is not known, in some nations the practice of indicating "rights reserved" in the photographic credits attests to the good faith of the user, who thereby declares himself willing to resolve the issue of copyright if the successors make themselves known.

Just as payment may be required for publication of a copyrighted image, an archival repository that holds a particular archives group may in some instances legitimately levy service charges when it copies documents or retrieves them for publication or display purposes. Such charges must clearly be separate from copyright, since they are made by the repository, not by the owner of copyright or moral rights in the materials.

Potential users must be clearly informed about copyright and service charges, especially since these may be added to other charges for photography, copying, or even framing documents. These activities clearly complicate the work of architectural archivists, but stem directly from the interest and value of the records.

Conclusion

Even though the archival management of architectural records presents particular challenges, these records, more than most archival materials, also have a great appeal for a wide audience. This potential for attracting a broad public highlights the key archival mission of disseminating information about documents and making them as widely available as possible in order to extend the circle of those aware of these extraordinary materials. The archivist who organizes an exhibition contributes to a general public understanding of architecture but, beyond this, also brings benefits to the archival institution itself.

Glossary of Specialized Terms for Archives of Architecture

Maygene Daniels, David Peyceré

Specialized terms that appear in this guide are drawn both from archival terminology and from the practice of architecture. Although some of these terms have very precise meanings that are widely accepted, many others are less clearly defined.

This selective glossary is included here as an aid to readers. It should not be considered a definitive dictionary to these terms, but instead a convenient reference to help in understanding the various subjects discussed in this guide.

access policy - policy established by an archival repository governing which historical materials will be available for research, who will be authorized to examine them, and under what conditions.

acquisition policy - policy established by an archival institution to define the types of historical records that it will seek to acquire. For architectural archives, this includes determining which buildings or architects or categories of work will be documented, and which types of record materials will be collected.

appraisal - [1] archival process of determining which documents have sufficient value for long-term preservation in an archives. [2] process of determining the market value of documents.

architectural project - ensemble of built work completed in accordance with a unified plan, sometimes including several coordinated struc-

tures and landscaping. Architectural offices commonly assign each project an identifying name or number, which is used to identify all project records.

as-built drawing - drawing showing some aspect of a built work in its final state, especially those parts of the structure or system that can not be seen when construction has been completed. Also known as record drawing.

axonometric drawing - perspective representation without a vanishing point. In this form of representation, angles are distorted, typically to represent a building from above or below so that the plan and certain elevations and sections can appear on the same drawing.

bid documents - drawings, specifications and the like defining a proposed architectural project that are used to solicit contractors' proposals for a construction project. In Canada and the United Kingdom known as tender.

blueprint - graphic reproduction characterized by white lines on a blue ground produced by a photographic process in which light is passed through a translucent document onto a paper treated with ferric salts. The blueprint was commonly in use between ca. 1900 and 1940.

brownprint - see van dyke.

building permit - form or dossier issued by a government body to authorize construction of an architectural project. Also known as a construction permit. Building permits often include data on project completion and inspection.

building permit file - in Europe, the primary set of construction plans, submitted with a building permit application.

building program - statement of a client's requirements for a proposed architectural project. The program defines the functions for the building, relationships of activities within the building, and the square footage of space to be assigned to different functions.

built environment - the totality of man-made structures, including buildings, transportation systems, and the designed landscape.

CAD (computer-aided design systems) - computer software used by architects to design and prepare drawings for building projects. Also known as CADD (computer-aided design and drafting) systems.

cartouche - see title block.

change order - official authorization for changes to an approved building plan during construction. Change orders often are on forms and generally require authorizing signatures. Sometimes also known as field order.

common floor plan - plan used for multiple floors of a many-storied building such as a skyscraper.

conceptual drawing - drawing showing the possible design of a building project or proposal prepared quickly by an architect to experiment with building ideas without regard to scale. In some cases, the conceptual drawing is considered to be an elaboration of a preliminary sketch, but commonly the terms are used interchangeably. Sometimes known as preliminary design drawing.

- construction drawing** - scale drawing used for building construction. Construction drawings can depict a building's exterior; electrical systems; heating, ventilation and air conditioning; plumbing, structural systems and other building elements. Each group of working drawings for a project is usually identified by the appropriate initial (A, E, HVAC, P, S and so forth) and numbered consecutively. Construction drawings usually are reproduced as blueprints or others copies for use by builders, engineers, and others in the field. Also known as working drawings.
- construction permit** - see building permit.
- contractor** - individual or firm that assumes the task of construction of an architectural project.
- copyright** - legal right to control reproduction and use of intellectual property, including architectural records.
- design drawing** - drawing, usually created with instruments, to refine or develop a concept for a building project. Also known as preliminary drawing.
- detail drawing** - working drawing of a limited aspect of a building project, often drawn at a larger scale than other project drawings.
- development drawing** - earliest scale drawing of a project, generally representing the complete graphic representation of a project at a scale that is readable but showing little detail. Development drawings are usually the basis for construction or working drawings. Also known as preparatory construction drawing.
- diazo** - a commonly used reproduction process that creates an exact copy of an architectural drawing by passing ultra-violet light through an image on a translucent support onto a paper treated with diazonium salts.
- drafting cloth** - see linen.
- elevation** - a two-dimensional representation, drawn to scale, of a visible vertical plan of a building such as an exterior or interior wall.
- field order** - see change order.
- linen** - a translucent, treated cloth used as the base for architectural drawings, especially valued for its strength and use for reproduction using processes based on the transmission of light, such as blueprint. Also known as drafting cloth.
- longitudinal section** - two-dimensional scale drawings through the longest vertical plane of a building. See section.
- madero** - see van dyke.
- measured drawing** - precise scale drawing of existing structure based on measure or mathematical calculation.
- model** - a reduced, three-dimensional representation of an architectural project, usually produced to show the expected appearance of a proposed building. Models are often constructed to scale and may be made of a wide variety of materials such as paper or cardboard, wood, plaster, or plastic.
- mylar** - see polyester film.

paper vellum - a reproducible translucent oiled paper used for architectural drawings. Sometimes referred to simply as vellum.

parti - a quick drawing, usually in the architect's hand, establishing the basic design or concept for an architectural project.

perspective drawing - see rendering.

plan - term sometimes applied to all graphic documents produced by architects. Strictly, a two-dimensional scale working drawing of the lay-out of a floor or level of a building project.

polyester film - thin transparent plastic sheeting used as a support for construction drawings. Sometimes known by the trade name mylar.

preliminary drawing - see design drawing.

preparatory construction drawing - see development drawing.

presentation drawing - representation of a proposed building created by the architect to communicate the final appearance of the project to a client. Presentation drawings often are perspective views or renderings that emphasize a project's aesthetic character and setting. The term also can include plans, elevations, and other drawings that illustrate the architect's concept to a client.

project file - documents created by an architect's office to document its work on an architectural project. Project files include financial and administrative records as well as design and construction drawings.

record drawing - see as-built drawing.

record group - body of documents from the same organizational source identified as a group within an archives for management control.

rendering - drawing of a building in three-dimensional perspective, often showing the effects of light and shade on a facade and the building's relationship to its surroundings. Renderings typically are created to show clients the expected appearance of a proposed building design. Also known as a perspective drawing.

reproducible - architectural drawing on a transparent support such as linen, treated paper or clear plastic to permit reproduction by techniques such as blueprint that require the passage of light through the document.

reproduction - a copy of an architectural drawing produced by any process that creates a precise copy of the original. Xerography, diazo, electronic scanning and blueprint are reproduction processes.

scale - the mathematical relationship between a large object such as a building and a smaller representation in a drawing or model, usually shown as an equation: e.g. 1/4" - 1' indicates that a measurement of 1/4" on the drawing or model represents a distance of 1 foot on the building.

schematic - simplified drawing showing general building concepts without precise scale or detail. A schematic is more specific than a design sketch but is not sufficiently detailed for building construction.

section - two-dimensional scale construction drawing of an imaginary cross-section of a building.

- sepia** - photochemical process for copying large architectural drawings recognizable by its brown tonality.
- series** - group of documents from a single source maintained and used in accordance with a unified filing system. A series of architectural drawings, for example, is often consecutively numbered.
- shop drawing** - scale drawing created by a contractor, sub-contractor, or materials manufacturer showing some aspect or detail of a building project.
- site plan** - plan showing the relationship between a building and the site on which it is located.
- sketch** - unmeasured drawing, usually created quickly by the architect in his own hand to study and experiment with the essential design or concept for an architectural project.
- skiagraphic drawing** - depiction of a building's elevation using shading to show recessions or projections of the facade.
- specifications** - technical requirements for building structure and systems, established in advance and frequently included in contract documents. Specifications generally are in textual form and may include manufacturers literature.
- stick-ons** - any secondary material added to the face of an architectural drawing, including gummed labels, or pre-printed images.
- sub-contractor** - an individual or firm that accepts from a contractor responsibility for completion of a portion of a construction project.
- support** - the material on which a document image is created. Paper, polyester film, linen, paper vellum, and tissue are common supports for architectural drawings.
- title block** - a standard block or column of information on architectural drawings to identify the architectural office, architect, project, and often the drawing title, number, date, scale and sometimes other information, including successive modifications of the document and their dates. Also known as cartouche.
- tracing paper** - a translucent paper through which an underlying image can be seen and traced. This paper often is stored on rolls and is used most commonly for sketches or schematic drawings.
- transverse section** - section through the shorter end of a building (see section).
- van dyke** - copying process invented by F. R. Van Dyke that was used extensively to copy architectural drawings in the early twentieth century. Any sepia-toned print is sometimes known as a «van dyke.» Also known as brownprint or madero print.
- vellum** - see paper vellum.
- working drawing** - see construction drawing.

Further Reading

Maygene Daniels, David Peyceré

Management of Architectural Archives

Michel Le Moël in 1972 prepared a paper for the VIIth International Congress on Archives concerning the archives of architecture, effectively bringing international attention for the first time to their significance. Since then a body of archival literature concerning architectural records gradually has developed. Selected writings that may provide further insight on specialized aspects of archival care for architectural records are presented here. Recognizing the two languages in which this guide is available, citations are primarily to sources in English and French.

Records in Architects' Offices

The understanding of architectural records also must include knowledge of the architectural process, architects' record-keeping needs and practices, and terminology used on architectural documents. Selected readings on these subjects are included here to provide further background concerning the circumstances in which modern architectural records are created, maintained, and used.

Archives Administration

Management of architectural records also depends on archival principles and practices that apply to all forms of documentary materials. These additional sources are cited as footnotes to the text in individual chapters. A comprehensive bibliography of sources relating to conservation appears at the end of Chapter 6, Conservation.

Management of Architectural Archives

Archives d'architecture en France, XIX^e et XX^e siècles. La Gazette des Archives, n°. 190, summer 2000. Special issue on managing architectural archives.

Archives et histoire de l'architecture: actes du colloque de La Villette. Paris: Éditions de La Villette, 1990.

COLVIN H. M. «Architectural history and its records.» *Archives: Journal of the British Records Association* 2, no. 14 (Michaelmas 1955): 300-311.

CUNNINGHAM, Patrick. «Types, forms, and control of architectural drawings.» In *Preparing for the 90's: Strategies for Diocesan Archivists and Records Managers*, edited by Ronald D. Patkus, Nancy Sandleback and John J. Treanor. Chicago: Association of Catholic Diocesan Archivists, 1993: 33-37.

DANIELS, Maygene. «Computer-aided design and drafting systems and the records of architecture. *Janus* (International Council on Archives) No. 1 (1992): 31-33.

DOCOMOMO International. *Documentation and Conservation of Buildings, Sites and Neighborhoods of the Modern Movement*. Actes du premier congrès international de DOCOMOMO, Sept. 1990, Eindhoven, DOCOMOMO international, 1991: 163-196.

Documenting Twentieth Century Architecture: Problems and Issues. The American Archivist 59:2 (Spring 1996). Special issue on architecture.

DWYER, John A. «Managing Cartographic and Architectural Archives.» In *Managing Archives and Archival Institutions*, edited by James Gregory Bradsher. London: Mansell, 1988: 92-103.

EHRENBERG, Ralph E. *Archives and Manuscripts: Maps and Architectural Drawings*. Chicago: Society of American Archivists, 1982.

EHRENBERG, Ralph E. «Aural and Graphic Archives and Manuscripts.» *Drexel Library Quarterly* 11 (January 1975): 55-71. In *A Modern Archives Reader* edited by Maygene F. Daniels and Timothy Walch. Washington, D.C.: National Archives Trust Fund Board, 1984: 187-200.

ERLANDSON, Alf. *Electronic Records Management: A Literature Review*. Paris: International Council on Archives, 1997.

FIREMAN, Belinda. «The Technology and Conservation of Blueprints.» *Paper Conservation News*, 81 (March 1997): 3-5.

FREY, Pierre. «Voyager dans les archives d'un architecte, les papiers Laverrière aux Archives de la construction moderne.» In *Alphonse Laverrière, 1872-1954, parcours dans les archives d'un architecte*. Lausanne: Presses polytechniques et universitaires romandes, 1999.

GIRAL, Angela. «Collecting and Organizing Architectural Drawings and Records.» In *The Architectural Library of the Future, Complexity and Contradictions*, edited by Peggy Ann Kusnerz. Ann Arbor: The University of Michigan Press, 1989: 83-94.

HARVEY, John H. «Architectural Archives.» *Archives: Journal of the British Records Association* Lady Day (March 25), 1954: 117-122.

- HILDESHEIMER, Françoise. *Processing of Architects' Records: A Case-Study, France*. RAMP study PGI 86\WS\13; ERIC ED286528. Paris: UNESCO, 1987.
- Institut Français d'Architecture. *ABC des archives d'architecture*. Actes de la journée d'études de l'IFA, Archives d'architecture du XX^e siècle. Paris: Institut Français d'Architecture, 1991. 3 vol., typescript.
- KISSEL, Eléanore and Erin VIGNEAU. *Architectural Photoreproductions: A Manual for Identification and Care*. Oak Knoll Press and The New York Botanical Garden, 1999.
- LATHROP, Alan K. «The Archivist and Architectural Records.» *Georgia Archives* 5 (Summer 1977): 25-32.
- LATHROP, Alan K. «The Provenance and Preservation of Architectural Records.» *The American Archivist*. Chicago. 43:3 (1980): 325-338.
- LE MOËL, Michel. *Archives of Architecture*. Paris: International Congress on Archives, 1972. 31 pp. (Paper, VIIth International Congress on Archives, Moscow, April 1972).
- MANIGAND-CHAPLAIN, Catherine. *Les Sources du patrimoine industriel*. Collection: *Documents et méthodes*: 4. Paris: CILAC, éditions du Patrimoine: 1999. 96 pp.
- MCGING, Angela and Anne PICTO. «The Conservation of Building Plans Project.» *Archives and Manuscripts* (Australia) 16: 2 (November 1988): 97-118.
- National Archives and Records Administration. *Managing Cartographic and Architectural Records*, Instructional Guide Series Washington D.C. NARA Office of Records Administration 1989.
- PORTER, Vicki and Robin THORNES. *A Guide to the Description of Architectural Drawings*. Boston, Massachusetts: G. K. Hall, 1994. Publication of the Architectural Drawings Advisory Group, Foundation for Documents of Architecture on behalf of the Getty Art History Information Program. New York: G. K. Hall, 1994.
- PRICE, Lois Olcott. «The History and Manufacture of Photoreproductive Processes Used for Architectural Drawings Prior to 1930.» *Topics in Photographic Preservation*. AIC Photographic Materials Group, vol. 6 (1995): 41-49.
- Proceedings of the Symposium on the Appraisal of Architectural Records*, April 26, 1985. Cambridge, Massachusetts: Massachusetts Committee for the Preservation of Architectural Records, 1987. 106 pp.
- Public Record Office [Great Britain]. *Retention Scheduling, Buildings Records: Guidance for Records Managers and Estates Managers*. Kew, Richmond, Surrey: Public Record Office, 1998.
- ROSS, Jeffrey J. *Cataloging Architectural Drawings: A Guide to the Fields of RLIN Visual Materials (VIM) Format as Applied to the Cataloging Practices of the Avery Architectural and Fine Arts Library, Columbia University, Developed for Project AVIADOR*. Tucson, Arizona: Art Libraries Society of North America, 1992. 90 pp.
- SEAMANS, Warren A. «Restoring and Preserving Architectural Drawings: An Economical Method for Treating Embrittled Documents.» *Technology and Conservation* (Winter 1976): 8-11.

SMITH, K.J. *The Management of Government Buildings Records: Guidance for Records Managers and Estates Managers*. Public Record Office (Great Britain), June 1996.

SZAMBIEN, Werner. *Le Musée d'architecture*. Paris: Picard, 1988.

Toward Standards for Architectural Archives: Proceedings of a Two-Day Conference, February 12-13, 1981. Washington, D.C.: American Architectural Foundation, 1984.

Ufficio centrale per i beni archivistici. *Gli archivi per la storia dell'architettura: Atti del convegno internazionale di studi, Reggio Emilia, October 4-8, 1993*. Pubblicazioni degli archivi di stato, saggi 51, 1999.

YOUNG, Jeanne and Nancy G. MILLER. *Managing Cartographic, Aerial Photographic, Architectural, and Engineering Records*. Instructional guide series. Washington: National Archives, 1989. 26 pp.

Records in Architects' Offices

BARBIER, Maurice, Roger CADIERGUES, Janine FLITZ and Gustave STOSKOPF. *Dictionnaire technique du bâtiment et des travaux publics*. Paris: Eyrolles, 1976. (Sixth edition.)

BURKE, Catharine R. «Records Management in an Architectural Firm: Skidmore, Owings & Merrill.» *Technology Libraries* 6: 3 (Spring 1986): 69-82.

CHING, Francis D.K. *A Visual Dictionary of Architecture*. New York: Van Nostrand Reinhold, n.d.

CUADRADO, John A. «Architectural Drawings - a Forgotten Province.» *Architectural Digest* 41 (June 1984): 184-192.

CULLINANE, John J. *Understanding Architectural Drawings: A Guide for Non-Architects*. National Trust for Historic Preservation, 1993. 139 pp.

CABLE, C. *The Architectural Drawing. Its Development and History, 1300-1950*. Vance bibliographies. Architecture Series. (Monticello, Ill, 1978), Bibliography no. A 16.

Dictionnaire de l'architecture moderne. Paris: F. Hazan, 1964.

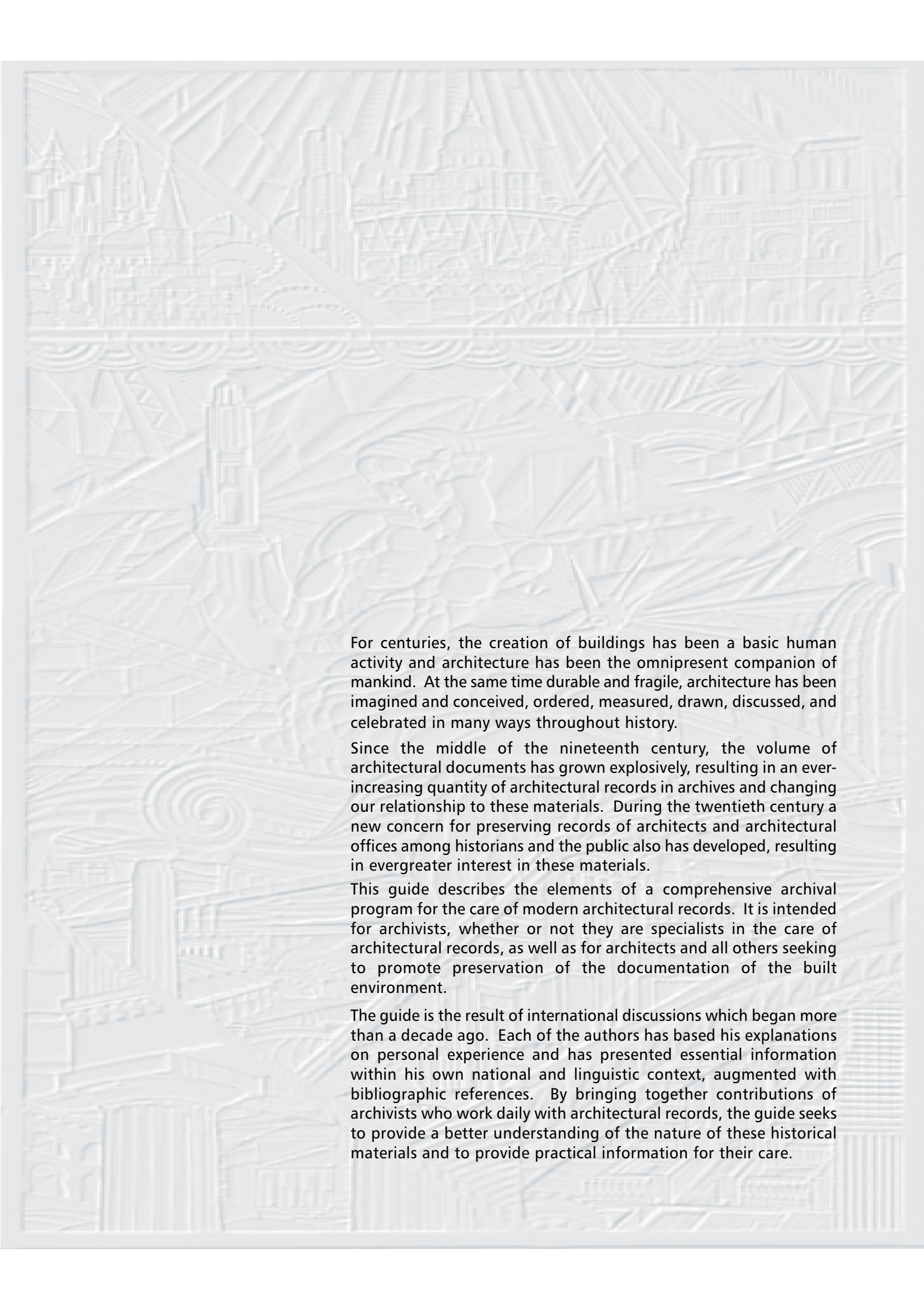
Dictionnaire encyclopédique de l'architecture moderne et contemporaine, Paris: Philippe Sers, 1987.

MIDANT, Jean-Paul, dir. *Dictionnaire de l'architecture du XX^e siècle*. Paris: Hazan/Ifa, 1996.

NELB, Tawny Ryan. «Protecting Your Investment: Will Your Drawings be There When You Need Them?» *P.O.B. (Point of Beginning)* 17: 6 (August 1992). (An article by the same title appeared in *Plan & Print*, December 1991).

NEUFERT, Ernst. *Les Éléments des projets de construction[...] à l'usage des maîtres d'œuvre, des architectes, des ingénieurs et des constructeurs [...]*. Paris: Dunod, 1952. (First German edition, 1936.)

-
- RUBIN, Rebecca. «The Conservation of Architectural Drawings: An Introduction.» In *Chicago Architects Design*. New York: Rizzoli, 1984.
- SCHROCK, Nancy Carlson. *Architectural Records Management*. Washington, DC: American Architectural Foundation, n.d.
- SCHROCK, Nancy Carlson, and Mary Campbell COOPER. *Records in Architectural Offices: Suggestions for the Organization, Storage and Conservation of Architectural Office Archives*. Cambridge, MA: Massachusetts Committee for the Preservation of Architectural Records, 1992.
- SYDLER, Jean-Pierre, dir. *Vocabulaire international des termes d'urbanisme et d'architecture (VITUA): français, allemand, anglais*. Paris: Société de diffusion des techniques du bâtiment et des travaux publics, 1970.
- WESTLAKE, Merle T. «Stow It, Don't Throw It (Construction Documents, Design Drawings, and Records).» *Architectural Record* 178 (March 1990): 41-43.



For centuries, the creation of buildings has been a basic human activity and architecture has been the omnipresent companion of mankind. At the same time durable and fragile, architecture has been imagined and conceived, ordered, measured, drawn, discussed, and celebrated in many ways throughout history.

Since the middle of the nineteenth century, the volume of architectural documents has grown explosively, resulting in an ever-increasing quantity of architectural records in archives and changing our relationship to these materials. During the twentieth century a new concern for preserving records of architects and architectural offices among historians and the public also has developed, resulting in evergreater interest in these materials.

This guide describes the elements of a comprehensive archival program for the care of modern architectural records. It is intended for archivists, whether or not they are specialists in the care of architectural records, as well as for architects and all others seeking to promote preservation of the documentation of the built environment.

The guide is the result of international discussions which began more than a decade ago. Each of the authors has based his explanations on personal experience and has presented essential information within his own national and linguistic context, augmented with bibliographic references. By bringing together contributions of archivists who work daily with architectural records, the guide seeks to provide a better understanding of the nature of these historical materials and to provide practical information for their care.