

CORPUS VITREARUM
UNITED STATES OF AMERICA
OCCASIONAL PAPERS II

**THE ART OF COLLABORATION
STAINED-GLASS CONSERVATION IN THE
TWENTY-FIRST CENTURY**

L'ART DE TRAVAILLER ENSEMBLE DIE KUNST DER ZUSAMMENARBEIT

Papers Presented at the
Forum for the Conservation Stained Glass
The International Committee of the Corpus Vitrearum for the
Conservation of Stained Glass
Held at The Metropolitan Museum of Art, New York
1-3 June 2009

Mary B. Shepard, Lisa Pilosi, and Sebastian Strobl, Editors

Harvey Miller Publishers for the American Corpus Vitrearum, Inc.

The Art of Collaboration: Stained-Glass Conservation in the Twenty-first Century

Edited by Mary B. Shepard, Lisa Pilosi, and Sebastian Strobl

Harvey Miller Publishers

An Imprint of Brepols Publishers

London/Turnhout

This publication is made possible by The William Cullen Bryant Fellows of The Metropolitan Museum of Art, The Samuel H. Kress Foundation, and the Levy Hermanos Foundation.

© 2010 The International Committee of the Corpus Vitrearum for the Conservation of Stained Glass

ISBN 978-1-905375-46-2

D/2010/0095/129

The conference, held 1–3 June 2009 at The Metropolitan Museum of Art, New York, was made possible by Corning Incorporated Foundation, Homeland Foundation, Inc., Jeri Garbaccio, John C. Weber, the Corpus Vitrearum International, and Mr. and Mrs. Danny P. Post

Photo Credits:

Front Cover: Designed by Louis Comfort Tiffany (1848–1933) and made by Tiffany Studios (1902–32), *Magnolias and Irises*, American, c. 1908, Leaded Favrite glass, The Metropolitan Museum of Art, Anonymous Gift, in memory of Mr. and Mrs. A. B. Frank, 1981 (1981.159)

Back Cover: Grisaille Panel from the Axial Chapel of the Virgin, Cathedral of Saint-Étienne, Auxerre, French, c. 1240, colorless glass with grisaille paint, The Metropolitan Museum of Art, The Cloisters Collection, 1982 (1982.204.2)

All rights reserved.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of Harvey Miller Publishers.

Printing and binding by Grafikon, Oostkamp, Belgium

Handle with Care: Ethics, Approaches, and Best Practice in Stained-Glass Conservation Today

IVO RAUCH

Summary

This essay not only attempts to describe the tools, techniques, and methods of modern glass conservation, but also provides notes on the ethical approach conservators should take to their artwork. To develop such a conservation ethic, this paper, for the first time, applies Walter Benjamin's concept of "aura" to the area of stained-glass conservation. Using the example of the precious windows of Chartres Cathedral and the stained glass of Bryn Athyn in Pennsylvania, the study analyzes the value and conservation ethic of the process, which can be used as an example for other works of stained glass. This theoretical introduction is followed by a discussion of several fundamental conservation methods, which currently are applied internationally in the conservation of stained glass.

After this I looked, and behold, a door standing open in heaven!

And the first voice [...] said, "Come up here, and I will show you what must take place after this." [...] and behold, a throne stood in heaven ... and around the throne was a rainbow that had the appearance of an emerald. [...] And before the throne there was as it were a sea of glass, like crystal.

Revelations 4: 1-6.

The prophetic words of the Book of Revelations were probably well-known to the builders of Chartres Cathedral as they commissioned glorious glass paintings for their choir clerestory at the beginning of the thirteenth century (Fig. 1). The windows at Chartres provide an excellent starting point for discussing the approaches of modern conservators to such precious works of art. This essay aims to describe something of the spirit—together with the tools, techniques, and methods—that informs today's science of glass conservation. Before addressing specific working methods and conservation techniques, we will begin where every project ultimately begins: with the conservation "ethic" that defines the work. One of the essential questions underlying such a project ethic is that of the so-called "worth" of the works under the conservator's care. The cultural importance of the object is the primary criterion, although in times of financial crisis the monetary element in art valuation tends to come to the fore. In order to determine the non-material worth of an artwork, and thus, for our purposes, its worthiness for conservation, we must weigh various art historical and philosophical issues. These are legion.

In this discussion, I would like to highlight what I believe to be some of the most compelling.

In every conservation case, it is crucial to know the object in question very well. For example, our famous first case study—the splendid Gothic cathedral in Chartres—was erected with great alacrity between 1200 and 1230, after a fire destroyed the former Romanesque church in 1194. Around 1220, the newly-erected choir received its brilliant glazing.¹ The complex theological program of the windows sets the patron of the church, the Virgin Mary, at the central point of the building. Mary sits upon a throne with the Christ Child on her lap. A thorough treatment of the theological underpinnings of the iconography, which derive partly from sermons by Chartrain bishops, is impossible here; a few notes on the complex program must suffice.²

Mary was often identified in medieval Christian thought with the Old Testament's Ark of the Covenant. As the Ark served as the footrest of God, Mary supported the infant Son of Man. According to the Bible, the Ark of the Covenant was bejeweled and flanked by angels—seraphim, to be exact—who surrounded

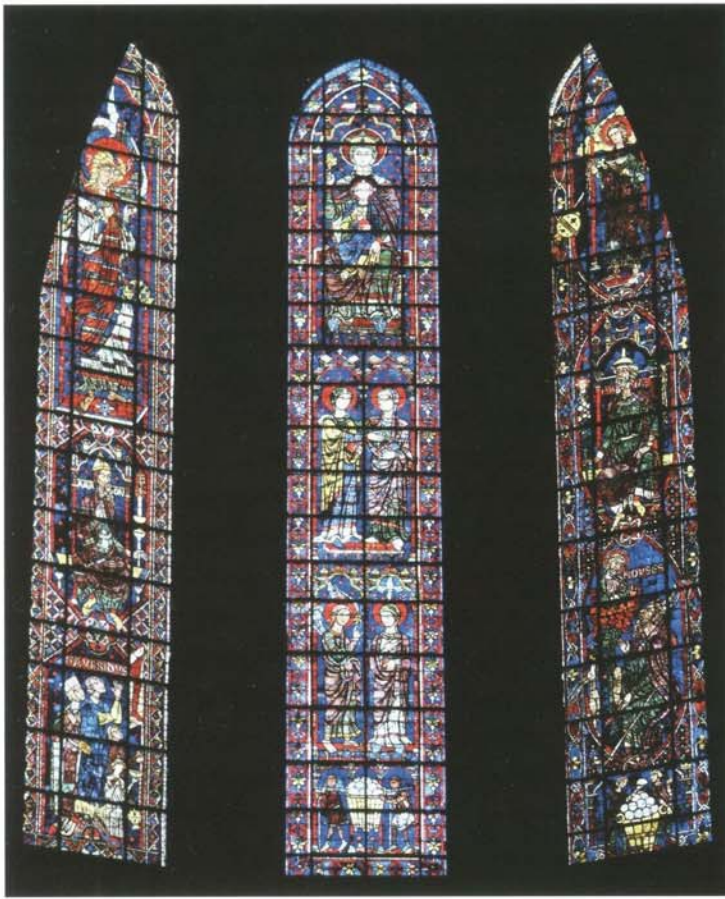


Fig 1. Axial windows of the choir (bays 101-102), c.1220, Chartres Cathedral (photo: author)

it with clouds of incense. Accordingly, in the Chartres choir clerestory, two seraphim flank Mary. The attending prophets of the Old Testament in the choir windows also refer to Mary's role as bearer of the Messiah that renders her the "Ark" of the New Covenant between God and man under Grace. A hitherto mysterious family appears in the glass left of the central axis. I have argued elsewhere that the scene depicts Arthur, heir to the English throne, at the front of a small procession approaching the Mother of God in the central window.³ Arthur appears here with his mother and his father, Geoffrey of Britain, who is prominently labeled "Gaufridus." This young Arthur was one of the candidates for the English crown after the death of Richard Lionheart, and was murdered at the age of sixteen on 3 April 1203 by his uncle, John Lackland, better known as Robin Hood's wicked Prince John. The magnificent choir windows were probably donated by Prince Louis of France, who wanted to make a statement. Apart from the theological meaning of the windows, he also intended to recall the evil deed of his English opponent.⁴ The choir windows of Chartres, then, not only present a multifold theological program, they also promote a political position that would have been understood by the contemporary viewer.

No one can dispute the fact that these marvelous windows are precious works of art, deserving of exacting care and preservation. They were, indeed, recently conserved with great success

and at great expense. But the case still warrants some examination, in order to bring us closer to the essence of our inquiry. Why do these windows possess undisputedly high value? What is so special about these images? What approach—what "ethic"—should a conservator adopt when approaching such works of art?

The Chartres clerestory windows were made about 1220, and their worth resides in large part on their age and rarity—undoubtedly two important categories for determining artistic "worth." Quality is also an important factor, together with rarity and age. (In more modern examples, one might add the authorship of a prized artist into the mix.) One particular designation—often easy to discern but sometimes hard to name—deserves special mention here because it explains a great deal about modern conservation ethics: the argument that every artwork possesses a particular, individual, and unmistakable "aura." The word might seem esoteric, but aura has a very precise and concrete meaning in philosophical discourse. Walter Benjamin conducted fascinating investigations of the concept during his 1936 exile in Paris. In his essay, "The Work of Art in the Age of Mechanical Reproduction," Benjamin questioned the effects on artistic worth when modern technology had made the reproduction of previously unique images easier than ever before.⁵ In order to describe the aura of a work of art, Benjamin explained, "Even the most perfect reproduction lacks one element: the here and now of an artwork, its unique presence at the place where it is found. The individual history that an artwork gathers over the course of its existence is dependent on that unique presence alone. This history includes the structural modifications an artwork has suffered along with the change of hands that may have befallen it."⁶ Later in the essay, Benjamin further defined his view of this unique sense of being: "It is impossible to separate the uniqueness of a work of art from its being embedded in tradition. Tradition itself, though, is something living, something extraordinarily changeable. An ancient statue of Venus, for example, existed in a very different traditional context with the Greeks, who made it as an object of veneration, and later with the clerics of the Middle Ages, who saw it as an ominous idol. But the uniqueness of the statue—in other words, its aura—confronted both."⁷ Benjamin continued, "The unique value of the 'authentic' work of art is based in the rituals where it finds its first and original use. As heavily mediated as this ritual basis might be, it is recognizable even in the most profane form, for instance, in the secular rites of the Cult of Beauty."⁷

Let us bring Benjamin's definitions of this philosophical idea of aura home to the particular area of glass painting. I have already indicated some of the theological and historical ideas in which the windows of Chartres are embedded. The windows are also fixed in space and time. Their place within tradition and sacred ritual becomes clear when one considers how the scenes represented in the glass painting have functioned as a foil to

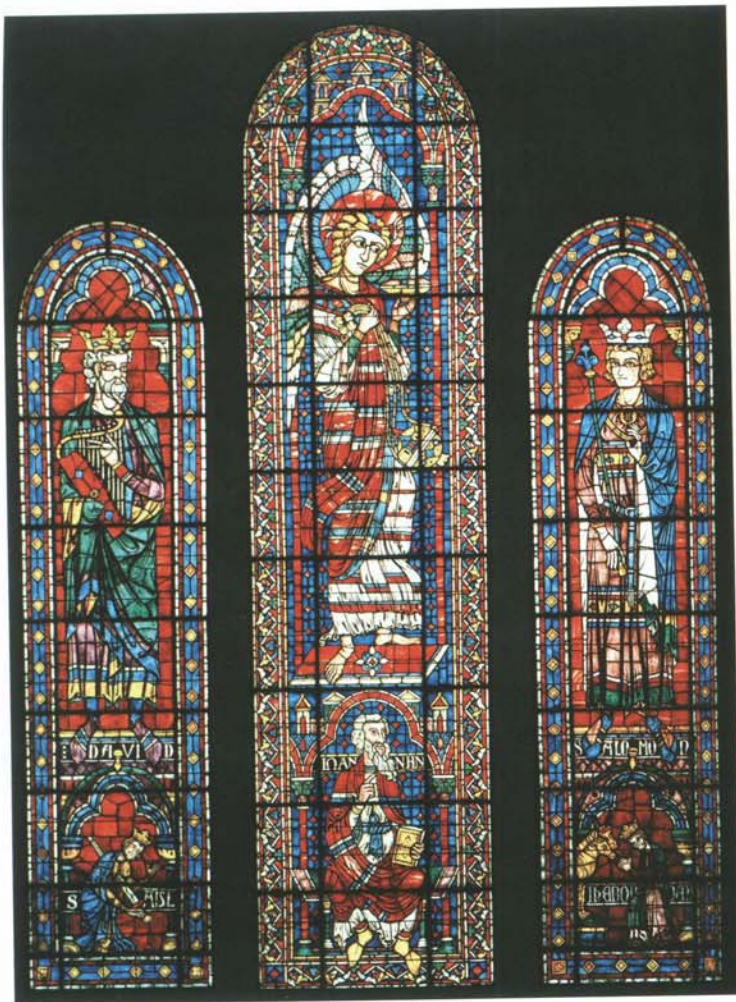


Fig. 2. North Window, Great Hall, c. 1932/33, Glencairn, Bryn Athyn, PA (from Glenn, *Glencairn*, p. 132)

countless prayers, adoration, and religious services. In the case of the Chartres windows, the applicability of Benjamin's definition of aura is immediately clear. To Benjamin, mechanical reproductions of art could not possess an aura.⁷ Does this judgment apply across the board, to every case on the conservator's workbench? How should we deal with hand-made, artisanal reproductions?⁸ Can the criteria Benjamin used to determine the aura of a work of art help us to define a conservation ethic in such a case?

In Chartres Cathedral, the image of the Mother of God in the central apse window is flanked by two large, magnificently rendered seraphim. In order to see such splendid angels, however, one must not necessarily travel to France. In Bryn Athyn, Pennsylvania, near Philadelphia, one can admire at close quarters the same figure of an angel on exactly the same scale as it appears at Chartres (Fig. 2). This glass painting is housed in the Glencairn Museum, the former mansion of Raymond Pitcairn, now managed by the Academy of the New Church.⁹ The "Chartres Angel" fills the middle window in the Great Hall, used by the Pitcairn family as a living room in their imposing Romanesque-style house. Raymond Pitcairn seriously began collecting European medieval art and stained glass on a large scale in about 1916; Glencairn was built between 1928 and

1931. He was particularly interested in the glass painting of the Ile-de-France, of which he was able to acquire a great many pieces.¹⁰ But the windows of Chartres were not for sale. The venerable windows interested Pitcairn primarily as artistic and technical models for the artisans working on the nearby Cathedral of the New Church as well as on his mansion, Glencairn.¹¹ Pitcairn managed to obtain several full-size drawings from the nineteenth-century conservation of the Chartres windows, but the coveted seraph had no such cartoon. So, Pitcairn had a scaffold built at Chartres, at his own expense, in the spring of 1932, in order to have a tracing taken of the original window.¹² As a result, the window at Bryn Athyn replicated original scale of the Chartres model. Pitcairn installed a glass workshop on-site in Pennsylvania, where craftsmen working under Winfred Hyatt made and set the glass for all the windows in the newly-built Cathedral of the New Church and for Pitcairn's own home.¹³

What motivated Pitcairn to go to such great lengths to replicate the Chartres angel? The striking beauty of the thirteenth-century seraph must, of course, have influenced his choice. But other factors were probably in play. As already indicated, Pitcairn was a member and a great supporter of the "New Church" or the General Church of the New Jerusalem. This denomination is based on the ideas and visions of Emanuel Swedenborg, who developed a new "theosophy" through writings and sermons in the early eighteenth century. Believers hold that God revealed himself to men in three testaments: the Old Testament, the New Testament, and the Writings of Emanuel Swedenborg.¹⁴ As Bruce Glenn has observed, in the context of Bryn Athyn we should not attempt to understand the Chartrain angel in conjunction with Mary (as at Chartres) but rather as it related to Swedenborg's exegesis of Revelations 8:3.¹⁵ Swedenborg wrote in *The Book of the Apocalypse Revealed*, that the angel "signifies spiritual worship, which is from the good of charity by the truths of faith."¹⁶

Another, perhaps more personal, Swedenborgian explanation might stand behind the central position of the Chartrain angel at Bryn Athyn and Pitcairn's extraordinary measures to include it at Glencairn: the New Church's teaching on humans as divided beings. According to Swedenborg, mankind has an inner, spiritual being and an outer, "natural" being. Those who live in God's wisdom and love will become fully spiritualized after death, and these spiritual beings might develop fully into angels, for "angels and other spirits once were human beings living the life that all of us know on the earth."¹⁷ Swedenborg taught that all angels were once men and women, people who practiced love during life in the natural world and after death in the spirit world—either singly or in married pairs. "If [a] couple also becomes spiritually one during their physical life, their marriage continues in heaven," Swedenborg wrote; he elaborated that the couple might become either two separate angels or a single, androgynous angel after death.¹⁸ Conversely,

angels are present already on earth, according to Swedenborg, sometimes in human form. Robert Kirven, of the Swedenborg School of Religion in Newton, Massachusetts, more recently proposed that these angels-turned-humans are “surprised to find themselves without wings, halos, white robes, and standard-issue harps.”¹⁹ Despite this theological explanation, nearly all the angels in the illustrations to Kirven’s book appear with the familiar attributes of wings and halo, as do many of the angels of Glencairn and the Cathedral of the New Church. Since Swedenborg’s angels would have been too difficult to depict as purely spiritual, ethereal beings, Pitcairn and the artists of the New Church seem to have fallen back on recognized symbols and traditional iconographies.²⁰ With this historical knowledge as a backdrop, how should we understand the value of the Chartrain angel in Glencairn, as opposed to the Chartrain angel in Chartres—from a Benjaminian point of view? In 1936, Raymond Pitcairn copied an angel of Chartres as precisely as possible—in style, size, composition, and visual impact. But the angel must have held a very different personal meaning for Pitcairn as a convinced Swedenborgian, as it originally had for the donors and builders of Chartres. While their form is nearly identical, the theological meaning and the sacred being of these two angels are completely distinct. In Benjaminian terms, the angel of Bryn Athyn also possesses a unique and irreplaceable aura rooted in its history and its traditional context. This angel is also embedded in sacred ritual, although it also has an active life in the world of secular rites. For example, in the 1950s and 1960s, the Great Hall and its glass paintings set the stage for the Annual Spring Dance at Glencairn—a true secular ritual in the Benjaminian sense.²¹ In the present day, another secular ritual, the Cult of Beauty, surrounds the ensemble at Bryn Athyn, for we find such a Cult of Beauty in every cathedral and museum in the world. The well-justified admiration of artworks, in our example of the Glencairn glass, closes a circle in which contemporary art lovers may appreciate the Chartres windows (both in Pennsylvania and in France) either in a secular or in a secularized spirit.

After this excursion to France and Pennsylvania, let us return to modern conservation ethics in a broader sense. How should we describe the “worth” of these two angelic compositions from a conservator’s point of view; how should a conservator approach them? To what extent, in the end, must we even differentiate between them: the Chartres window, 800 years old, donated by Prince Louis of France as the focal point of the cathedral choir, and the Bryn Athyn angel, 70 years old, obtained by Raymond Pitcairn as the centerpiece of the Great Hall of his medieval-style mansion? Is one a true, or authentic, work of art, and thus more valuable than the other? According to Benjamin’s criteria and from a conservator’s standpoint the choice is not difficult—it must not even be made. Both glass paintings possess unique and unmistakable, although very different, auras.

These auras render both windows valuable historical witnesses. Their art historical importance, of course, varies. Their financial worth would certainly be judged differently on the open market. However, the sense of value with which a conservator must approach each one is equivalent. Both deserve equal care and painstaking attention from the conservator’s point of view. This is due not to the content of the windows or to their material, but to the individual aura of each composition. Equal care and painstaking attention does not necessarily mean treatment with the same techniques, methods, or tools. Every work of art demands conservation on its own terms. As techniques and tools may change very quickly over time, however, the concept of conservation ethics takes precedence in our discussion. The approach of the technician to the object ultimately determines her methods. A conservator with a sound ethic is in a position to choose, or even develop, techniques and tools that enable preservation of an object’s structure and content, its physical materials, and also its aura.²²

In practical terms, every conservation project must follow certain principles. The three most important are listed as follows:

- Before and during each conservation project, each object must be *researched* as thoroughly as possible. The research must account for the object’s origins, its history, and also its material. The last is of utmost importance, since ignorance of the materials and construction techniques easily leads to bad conservation decisions and sometimes to irreversible damage.
- Artwork should be protected from harm. Like invasive surgery, dramatic intervention should be avoided whenever possible. *Preventive conservation* is always preferable, so that the original condition of the object remains as intact as possible. Preventive conservation for glass painting, for example, might include the installation of ventilated protective glazing for glass still *in situ*, or climate-controlled storage in a museum.
- The most important part of any conservation project is to maintain the *authenticity of the object*.²³ This means that whenever possible, when a stained-glass composition comes to the conservator, all its elements, including glass, pigment layers, lead, and framing, must still be present after the treatment. Strict observance of this principle is absolutely necessary for conserving, not only the physical body of an object, but its history and aura. All interventions by the conservator must be reversible, including material such as adhesives or supports.

The principles named so far do not originate in any particular national tradition. These ground rules were developed over decades—often through heated debate—in many different international forums. The famous UNESCO Venice Charter of 1964 was one such occasion; it was codified that an artwork

must be understood as inseparable from its history and that respect for its historical materials must have highest priority.²⁴ More recently, an international committee of the *Corpus Vitrearum* worked out the principles I have introduced as they specifically apply to stained glass. These are published as the *2004 Guidelines for the Conservation and Restoration of Stained Glass*.²⁵

Every professional modern conservation project begins with a very precise investigation of the artwork at hand.²⁶ The goal of painstaking preliminary research is to gather as much information as possible about the object in question, which will be taken into account when developing a conservation plan. The examples of Chartres and Bryn Athyn demonstrate the importance of historical research to a conservator's ability to judge value and develop an appropriate ethic; conservators must understand what they are working on. One must know as much as possible about a work of art's past and present meanings, its artistic production, its history, and the changes it has undergone throughout its lifetime. Investigating the object itself reveals the best information about the materials and techniques used to construct it, as well as any damage it has suffered. Weighing the results of research enables a conservator to develop a concept and a plan for work on the object. The conservation plan should lay out the purpose, goals, and techniques of conservation work as precisely as possible before the intervention begins.

There are many different conservation methods. I would like to discuss several that illustrate some of the most common—yet also, most serious—problems faced by glass conservators: first, damaged paint layers and the intimately connected problem of glass corrosion; second, approaching younger infills, or patches in historic glass; third, issues presented by historic leading; and finally, some remarks on the techniques of protective glazing.

Glass Corrosion and Damaged Paint Layers

Whether ancient or modern, glass painting almost always consists of colored glass painted with black enamel. This paint, which consists mostly of iron oxide, is applied to the glass surface and fired at around 1150 degrees Fahrenheit. The paint sometimes shows damage due to production errors, but more frequently it is due to longtime weathering, damp conditions, and air pollution.

A photograph of the head of the prophet Ezechiel from the *Tree of Jesse* window in Wells Cathedral, produced about 1340 (Fig. 3) provides a clear example of paint damage and glass corrosion. The microscopic image in the upper right-hand corner of the image shows the eyebrows of the prophet at 25x magnification, and one can clearly see serious deterioration of the paint layers. Similar damage is often to be seen in enamel paints from the seventeenth and eighteenth centuries. These enamels were made from ground glass melted onto the supporting pane

that has often simply flaked away. This is not a complaint of extreme old age; the same problem affects glass paintings from the nineteenth century—and even from the twentieth century. Glass corrosion often accompanies paint damage, as is evident in the prophet's head from Wells, where the products of corrosion appear clearly in the form of a white crust.

How does this damage occur? Glass is far from a homogeneous material; the thickness of its components varies in well-defined layers, each of which has a slightly different chemical composition. Weathering washes out alkaline elements, leaving behind a silicate skeleton, often called the gel (or leached) layer. This gel layer lies atop the base glass: a jagged sheet shot through with micro-cracks. The gel layer carries (and contains) the original paint, corrosion products, pollution, and microorganisms.

When the gel layer is damaged, how can a conservator combat the complicated marriage of original structure, glass corrosion, and paint loss? The process involves cleaning, repair, and the prevention of further damage. Before cleaning away corrosion products, the loose flakes of paint must be stabilized with an adhesive. This should be done under a microscope. The adhesive should be applied only to problem spots, never to the entire glass surface, and always underneath the flaking areas.

After stabilization of the paint, the glass surface may be cleaned. In view of the delicate nature of most stained and painted glass, harsh cleaning methods are out of the question. Attempts to clean glass with sandpaper, steel wool, steel brushes, sponges, acid baths, or strong soapy water—all of which occurred in inexperienced workshops some years ago—are thankfully, for the most part, a thing of the past. Different restorative cleaning methods have been developed. For instance, some conservators prefer to remove corrosion chemically, by means of poultices or gel pads. With this type of intervention, a cotton-wool poultice steeped in ethylenediaminetetraacetic acid (EDTA), a loosening



Fig. 3. Head of the Prophet Ezechiel with magnified detail, *Tree of Jesse* (East I), c. 1340, Wells Cathedral (photo: author)



Fig. 4. Detail of an interlace window, c. 1230, cloister of the Cistercian abbey at Marienstatt (photo: author)

agent for chalky encrustations, is placed directly onto the glass. After a while, the poultice or pad can be removed. In the hands of a specialist, this method can be used for a focused cleaning. With fragile painted glass, this chemical method has the disadvantage of endangering broken remains of paint still on the surface. In such cases, work can be undertaken in a more controlled manner by using mechanical means. Some conservators work with cotton buds, with which corrosion encrustations are removed in layers, often with the help of deionized water or chemical cleaning agents such as ethanol poultices. Other mechanical methods include the use of soft paint brushes or scalpels. In most cases, this type of cleaning takes place under the microscope. Many mechanical means are available for further cleaning of the surface, such as hard brushes or fat-absorbing powder. In particularly tricky cases, it may be useful to conduct tests of various cleaning methods on small areas and to assess them afterwards with scientific analysis.

To a certain extent, conservators in different countries have built up preferred technical traditions, but judgment of these cleaning methods is fortunately no longer divided into national camps. It is also generally agreed that all the methods mentioned can cause extensive damage in the hands of an inexperienced technician. It is, therefore, very important that only specialized and experienced conservators undertake stained-glass conservation treatments.

Leading

The lead matrix that provides structure to a window tends to bulge easily, leading to fractures. The cement between glass and lead becomes brittle, and the panes are pulled loose by their own weight. Lead comes tend to fracture close to historic soldering

points. The panel loses stability and bends out of shape. In extreme cases, problems with leading cause entire windows to lose their form. Despite such buckling, it is usually not necessary to actually renew or replace the leading. Historic leading is considered part of the original artwork and must be preserved whenever possible. The interlace window from the Cistercian abbey of Marienstatt offers a particularly impressive example for the conservation of historic leading (Fig. 4). This window was de-installed in the early nineteenth century and stored in a box in the abbey attic. Although the window suffered great losses, it included panels that had remained untouched since the window was made around 1320. The most recent conservation project for the window, therefore, followed the principle of strict "preventive conservation." The remains of the window were laid onto colored glass, giving the visitor a sense of the original composition, while ensuring that all remains of the early fourteenth-century leading remained integral and visible. Following its conservation, the Marienstatt window gives us a wonderfully clear picture of medieval techniques for casting and working lead, as well as a true sense of the window's original aesthetic. If the window had ever been releaded, an important part of the artwork would have been destroyed. This principle applies not only to medieval windows but also to more-recent panels. Should the leading in the Bryn Athyn windows be replaced, for example, an important component of the image's authenticity would be lost.

Infills

This discussion of historic leading is equally relevant to conservators' treatment of broken or missing glass. Technically, as with leading, the removal of old glass and its replacement with new pieces is never unavoidable. Even in the case of terribly damaged

windows, one can always find a solution that preserves all the remaining pieces. The broken pieces of original glass may be fastened together side-by-side. Missing pieces may be replaced in several different ways. Many conservators decide to fill gaps with new glass that harmonizes in color with its surroundings but lacks painted contours, figures, or lettering. Such an infill plugs a hole without too much optical disturbance, but it does not attempt to create a replacement for an original text or pattern that remains unknown to us. This approach is applicable to any case in which we cannot hope to reproduce original content. The conservators of the Great East Window of York Minster employed a different concept (Fig. 5). Here, copies meant to complete the composition substitute for missing pieces. The new glass is scored with a set of fine lines, however, meant to inform the viewer that the piece is a modern addition.

Protective Glazing

As described above, glass is not chemically stable and is subject to damage by environmental conditions. In many cases, glass should therefore be protected from weather, dirt, and condensation. A protective glazing system ventilated from the inside is generally a good solution. Such a system can take several different



Fig. 5. Detail showing modern infills, installed by the York Glaziers Trust in 2008, Great East Window, York Minster (photo: author)

forms and must always be specifically designed for its site. This is important in both a technical and an aesthetic sense.

Protective glazing installed on the exterior of a building with space between the new and historic panels is particularly effective in shielding glass from moisture. The historic panel is tipped slightly to allow for ventilation, and is thus surrounded by warm interior air on both sides. Under these conditions, normally no condensation is possible on the fragile surface. If condensation does occur, due to fluctuations in exterior temperature, it gathers on the interior of the *protective* glass, where it does no damage. The system of protective glazing with interior ventilation has been shown to be effective at most sites in temperate climates, but would be problematic in warm and humid zones such as the southern United States. An air-conditioned church in the humid swamps of Louisiana effectively reverses temperate climate conditions and therefore requires a protective glazing system built according to different principles.

Aesthetically, the outside view of protective glazing often presents particular difficulties. In view of this issue, the choice to install protective glazing must be weighed carefully and made only where strictly necessary to protect historic glass. The need for protective glazing is urgent when weather conditions on a site endanger paint layers and cause glass corrosion. Protective glazing is often necessary for guarding precious leading or



Fig. 6. Protective glazing with smooth panes, installed 2006, the Gothic Chapel, The Cloisters, New York (photo: author)



Fig. 7. Exterior view of choir chapel windows with thermoformed protective glazing, installed 2008, Chartres Cathedral (photo: author)

original mounting systems made of copper foil and tin, such as those used by the workshops of Louis Comfort Tiffany or John La Farge. But in each case, the protective glazing system must be designed for the specific technical, architectural, spatial, and aesthetic requirements of the site in question. There is no “one size fits all” formula; every object and every site requires an individualized approach.²⁷

The often aesthetically-problematic exterior of protective glazing has led to the development of many possible solutions designed to address the situation (and conservation ethic) of

differing individual sites. For instance, the protective glazing of the Gothic Chapel at The Cloisters in New York’s Fort Tryon Park is made of smooth panes (Fig. 6). While they are reflective, it does not really disturb the ensemble, as it may at other locations. Other varieties of protective panes work differently; our next example represents a return to Chartres, the starting point for our discussion (Fig. 7). In the last conservation project of the southern choir chapels, the conservators at Chartres opted for so-called “thermoformed” glass for the protective glazing. Here, a cast of the original leading is melted onto the protective glass. The new panes therefore give an impression of the original uneven appearance and optical movement similar to that of the original lead network now installed behind them.

This brief discussion has included only a handful of the many techniques and methods active in current stained-glass conservation. Every conservation case requires individual consideration of which methods to use and how to employ them. Different conservators may be specially trained in different techniques, but the primary issue here is not which particular tricks a conservator has up their sleeve.²⁸ Rather, emphasis should be placed on the importance of evaluating which approaches fit a particular conservation project, and how best to integrate conservation ethics with the object or the site. The maxim, “handle with care!” applies not only to fragile glass, but also to its leading or mounting system, its architectonic environment, the unique history of the whole ensemble and, last but not least, to its irreplaceable, individual aura.

Résumé

Cet essai tente de décrire les outils, les techniques et les méthodes modernes de conservation du verre et propose également des remarques sur l’approche éthique que les restaurateurs devraient adopter vis-à-vis de leur œuvre d’art. Pour mettre au point une telle éthique de la conservation, cet article applique pour la première fois le concept de Walter Benjamin d’une “aura” dans le secteur de la conservation de vitraux. En utilisant l’exemple des précieux vitraux de la cathédrale de Chartres et de ceux de Bryn Athyn en Pennsylvanie, cette étude analyse la valeur et l’éthique de conservation de ce procédé qui peut être utilisé comme exemple pour d’autres travaux sur des vitraux. Cette introduction théorique est suivie d’une discussion sur plusieurs méthodes fondamentales de conservation, actuellement utilisées au niveau international dans la conservation de vitraux.

Zusammenfassung

Das Essay versucht nicht nur die Werkzeuge, Techniken, und Methoden zu beschreiben, mit denen die moderne Glaskonservierung arbeitet, sondern auch Hinweise zu geben auf die ethische Haltung, mit der sich ein Restaurator seinem Kunstwerk nähern sollte. Um eine solche Konservierungsethik zu entwickeln, wird erstmals der Begriff der "Aura" von Walter Benjamin auf das Gebiet der Glasmalereikonservierung angewandt. Am Beispiel der kostbaren Fenster der Kathedrale von Chartres und der Glasbilder von Bryn Athyn in Pennsylvania wird deren Wertigkeit untersucht und eine Konservierungsethik entwickelt, die beispielhaft auch für andere Werke der Glasmalerei gelten kann. Auf dieser ideellen Basis werden abschließend einige grundlegende Konservierungsmethoden dargestellt, die derzeit international in der Glasmalereikonservierung gebräuchlich sind.

1. On the windows of Chartres, see the fundamental work of Yves Delaporte, *Les vitraux de la cathédrale de Chartres. Histoire et description*, I (Chartres 1926), and Claudine Lautier's entry on Chartres cathedral in Louis Grodecki, et al., *Les Vitraux du centre et du pays de la Loire*, Corpus Vitrearum: France, Recensement des vitraux anciens de la France II (Paris, 1981), pp. 25-44.
2. The author has previously published a thorough iconographic study of the program. See Ivo Rauch, "Die Bundeslade und die wahren Israeliten—Anmerkungen zum mariologischen und politischen Programm der Hochchorfenster der Kathedrale von Chartres," in *Glas, Malerei, Forschung: Internationale Studien zu Ehren von Rüdiger Becksmann*, ed. Hartmut Scholz, Ivo Rauch, and Daniel Hess (Berlin, 2004), pp. 61-72.
3. *Ibid.*, pp. 68-71.
4. *Ibid.*, p. 70.
5. The German edition is cited here: Walter Benjamin, *Das Kunstwerk im Zeitalter seiner technischen Reproduzierbarkeit* (Frankfurt, 1977). The text was originally published in a shorter French version: "L'oeuvre d'art à l'époque de sa reproduction mécanisée," *Zeitschrift für Sozialforschung*, 1 (1936), pp. 40-68.
6. Benjamin, *Kunstwerk*, pp. 11-12. Beatrice Kitzinger is responsible for the English translation here and in notes 7-9.
7. *Ibid.*, p. 16.
8. Handmade-art reproductions were highly valued through the end of the nineteenth century. Contemporary art critics and connoisseurs argued that woodcuts, copperplates, steelplates, or casts could sometimes express the true essence of an artwork better than the original itself. On this topic, see the witty and relevant work of Wolfgang Ullrich, *Raffinierte Kunst. Übungen vor Reproduktionen* (Berlin, 2009). It is important to note that we should recognize a difference between Benjamin's philosophy as it applies to art criticism and to conservation ethics. Theodor Adorno argued that, following Benjamin's logic, everything handmade should have the status of a work of art, rendering the field of artwork far too inclusive (see Adorno's letter to Benjamin in *Theodor W. Adorno/Walter Benjamin. Briefwechsel 1928-1940*, ed. Henri Lonitz [Frankfurt, 1994], p. 169). This, however, is the point at which the art critic and the conservator part ways. The factors that lend aura to an object, following Benjaminian lines, may help to define the object's "worth" in terms essential to the conservator and their conservation ethic, but irrelevant to the judge of artistic quality or value. To my knowledge, the literature on conservation ethics has not yet taken this distinction properly into account.
9. On the history of the building's construction and use, see E. Bruce Glenn, *Glencairn. The Story of a Home* (Bryn Athyn, 1990) and the Web site of the New Church: <http://www.newchurchhistory.org/photographs/> (accessed 20 September 2009).
10. On Pitcairn's collection of medieval glass, see Jane Hayward and Walter Cahn, *Radiance and Reflection: Medieval Art from the Raymond Pitcairn Collection*, exh. cat.: New York, The Metropolitan Museum of Art (New York, 1982), pp. 32-47.
11. *Ibid.*, pp. 36-37.
12. Glenn, *Glencairn*, p. 134.
13. For the glassworks in Bryn Athyn, see http://www.newchurchhistory.org/photographs/browse_albums.php?aid=11 (accessed 20 September 2009).
14. For Swedenborg's major work, see Emmanuel Swedenborg, *Arcana coelestia*, 8 vols. (London 1749-56). See also Konrad Algermissen's articles, "Swedenborg und Neue Kirche" in *Lexikon für Theologie und Kirche* (Freiburg, 1962), 9: col. 1199-1200 and 7: col. 894-95.
15. Glenn, *Glencairn*, p. 137.
16. Cited after Emanuel Swedenborg, *The Doctrine of the New Jerusalem Concerning The Lord* (New York, 1946), ch. 392, p. 3.
17. Robert H. Kirven, *Angels in Action. What Swedenborg Saw and Heard* (West Chester, 1994), pp. 48-49.
18. *Ibid.*, p. 74.
19. *Ibid.*, p. 51.
20. A thorough investigation of the iconography used by the New Church would be worth undertaking. Its artists seem to use old models on a regular basis, modifying them only slightly. The large window in the west wall of the Glencairn Great Hall is a case of stronger modification: the composition copies the St. Anne and Virgin window from the northern transept at Chartres, but changes the iconography into a Virgin and Child because according to the New Church, "neither Mary nor any saint is addressed as ruler or intercessor but Christ, who alone is God," Glenn, *Glencairn*, p. 15.
21. See in the illustrations in *Ibid.*, pp. 154-55.
22. A scholarly treatment of conservation ethics was first developed by Katrin Janis, *Restaurierungsethik im Kontext von Wissenschaft und Praxis* (Munich, 2002). Beginning with Alois Riegl and Georg Dehio in the early twentieth century, Janis presents a historical overview of modern conservation ethics that continues from the Italian conservators Cesare Brandi and Umberto Baldini to the present day.
23. On the relationship between an original object and its "authenticity," see *Ibid.*, pp. 135-37.
24. Published by ICOMOS in *International Charters for Conservation and Restoration*, vol. 1 (Paris, 2001). See also http://icomos.org/venice_charter.html (accessed 12 December 2009).
25. Published in <http://www.cvma.ac.uk/conserv/tl/guidelines.html> (accessed 20 September 2009).
26. For a thorough treatment of modern glass conservation techniques, see Ivo Rauch, "Konservierung und Restaurierung historischer Glasmalereien. Eine Einführung in die Problematik," *Die Denkmalpflege*, 62/2 (2004), pp. 141-50. For further fundamental literature, see Isabelle Pallot-Frossard

et al., *Manuel de conservation, restauration et création de vitraux* (Paris, 2006); Sarah Brown and Sebastian Strobl, *A Fragile Inheritance. The Care of Stained Glass and Historic Glazing: A Handbook for Custodians* (London, 2002); *Restaurierung und Konservierung historischer Glasmalereien: Ein Förderprojekt des Bundesministeriums für Bildung, Wissenschaft, Forschung und Technologie*, ed. Arnold Wolff (Mainz, 2000); B.A.H.G.R. Jütte and Rob Crèvecoeur, *Richtlijnen voor de conservering van Gebrandschilderd Glas* (Amsterdam, 1994); *Glas in Lood*, ed. Yvette Vanden Bemden (Brussels, 1992).

27. I am grateful to Marian Austin, a student of glass conservation at York University, for drawing my attention to an interesting study on protective glazing in the United States: Inspired Partnerships, *Protective Glazing Study*, ed. Mark Gilberg, U.S. Department of the Interior, National Park Service, National Center for Preservation Technology and Training, no. 1996-06 (Chicago, 1996). It includes numerous existing American cases of protective glazing that are documented and evaluated. Unfortunately, the study mostly covers cases of outdated technology that did not reflect the wider range of technical and aesthetic possibilities for protective glazing existing at the time—not to mention what is currently available. Accordingly, the

authors gave overwhelmingly negative evaluations to the field of protective glazing without making any suggestions that might improve the disappointing results of their case studies based on newer scientific analyses or data based on updated technology. The list of "Pros and Cons" presented on p.4 is particularly incomplete; and the most important grounds for installing protective glazing (defense of fragile paint layers, protection against glass corrosion, conservation of glass and leading systems together, conservation of the technical and artistic authenticity of a whole window) are never discussed. Since the real reasons for desiring protective glazing are never made clear, the authors come to the conclusion that such interventions should be avoided wherever possible. Despite the rich material and breadth of the study, its fundamental methodological problems render it difficult to use in the field of contemporary glass conservation.

28. Luckily, there are excellent training opportunities for both the practical and the scholarly sides of current conservation of stained glass. It is possible to study at a very high level in Antwerp, Belgium; Paris, France; Erfurt, Germany; and now in the first Anglophone M.A. program at the University of York, Great Britain.