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Figure 1. Square piano, Jacob Ball, London, 1790s. Colonial Williamsburg collection.



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Figure 2. Square piano, Johannes Zumpe, London, 1766. Colonial Williamsburg collection.

Instrument and Document: Balancing Values in the Conservation of Musical Instruments

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ABSTRACT

The objectives of conservation include both restoration and preservation. When viewed in their narrowest definitions, the two objectives appear irreconcilable. Our profession is thankfully not dependant on narrow and polarized definitions, yet a great challenge is faced in the conservation of functional objects in general and musical instruments in particular. Although there is a certain paradox of restoration, restorative conservation offers a reasoned approach that balances the restoration of form with equal attention to preserving material evidence. This involves understanding, respecting, and balancing diverse values, including an array of intrinsic and extrinsic values.

The principles of restorative conservation rarely lead to simple rules about how to balance restoration and preservation, so every case requires judgment and discussion among stakeholders. Different families of musical instruments (strings, woodwinds, brass winds, percussion, keyboards, et al.) also have differing vulnerabilities and so differing traditions of treatment. This paper will feature several musical instrument case studies, selected to illustrate different solutions for different situations:

- A 1790s square piano that received a traditional approach to restoration
- A 1766 English square piano that received stabilization treatment, and not musical restoration
- A mid-eighteenth-century pipe organ that received restorative conservation
- An 1816 English grand piano restoratively conserved to playing condition

In their most rigorous forms, the objectives of preservation and restoration appear almost irreconcilable, yet conservation professionals must combine them whenever preservation-worthy objects are prepared for use. This is the challenge of functional objects in general, and musical instruments in particular. Restorative conservation is an approach to restoration that offers a reasoned approach to balancing the restoration of form with equal attention to preserving material evidence. This involves understanding, respecting, and balancing diverse values, including an array of intrinsic and extrinsic values.

The principles of restorative conservation are not reducible to simple rules that balance restoration and preservation, so every case calls for discussion among the stakeholders, and informed judgment. Different families of musical instruments (strings, woodwinds, brass winds, percussion, keyboards, etc.) have different vulnerabilities that affect the prospects each has for restorative conservation. This paper features several musical instrument case studies, selected to illustrate different solutions for different situations.

We'll begin with a square piano made in London in the 1790s (fig. 1). The restorer's extraordinary knowledge of pianos from this period, his unswerving resolve to use the "right" materials such as ivory and baleen to replace missing parts, and his skill at reproducing period workmanship achieve for him in the eyes of many collectors, the highest respect as one of the best piano restorers in North America. The result is a piano

that musicians love, because it plays so well and is now unblemished by the ravages of time.

How did the restorer come to be so knowledgeable about period methods and workmanship? Undoubtedly he learned by looking closely at the originals. One can picture him, for example, using a magnifying glass to observe tool marks from the original construction. Then he used what he had learned to rework damaged surfaces and remake lost or damaged parts in close imitation of the original, as if he had served an apprenticeship with the original maker. He surely felt he had achieved the authority to act on behalf of the original maker. The result of his restoration was the rebirth of an eighteenth-century piano having once again the pristine appearance in which it emerged from the original workshop over two hundred years ago.

Some might find this story inspiring so far, but, we have only looked at one side of the paradox of restoration. The owner of this piano at the time of its restoration felt no need for a restoration report, nor did the restorer see any profit in writing one. Thus no record of the restoration exists. Not long after the restoration, the piano was given to a museum where historians carry out research on the history of piano-making technologies. Like many of you, they depend on minute physical evidence of the past, deposited and etched on historic surfaces. This is quite a different perspective from the restorer's, for we now see that this piano has lost the historical text encoded on its surfaces. Looking close for evidence of the original maker's tools and workmanship, one can never know whether one is seeing the hand of the original maker, or the modern restorer. In its new state, the piano has gone from being a primary document to being a secondary document. It has gone from having complete historical integrity, to being falsified and a mere replica of itself. It may be a pristine musical instrument now, but as a historical document, this piano is an imposter.

A distinction exists between an artifact's *form* and its *substance*. The *form* is the original maker's vision, and the *substance* is the resulting physical object, embodying that form, but also layered with physi-

cal evidence of its making, and generations of use. The restorer of this piano had one goal: to restore the form envisioned by the original maker. What neither the original maker nor the restorer realized was that artifacts may eventually become more than utilitarian or aesthetic objects. They become as much or even more importantly historical documents, recording in their aging substance, a physical record of not only its making at a moment in time, but a whole history of subsequent use.

A conservation professional may be required to restore a historic piano, but the difference between this kind of traditional restoration and restorative conservation is that the conservator uses specialized methods for getting the restoration job done while also protecting the survival and integrity of that evidence, using conservation methods such as a less invasive approach to intervention and documentation.

Although this piano can still serve as a perfectly good piano, it also serves as a frightening object lesson in the consequences of traditional restoration.

The next case study is another square piano (fig. 2). The German immigrant Johannes Zumpe made the piano in London in 1766. That is the first year of piano production anywhere in the English-speaking world. The piano was purchased by the Colonial Williamsburg Foundation in 1968 and was left with the dealer/restorer, for restoration. Most other museums probably would have done the same thing in 1968; at that time, everyone thought the only important thing was to bring a silent musical instrument "back to life."

The story of this piano over the following three years, recounted in colorful detail in our object file, reads almost like a TV crime investigation. The restorer soon dropped out of sight, and the museum eventually hired a private investigator to find him and the piano. At a low point in the investigation, it appeared the restorer's landlord had deposited the piano in the Annapolis city dump. Eventually, the restorer turned up and he still had the piano, having not begun the restoration.

Back in Williamsburg, the piano rested in storage for the next fifteen years, as the museum began to think of it not as a mere tool for making music, but more importantly as a primary document. It was worthy of study and preservation, and too important to be subjected to restorative alterations and consumed for our amusement.

Any musical restoration of this piano would have necessarily involved replacing the original strings, the original leather hammer heads and their hinges, and the original cloth that cushions the keys. The restorer back in 1969 had claimed to have already prepared a new soundboard for the piano. How important is it to retain this remarkable piece of eighteenth-century technology, an original 1766 soundboard laminated from three 1 mm layers of spruce? If the piano had been restored to playing condition, it would arguably be neither an antique nor a new piano.

Every object has some mix of the types of intrinsic value.¹ In the list below, one can recognize that our earlier example (the piano that underwent extensive restoration) was restored as if its only value was number 4: Economic/Utilitarian value. With this second example, a very important and rare Zumpe piano, surviving with so much vulnerable evidence, the balance clearly tilted towards number 2: Informational/Documentary value. Too much of that value would be lost if its utilitarian potential was given precedence through restoration. Our conclusion is that this piano should never be restored to playing condition.

Intrinsic Values

1. Associative / Symbolic
2. Informational / Documentary
3. Aesthetic / Emotional
4. Economic / Utilitarian

But there is still something wrong with this example as it stands so far. Wouldn't you like to hear what the very first pianos in America sounded like? We certainly did. In the very same year as the first public piano performance in America (which was

in Boston in 1771), a piano forte almost certainly of this very type was used in a concert at the Raleigh Tavern in Williamsburg. We strongly wanted to hear this piano, and to present it to our visitors. Well, there is a natural outcome of all of this. We relied on this very complete and un-restored antique to tell us in detail how to make an accurate reproduction. It was my honor to make the new instrument, to read the original as a document, and to see it virtually restored, not as a hodgepodge of new and old parts, but in the form in which the piano would have appeared to that audience in Williamsburg in 1771. Side by side, the unrestored original piano and the reproduction represent the best kind of before and after picture. Now we can see and hear the Zumpe piano as it appeared when it was new, without having lost a single part or surface in the antique.

One might start getting the picture from all of this that the question of restoration for musical instruments is an open and shut case—they should never be restored or used. Every philosophy can devolve into a simple-minded fundamentalism, and there are those who indeed claim all restoration should stop. But fundamentalism oversimplifies to the point of absurdity, and worse, it turns a blind eye to the complexity of diverse situations. There is not just one value potentially inherent in old objects, but a variable mix of values. Each value argues for its own version of preservation, and sometimes, the balance tilts toward numbers three and four in our list of value types. That is, an object's main value may finally shift towards their aesthetic or utilitarian value. We now come to the example of pipe organs, many of which simply do not have the option of retirement. For them, the question will never be *whether* they will be restored, but *how* they will be restored.

One of the main problems in the conservation of musical instruments can be illustrated with organs. (fig. 3) Organs are largely wooden artifacts, and the members of our specialty group are mainly conservators of wooden artifacts, yet who among us knows enough of the arcane art and craft of

organ building, where a little air turbulence from an improperly leathered bellows can wreak havoc on the artistic results? Who knows how to run a smooth solder seam in lead-alloy pipes, or to discover an original tuning temperament by analyzing the damaged rims of old pipes? The point is that restoring organs in a way that is sufficiently informed by the organ building craft as well as the discipline of conservation, is virtually impossible by any one person. Such a practitioner would need a lifetime of organ building experience and another lifetime of conservation experience to pull it off. The logical solution is to make organ restoration a collaboration between conservation specialists and organ specialists. Again, this may be equally true of the conservation of many other musical instruments or other functional objects.

This is how we approached the restorative conservation of several organs in our collection, and another for the Museum of Fine Arts in Boston. For many condition issues, it is the organ specialist who knows the desired result, and who knows the traditional expedients for achieving that result. But as we know, there are numerous treatment alternatives for every condition problem. Once we

understand the desired result, we can draw from a skill set that offers minimally-intrusive alternatives toward the same restorative result. It will usually be the conservator that also understands the type of documentation that is called for. Such collaboration worked well in our treatment of these organs, and there was a useful exchange of specialized knowledge between the parties to the benefit of everyone, especially the objects themselves.

I must admit that part of the reason why these collaborations worked so well for us is that the instruments belonged to the museum, and it was the conservators who invited the organ builders to be involved. But for hundreds of years, organ restoration was, and generally remains, the purview of organ builders, few of whom perhaps understandably, are quite ready to admit they can learn anything from us about organ restoration. When negotiating treatment plans, there may be clashes of doctrine. After all, the restorer serves the god of Form, and the conservator is in the precarious situation of serving two gods, restoring Form while also preserving Substance. For many of the most respected restorers, it is an article of faith that materials, construction methods, and workmanship



Figure 3.
Chamber organ, maker unknown, England, ca. 1740–1760. Colonial Williamsburg collection.

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should be indistinguishable from the original, with rarely any thought to the risk of falsifying historical evidence. Yet there is a common ground that can be built upon at the outset so such differences can be solved before they destroy the collaboration. By anticipating the problem, solutions exist that can usually satisfy both sets of requirements.

Our next instrument is a grand piano made by the London firm of Broadwood in 1816. (fig. 4) Within a year after they made this piano, Broadwood made a virtually identical piano for the composer Ludwig van Beethoven, making this instrument an important vehicle for playing Beethoven and his contemporaries. If we look at the inherent values, we note that this piano rates highly in associative value because of its similarity to Beethoven's piano, and it rates highly in utilitarian value because it belongs to a university that can potentially give music students a valuable experience in hearing and even playing a period piano. But what about informational value? This instrument had a very different

kind of preservation than the Zumpe piano (our second example that had escaped past restorations). This one had been through two heavy-handed restorations during the twentieth century. Early in the century, the Chickering piano factory had performed a restoration, and another restorer did so in 1976, at which time the hammers were replaced with modern style felt hammers, leather components were replaced with Naugahyde, and the finish was supplemented with what appears to be three-pound cut, hardware-store shellac, applied very coarsely. Unlike the Zumpe piano we talked about before, the original parts most likely to beg for replacement in a restoration had long since been replaced. All of this tilted this instrument toward utilitarian value, and so we undertook restorative conservation to good playing condition.

With ruinous restorations in its past, does it really mean we don't have to worry about preserving any historical substance that might remain in the piano? Speaking for a moment as a musical instrument historian, I feel we should never

write off an object with even fragments of surviving evidence; while the object may have been mistreated, we can still take a restorative conservation approach to preserve what remains. More than some objects this piano is a palimpsest, a metaphor that is well worth reviewing from time to time. Most of us have heard about the Archimedes palimpsest, to take a celebrated example. It is a copy of a treatise originally written by Archimedes in the second century BC, surviving in a copy from the tenth century. Eventually, the tenth-century parchment was recycled, the Archimedes text scraped off, and a less important text written upon the parchment. In modern times, the early Archimedes text was rediscovered, and every available investigative method was used to squeeze from the parchment Archimedes' original words and diagrams.² Just because a text is incomplete

is no indication that it will not be of interest to future investigators. In some ways, all historic ob-



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Figure 4. Grand piano, John Broadwood and Sons, London, 1816. The College of William and Mary.

jects are palimpsests, having been overwritten by generations of users and restorers. Our job is to preserve the document, and where restoration is warranted, to undertake the work in a ways that minimize our tampering with historical evidence.

While we are on the example of this grand piano, consider one practical matter about stringed musical instruments and especially keyboards. Each string exerts several pounds of string tension, and with one or two hundred strings, this can add up to thousands of pounds of constant stress on an instrument that does not have the benefit of an iron frame as does the modern piano. One might imagine keeping a 2000 pound weight on any other piece of 200-year-old furniture. This reality for keyboard instruments has implications about the structural integrity of any glue joints we make during conservation, and about the importance of releasing string tension when an instrument is retired from musical use. One of the reasons we decided it was acceptable to restore this piano, was that the early twentieth-century restoration involved the intrusive installation of a steel I-beam on the underside of the piano. The I-beam was replaced in 1976 with a piece of beech wood that subsequently twisted and warped. We replaced the brace again with a new solid steel beam, the installation of which relied on the alterations of the first restoration, that is, no more original wood had to be cut and drilled to install it. This appendage substantially stabilizes this aging instrument against the tension of strings, though it should not be considered a standard conservation measure. It was an option for us since the intrusion of its attachment had already been made long ago.

Finally, some brief comments about some other instrument types. It is always a good idea to reduce string tension on members of the violin family if they are not being maintained in playing condition, but in the case of violins, a little bit of tension is required so that the internal sound post will not fall out of its critical position. (fig. 5)

Some instrument types resist restorative conservation (fig. 6). The neck of a harp, the curved part at the top, tends to distort from string tension, and the only restoration would be replacement. In terms of workmanship, a harp's neck is half of the instrument. The best solution for harps that have distorted over time is retirement from duty as a working instrument.

Playing historic woodwind instruments is especially problematic for at least two reasons. First, playing a woodwind instrument means infusing the center of a dry wooden tube with warm saturated air. Without some clever methods of preparing the instrument over days, if not weeks, for such use, and even with such preparation, the instrument is vulnerable to splitting as the moist inner wood expands faster than the outer part of the tube. Another issue with woodwind instruments is the tendency to eventually shrink in cross section, into an oval, causing problems to the joints and to its musical characteristics. Also, the mortise and tenon joints of woodwinds are usually wrapped with waxed thread to make the joint air-tight but moveable. The thread is likely to become uneven



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Figure 5. Detail of violin with sound post circled. Nathaniel Cross, London, 1727. Colonial Williamsburg collection.



Figure 6. Harp, George Froschle, London, 1793. Colonial Williamsburg collection.

in its pressure within the joint, and if you leave instruments assembled, such pressure can distort or split the joint. If it is necessary to leave a woodwind assembled, as for exhibit, consider making a dowel with soft spacers for the bore of the instrument (fig. 7) to hold it together gently without any thread in the joints.

In summary, the question posed in these meetings is whether conservation is compromised in using artifacts. It seems to me the question reflects some lingering confusion about just how narrow



Figure 7. Recorder, Urquhart, England, 1710–1740. Colonial Williamsburg collection.

is our definition of conservation. Using artifacts almost always does compromise *preservation*, at least when material evidence is the thing being preserved, but preservation is only one part of the rather more complex discipline we call *conservation*. Clearly, some musical instruments would suffer too much if restored and played, but part of our work as conservators is to provide restorative treatments, whether it is to make a chair a bit more presentable for exhibit, or to restore and maintain selected musical instruments in playing condition. The constant in our work is that all interventions follow professional standards in the preservation of historical evidence, and in a nutshell, that is what our profession brings to the ancient and evolving business of restoration.

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Notes

1. William D. Lipe, "Value and Meaning in Cultural Resources" in *Approaches to the Archaeological Heritage: A Comparative Study of World Cultural Resource Management Systems*. Edited by Henry Cleere. Cambridge University Press 1984. Ultimately, all value is extrinsic, but for present purposes I am using Lipe's taxonomy to identify artifact value that can be recognized by enough people that the value constitutes intrinsic value.
2. See: <http://www.archimedespalimpsest.org/> accessed 7-11-2006.