



An Alternative Technique for Applying Accession Numbers to Museum Artifacts

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SHORT COMMUNICATION

AN ALTERNATIVE TECHNIQUE FOR APPLYING ACCESSION NUMBERS TO MUSEUM ARTIFACTS

THOMAS J. BRAUN

ABSTRACT—For decades archaeologists and museum professionals have applied accession numbers to artifacts using a variety of methods. A common method has been the hand-numbering technique: a barrier layer is applied, over which the number is written in ink and after that has dried, another clear coating is applied. Recently, many archaeologists and museum professionals have sought alternative, more efficient methods for artifact numbering. This paper describes another technique that offers many advantages. The accession numbers are printed onto paper using a computer printer employing a small font, which is then cut out, and the paper label adhered to the artifact with an appropriate adhesive. This has many advantages over hand-numbering, though this paper recognizes that hand-numbering is still appropriate in many situations. In this alternative technique, the application of the numbers is a one-step process offering a large reduction in the amount of time required to label artifacts, and by extension, less handling of artifacts. Compared to hand-numbering, the legibility of the numbers is improved, even while the size of the numbers is reduced. Accession numbers can be printed from existing databases, which may reduce transcriptional errors. Additionally, the permanence of these labels is high, if certain procedures are followed when producing them. Lastly, this technique may require less manual dexterity than hand-numbering in order to properly and safely apply accession numbers. This technique may enable this task to be delegated to other staff members or volunteers. The purpose of this article is to document its use and provide specific details on its application to various types of objects, and to disseminate this information to the museum community as a whole.

TITRE—Une nouvelle technique pour la pose de numéros d'acquisition aux objets de musée

RÉSUMÉ—Depuis maintes décennies, les archéologues et les professionnels des musées ont numéroté les objets de leurs collections selon plusieurs différentes méthodes. Une approche populaire consiste à écrire le numéro à la main: d'abord une couche séparatrice

est posée, sur laquelle le numéro est inscrit à l'encre et après séchage, un revêtement protecteur est appliqué. Récemment, plusieurs archéologues et professionnels des musées ont recherché des méthodes différentes et plus efficaces pour la pose des numéros d'acquisition. Cet article présente une méthode différente qui offre plusieurs avantages. Les numéros d'acquisition sont imprimés sur du papier à l'aide d'une imprimante d'ordinateur utilisant un lettrage de petite taille, qui est par la suite découpé et collé sur l'artefact à l'aide d'un adhésif approprié. Cette approche possède plusieurs avantages comparativement à la numérotation à la main, même si cet article reconnaît que cette dernière demeure appropriée dans plusieurs situations. Cette nouvelle technique permet en une étape de réduire le temps requis pour numéroté l'artefact et implique moins de manipulation pour l'objet. Comparée à la numérotation à la main, la lisibilité des numéros est améliorée, bien que leur taille en soit réduite. Les numéros d'acquisition peuvent être imprimés à partir d'une base de données existante, ce qui peut réduire les erreurs de transcription. De plus, la stabilité de ces étiquettes est grande si certaines précautions sont prises lors de leur production. Enfin, cette technique peut requérir une dextérité manuelle moins grande que la numérotation à la main lors de l'application des numéros. Elle peut donc être utilisée par d'autres membres du personnel ou des bénévoles. L'objectif de cet article est de documenter son utilisation et de fournir des détails spécifiques des ses applications à plusieurs types d'objets, afin de disséminer cette information à l'ensemble de la communauté muséale.

TITULO—Una técnica alternativa para aplicar números de inventario a artefactos de museo

RESUMEN—Por décadas los arqueólogos y profesionales de museos han aplicado números de inventario a los artefactos de la colección utilizando una variedad de métodos. Un método común ha sido la técnica de numeración manual: se aplica una capa como barrera, sobre ésta se escribe el número en tinta, y después que esto ha secado se aplica otra capa de recubrimiento transparente. Recientemente, muchos

arqueólogos y profesionales de museos han buscado alternativas más eficientes para numerar los artefactos. Este artículo describe otra técnica que ofrece muchas ventajas. Los números de inventario se imprimen en papel usando una impresora de computadora con un tipo de letra pequeño, que luego se recortan, y las etiquetas de papel se adhieren a los artefactos con el adhesivo apropiado. Esto tiene muchas ventajas sobre la numeración manual, aunque en este artículo se reconoce que en muchos casos la numeración manual sigue siendo apropiada. En esta técnica alternativa, la aplicación de números es un proceso de un solo paso, ofreciendo así una disminución del tiempo requerido para colocar los números de identificación a los artefactos, e implica por lo tanto, menos manipulación de éstos. Comparado con el método de numeración manual, la legibilidad de los números es mejor, aún cuando el tamaño de las letras sea reducido. Los números de inventario se pueden imprimir a partir de bases de datos existentes, lo que puede disminuir los errores de transcripción. Además, la durabilidad de estas etiquetas es alta, si se siguen ciertos procedimientos al producirlas. Por último, esta técnica requiere menos destreza manual que la de numeración manual para aplicar apropiadamente y con cuidado los números de inventario. Esta técnica se puede usar para delegar esta tarea a otros miembros del personal o a voluntarios. El propósito de este artículo es documentar su uso y proveer detalles específicos sobre su aplicación a varios tipos de objetos, y disseminar esta información en toda la comunidad de museos.

TÍTULO—Uma técnica alternativa para aplicar números de registro em artefactos museológicos
RESUMO—Por décadas arqueólogos e profissionais de museu têm aplicado os números de registro nos artefactos usando uma variedade de métodos. Um método comumente usado é a técnica de escrita manual: uma camada de barreira é aplicada no objecto, o número é escrito à tinta sobre esta camada e, após sua secagem, um outro revestimento transparente é aplicado. Recentemente, muitos arqueólogos e profissionais de museus têm procurado métodos alternativos e mais eficientes para numeração de artefactos. Este artigo descreve uma outra técnica que oferece muitas vantagens. Os números de registro são impressos em papel usando uma impressora de computador empregando uma fonte pequena, os quais são então cortados, e as etiquetas de papel coladas nos artefactos com um adesivo apropriado. Isto traz muitas

vantagens sobre a escrita manual, embora este artigo reconheça que a escrita manual seja ainda apropriada em muitas situações. Nesta técnica alternativa, o processo de aplicação dos números se dá em uma só etapa, propiciando uma enorme redução do tempo requerido para etiquetar os artefactos, e por conseguinte, reduzindo o manuseio dos mesmos. Comparado à escrita manual, a legibilidade dos números é melhor, mesmo quando o tamanho destes é reduzido. Os números de registro podem ser impressos a partir de bancos de dados existentes, o que pode reduzir os erros de transcrição. Além disto, a permanência destas etiquetas é elevada, se determinados procedimentos forem seguidos ao produzi-las. Finalmente, esta técnica requer menos destreza do que a escrita manual para se colocar os números de registro corretamente e com segurança. Esta técnica pode ser usada para se delegar esta tarefa a outros membros da equipe ou a voluntários. A finalidade deste artigo é documentar seu uso e fornecer detalhes específicos para sua aplicação em vários tipos de objetos, e disseminar esta informação à toda comunidade de museus.

1. INTRODUCTION

It is critical for archaeologists and museum professionals to identify the artifacts with which they work. Archaeologists must record the stratigraphy and provenience information of the artifacts they excavate. Museum professionals need to record salient information about the artifact, store it, and later retrieve that information from storage. Accession numbers are applied to artifacts in order to facilitate these tasks. Whenever possible, these numbers should be securely attached to the artifact but not impossible to completely remove later if that becomes necessary. It is important to note that usually these numbers are not intended to act as a security device or to prove ownership in case of theft, though it is possible that they could assist in this manner (MDA web site 2003).

In the past, archaeologists and museum professionals have applied accession numbers to artifacts using a variety of methods. One of the most common has been to first apply a small area of a clear barrier layer using one of a variety of coatings such as Acryloid B-72 carried in solvent, Jade poly(vinyl acetate) emulsion adhesive, Rhoplex acrylic emulsion adhesive (known as Primal outside the U.S.), clear

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Fig. 1. Several examples of artifacts labeled by hand-numbering. The marble statuette on the left was labeled using black ink, the goat figurine in the center was labeled using white ink, and the oil lamp on the right side was labeled using white paint under the numbering, which was written in black ink. This photograph illustrates how three different artifacts may require three different hand-numbering techniques to apply accession numbers to them. In these three cases, usage of these techniques was dependant on the underlying color of the artifact. Photograph by the author

acrylic paint medium, lacquer, or another clear resin. After drying, the accession number is written on the surface of the resin using a soft quill pen or metal nib pen, with white or black ink or paint. In recent years, many have adopted the use of felt-tipped pens for writing accession numbers on the protective resin, as some pens were found to have at least the minimum level of permanence to light fading (Wood and Williams 1993; Munyer 1997a). Whether to use white or black ink or paint usually depends on whether white or black can be seen more easily given the color of the artifact—if the artifact is light, use dark numbers; if the artifact is dark, use light numbers. Alternatively, sometimes with dark-colored artifacts, a white layer of paint is applied over the initial resin and the numbers are written on this using black ink, paint, or a felt tip pen (fig. 1). Regardless, after the ink has dried, another clear coat of resin is applied over the number in order to protect it from abrasion and loss.

2. SOME LIMITATIONS OF HAND-NUMBERING

In recent years many archaeologists and museum professionals have sought alternative methods of applying accession numbers for a variety of reasons. Hand-

numbering is labor-intensive, time consuming, may be prone to transcriptional errors, and can be hard to read due to poor handwriting and uneven artifact surfaces. Different colored inks and paints must be used depending on the color of the artifact, which makes hand-numbering more laborious (fig. 1). Additionally, while soft quill pens rarely scratch artifacts, the metal nib quill pens that can be used to write numbers on the artifacts have been known to permanently scratch the surface of artifacts. For this reason, most recent descriptions of the hand-numbering technique do not recommend using metal nib pens.

While most black inks are fairly permanent, some fade over time. The white “inks” used to label dark artifacts are not true inks but white paints of various types. None of these white “inks” are as permanent as the best black inks. The use of poor quality lacquer and ink in the past is a cause for concern, as flaking, yellowing, fading, and even the loss of the entire number have commonly occurred, and the loss of an accession number can be a very difficult problem to rectify. For obvious reasons, inferior materials should not be used, such as fingernail lacquer and typewriter correction fluid. These products may contain any number of raw materials that can be changed at the will of the manufacturer and may be detrimental to the permanence or reversibility of the label.

Many fingernail lacquers are composed primarily of cellulose nitrate, which is known to be unstable and corrosive, particularly after aging for several decades, and can contain other unstable compounds such as plasticizers.

In the author's experience, many museum professionals have sought alternate techniques to hand-numbering as they have realized the difficulties and painstaking process of hand-numbering. When applying accession numbers to an artifact, one may assume that the accession number will remain on the artifact forever. Frequently however, the number may become outdated, damaged, or lost. At this point, a conservator is often asked to replace the accession number, or to move it to a less conspicuous location on the artifact. At this point the old, improperly-applied accession number is often discovered to be difficult or impossible to remove, or that the metal nib quill pen used to apply the number has permanently scratched the number into the artifact. Another common occurrence with artifacts improperly numbered without an isolating layer is that the ink has been irreversibly absorbed into the pores of the artifact.

3. AN ALTERNATIVE TECHNIQUE

An alternative technique has been employed by some museum professionals that complements proper hand-numbering and may offer some advantages over it.

The accession numbers are printed in a small font onto archival paper using a computer printer (figs. 2 and 3). The numbers are then cut out and applied to the artifact with an appropriate adhesive. The advantages of this technique are numerous, not least of which is that the application of the numbers is a one-step process, offering significant savings in time and reducing the amount of handling required. Compared to hand-numbering, the legibility of the numbers can be much improved, even while the size of the numbers is significantly reduced. The accession numbers can frequently be listed and printed directly from an already existing database, thus greatly reducing the possibility of transcriptional errors. However, diligence is still required to ensure that the proper label is attached



Fig. 3. Detail of the printed-paper label applied to the oil lamp in figure 2. Photograph by Eric Mortenson

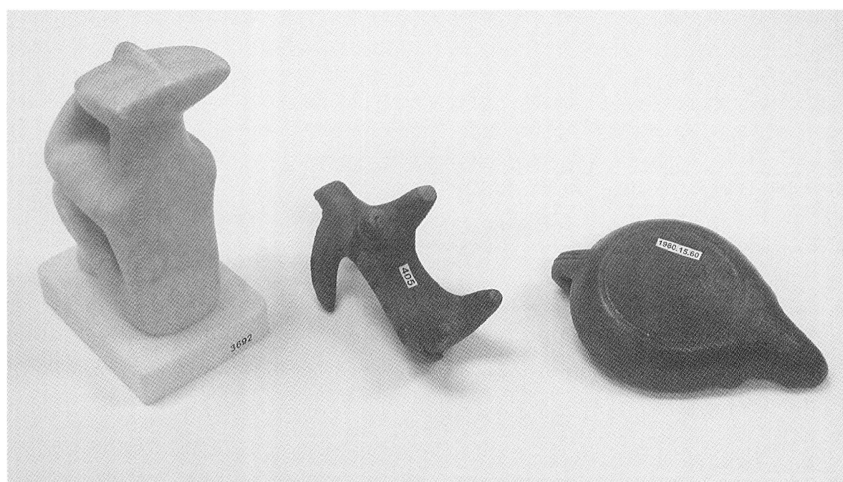


Fig. 2. The same examples pictured in figure 1, but now labeled with this alternate technique, using printed paper labels. All three artifacts were labeled using the same technique, rather than three separate techniques. Photograph by the author

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to the proper artifact, especially when dealing with large numbers of artifacts or with many similar artifacts. The permanence of these labels is high, if certain procedures are followed when producing them and if appropriate materials are used. Additionally, the same labels can be used for both light and dark colored artifacts, eliminating the need in hand-numbering to have both black and white inks. Lastly, this technique requires less skill and manual dexterity than hand-numbering in order to properly and safely apply accession numbers. As a result, when this technique is used, there are a greater number of staff members to whom the task may be delegated.

4. PREVIOUS WORK

The author has seen this technique used at many institutions, but has found no published works that thoroughly describe it. The purpose of this article is to document its use, provide specific details on its application to various types of objects, and to disseminate this information to the conservation and museum community as a whole. There are many publications describing methods of applying accession numbers to artifacts, although the majority of these appear to be produced regionally as informational pamphlets and are not widely published or available. All of the publications known to the author regarding the application of accession numbers to artifacts are listed in the References and in Further Reading sections at the end of this article. Some of these publications are more informative than others, and some of them have become outdated. While many come out of the field of archaeology, several are from the fields of registration, curation, conservation, and natural science. Only a few of these publications describe this new technique in any great detail (Segal 1998; Delfino 2000b; MDA website 2003; Cassman et al. 2007). It appears that natural history museum professionals have used laser-printed labels for many years in wet biological specimen storage with success. Snyder (1999) indicated that laser-jet labels are sensitive to solutions containing oily alcohol solutions. However, in a recent article, Zala et al. reported that the results of their 14-year study "provide no reason to suggest that laser-printed labels should not be used with biological specimen lots stored in 70% ethanol or 10% formalin" (2005, 55).

The labeling technique presented in this paper is not new. The author was first exposed to this technique while in graduate school in the fall of 1994,

during discussions within an archaeological internet discussion group. He was again exposed to this technique in 1998 while completing an internship at the Arizona State Museum in Tucson, Arizona. This technique reportedly had been used there since the late 1980s and early 1990s.

5. PROCEDURE

This artifact labeling technique involves printing the accession numbers in an appropriate and easily readable font style and font size onto paper. The printing must be completed on a specific type of printer and onto archival paper. The type of adhesive used is dependant on the substrate the label is to be adhered to, and how easily the number can later be removed from the substrate. Selecting a location on the artifact for the label is an important decision. The labels can easily be removed with a scalpel or solvents. The rest of this section will illustrate the details of each of these points.

5.1 NUMBERS

Often, accession numbers are applied (or reapplied) after conservation treatment has been completed. When done this way, the treatment is less likely to remove the accession number or disfigure it. The first step is to compile a list of the numbers needed to apply to artifacts. If only a few artifacts are being numbered, it may be easiest to just type these numbers directly into a word processing program. Alternatively, if there are a large number of artifacts to number at once, and a database has already been completed to track these artifacts, with minimal work most database programs can be manipulated to produce a list of accession numbers that can be printed.

5.2 FONT SELECTION

Several considerations need to be made in the selection of the font style, in finding fonts without serifs, and in deciding the font size. After the numbers are entered into the computer, select a font that is easy to read. Fonts that work well are block-letter fonts, such as Lucida Console, OCR A Extended, and Tahoma (see table 1). Avoid fancy or stylish fonts as these often can be unclear to the reader.

Table 1. A list of block fonts and other similar fonts, in their respective font styles*

Font name	Font numbers	Uppercase "i"	Lowercase "L"	The number "1"
Arial (bold)	123456789	l	l	1
Atlanta (bold)	123456789	l	l	1
Century Gothic (bold)	123456789	l	l	1
Franklin Gothic Demi	123456789	l	l	1
Lucida Console (bold)	123456789	I	l	1
Microsoft Sans Serif (bold)	123456789	l	l	1
OCR A Extended (bold)	123456789	I	l	1
Rockwell (bold)	123456789	I	l	1
Tahoma (bold)	123456789	I	l	1
Trebuchet MS (bold)	123456789	l	l	1
Univers (bold)	123456789	l	l	1
Utah (bold)	123456789	l	l	1
Verdana	123456789	l	l	1

*This table also illustrates the confusion that can occur between the letters i, L, and the number one. Of these fonts, Lucida Console, OCR A Extended, and Tahoma are the only fonts that clearly and visually differentiate all of these three characters.

“Sans-serif” fonts tend to be easier to read when very small font sizes are used for these labels. Also, if an accession numbering system uses both letters and numbers, one should pay particular attention to the numbers “1” and “7” in a font, because often they can look very similar. Additionally the number “1,” the uppercase of the letter “i,” and the lowercase of the letter “L” in many fonts look nearly identical, and can cause misidentification of a number or letter (see table 1). It is also important to note that the font name “OCR A Extended” is an abbreviation of “Optical Character Recognition,” and this font was designed specifically to avoid visual confusion of printed characters and to assist machines in the recognition of printed characters. Lastly, often a “bold” font style is preferable, as the lines of some font letters and numbers can be quite thin.

Frequently it is helpful to print several versions of the same accession number, each at a different font size. When the different-sized font numbers are printed, it is easier to find a label that best fits the size of the area on the artifact receiving the number. Font sizes from twelve to six points will fit most artifacts. The large 12-point font is often used for large items such as furniture, and the smallest fonts down to two or three points are used for very small archaeological artifacts such as on teeth or on the edge

Table 2. Sample Print Sizes of Accession Numbers

Font size 12	2004.4.22
Font size 11	2004.4.22
Font size 10	2004.4.22
Font size 9	2004.4.22
Font size 8	2004.4.22
Font size 7	2004.4.22
Font size 6	2004.4.22
Font size 5	2004.4.22
Font size 4	2004.4.22
Font size 3	2004.4.22

Note: An example of how the author prints various sizes of accession numbers, thus allowing one to be cut out that best fits in the space available. Additionally, note how the smallest numbers would be very difficult to hand write but are still readable, though admittedly may require magnification.

of a coin (table 2). One source suggests improving the legibility of these labels by increasing the character spacing by 0.3 or 0.4, depending on the type of word processing software being used (Cassman et al. 2007).

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5.3 THE PRINTER USED TO PRINT THE LABELS

It is important that labels used in this technique are produced xerographically. Most photocopiers and laser printers use the xerographic process, also referred to as the electrophotographic process or the reprographic process (Grattan 2000). Xerographic process copiers and printers use dry powdered toner, rather than liquid ink. Non-xerographic printers such as inkjet, bubble jet, dot matrix, and daisy wheel printers use liquid dyes and liquid inks, and these usually dissolve, smear, and run when exposed to liquids. This is a problem when liquid adhesive is applied to the labels to adhere them to the artifact. Additionally, copier inks and printer inks are generally not stable enough to withstand long-term exposure to light without fading, as opposed to copier toner and printer toner, which are less light-sensitive.

Xerographic printers use dry powdered toner, which is usually composed of approximately 90% acrylic or polystyrene polymer finely divided into particles between 8 to 15 microns in diameter. Usually the remaining ten percent will be made up of finely divided carbon black added as a pigment (Subt and Koloski 1987). Additionally, toners also may contain small quantities, usually less than 4%, of a variety of other ingredients, including charge control agents such as ferrite (Grattan 2000).

The xerographic process uses light or a laser to expose an electrically charged metal drum inside the printer or copier. The light changes the charge on the drum, and in turn, the drum attracts toner to it where the image is to be printed. Interestingly, toners used for laser printers and copiers are frequently not interchangeable, as each process requires a charge opposite the other (Grattan 2000). Regardless, the drum is heated to approximately 70°C so that the toner melts onto it, and when the paper is rolled tightly against the drum, the melted toner is absorbed into the surface of the paper, where it cools and sets in place (Subt and Koloski 1987).

Many studies have been conducted on the permanence of various types of photocopies, and the xerographic process has been firmly established as more permanent than alternative methods (Subt and Koloski 1987; Jones 1990; Australian Archives 1993; Grattan 2000). Carbon black pigment, since it is elemental, is impervious to fading by light, and although the acrylic and/or styrene polymer may degrade with

time, it will not lose adhesion due to light exposure except at extreme levels. What most often causes poor adhesion of toner to paper is a poorly tuned printer. The drum of a poorly tuned printer might not heat sufficiently to completely melt the toner, or the drum may not press the paper firmly enough to cause the toner to fuse onto the paper. There are various peel tests that can be used to test if a printer or photocopier is making permanent archival copies (Subt and Koloski 1987; Jones 1990; Australian Archives 1993; Grattan 2000; National Archives and Records Administration 1999). However, one of the most current and easily obtainable is available online from the United States National Archives, and is based on the work done by Subt and Koloski, and also by Jones. It can be found at www.archives.gov/preservation/technical/peel-test/html. Because the toner is melted into the paper in the xerographic process, it will not run when exposed to water like inks will, and toner also cannot easily be abraded from the surface of the paper. In fact, toner has been established as being more stable than the paper it is adhered to (Subt and Koloski 1987).

The author is not aware of any concerns about the component composition of a particular toner, but if there was concern, it might be elucidated by referring to the Material Safety Data Sheet (MSDS), which must be provided by the manufacturer. Some toners may contain ferrite as a charge-control agent, and these might be avoided due to concerns about corrosion and foxing, though the author is not aware that these problems have been observed. Also, for best quality copies use only the toners specified by the printer or photocopier manufacturer (Grattan 2000). Additionally, if an institution uses only inkjet or bubble jet printers, but there is access to a photocopier, labels can be printed on an inkjet or bubble jet printer, and then more permanent copies of the printout can be made on a xerographic photocopier. Finally, even labels produced xerographically should be tested by immersion in the chosen adhesive, in order to be certain that the toner is stable in the adhesive, as some toners are rumored to include dyes that are fugitive in liquids.

5.4 THE PAPER USED TO MAKE THE LABELS

Careful consideration should also go into the choice of paper used to make labels. Many common

office papers may contain lignin, optical brighteners, or other materials that can adversely affect their long-term permanence. For this reason, it is best to avoid these and instead use only high-quality papers such as those containing at least 25% cotton rag and little to no lignin or optical brighteners. If possible, avoid using papers with watermarks, as sometimes the toner will not adequately adhere to the areas of the watermark, since the paper is slightly thinner at the watermark and the toner drum cannot properly press against the paper here (Subt and Koloski 1987). ASTM standard D 3458-96 outlines the specific requirements paper must have to make "copies from office copying machines for permanent records" (Grattan 2000, 1). The paper with the best permanence in this standard is classified as "LE-1000" or "Type 1" and can be expected to last several hundred years under normal conditions. Standards such as this and ANSI/NISO Z39.48-1992 also outline minimum requirements for fiber content, lignin content, tensile strength, pH, tear resistance, accelerated aging, opacity, brightness, and other factors (Grattan 2000, 6). Any photocopy paper that adheres to these standards should suffice for numbering artifacts with this technique.

Some conservators might be tempted to use Japanese mulberry paper with this technique. However, most white office papers were designed specifically to be processed by printers and copiers, and to accept toner, and mulberry paper usually will not process properly through a printer or copier, nor will it accept toner as readily as white office papers. The author does not recommend using mulberry paper with this technique.

5.5 LABELS PRINTED ONTO CLEAR POLYESTER FILM

For applying accession numbers to transparent materials such as clear glass and clear plastic, a white paper accession label can be disfiguring or distracting to the viewer. In these cases a more discreet accession label can be made by photocopying the accession number onto a clear polyester film, such as Mylar D or Melinex (fig. 4). This type of polyester film can withstand the heat of the xerographic roller without melting, and the toner will adhere to it. Depending on the type of printer or photocopier used, experimentation may be necessary with polyester films of different thicknesses, as most copiers are designed to

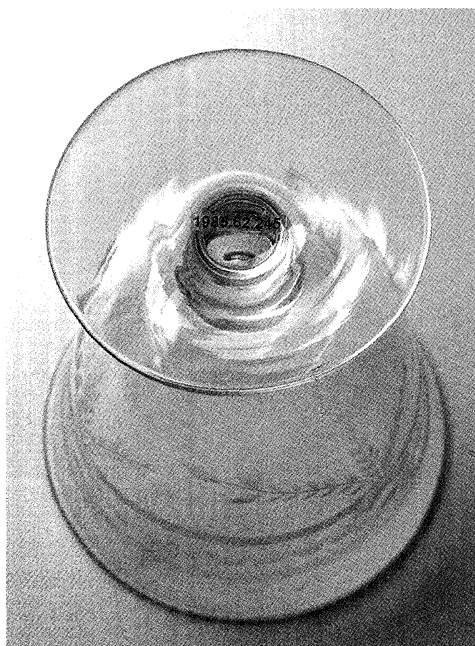


Fig. 4. Example of a clear polyester (Mylar) label applied to a glass artifact (near the pontil mark). This technique allows for more transparency, making the label less apparent to the audience. Additionally, by placing the label in the hollow concavity on the underside of this cup, it is protected from abrasion when the artifact is upright. Photograph by Eric Mortenson

accept paper sheets of a specific thickness. Because of its non-porous nature, polyester can be more difficult than paper to adhere to glass or plastic, but a poly(vinyl acetate) emulsion adhesive such as Jade 403 usually works well, and it will not be difficult to remove from most types of plastic and glass. Care should be taken not to use overhead transparency film or cellulose acetate film, due to concerns about permanence. Transparency films may contain unstable coatings, and cellulose acetate films can degrade and release acetic acid. Additionally, manufacturers may change the raw materials used to manufacture these films, which can lead to poor permanence.

5.6 POSITIONING THE LABEL ON THE ARTIFACT

Once the numbers have been printed, they are cut out using a paper cutter or scissors. One source

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recommends rounding the corners of the labels, if possible (Cassman et al. 2007). Before the label is attached to the artifact, carefully examine it and decide where to place the number on the artifact. This should not be done cursorily; consider asking others for their opinions, including curators, owners, registrars, clients, collection managers, art handlers, and others. Ideally, everyone should be able to agree on the best location for the accession number. This is especially important on large artifacts, where the accession number may be hard to locate, which may lead to its being applied repeatedly over time in multiple locations—something it may be desirable to avoid. Often the best location is out of sight of the audience or observer, but also easy to locate for those museum staff members or others who regularly access the artifact. Sometimes rules and guidelines in this manner do not apply to large, fragile, or difficult to move artifacts, where the label will be located in a more obtrusive location, thus facilitating its discovery by museum staff and reducing handling.

A good guide on where and how to place labels on artifacts can be found in Segal (1998, 78–85), but the author can also provide a short description on how it is done at his employer. At the Minnesota Historical Society, staff members have established guidelines on where to apply accession numbers on artifacts. Due to the large diversity of artifacts found in today's museums, guidelines such as these are inherently difficult to establish, and people labeling artifacts are best advised to understand how these numbers will be used by other staff members in order to guide them to where on a typical artifact the accession number should be applied. It is important that all people applying accession numbers in a given institution understand and agree on these guidelines, which makes them more useful to all staff members. The best advice to people labeling artifacts is to "use common sense," but beyond that, there are some general guidelines that can be followed (Cagley 2006; Delfino 2004).

Clothing is usually labeled by sewing a strip of cotton twill tape to the fabric, having first had the accession number written on it with a permanent marker such as the Sakura Micron Pigma pen, in the same manner described in numerous sources (CCI Notes 1994b; Segal 1998; Mailand and Alig 1999; Delfino 2000a, 2000b, 2004). The labels are usually sewn inside the center back of the neck or the inside center back of the waistline, though not obscuring any existing labels. Hats are labeled inside the center back, where the crown and the brim meet. Long, flat or

large textiles are labeled in the back lower right corner. Fragile or fragmented textiles are labeled on their storage supports. Textiles in poor condition should not be sewn into, as the needle may fracture the fibers. Fine basketry is labeled on the bottom or the back, depending on the structure, or the twill tape can be sewn into a loop around a handle or other strong and stable loop of weaving (Delfino 2004).

Three-dimensional objects are probably the most difficult to assign labeling rules, as they take all shapes and sizes. Usually the back or the bottom of an artifact is a good place to consider, or anywhere else that is unobtrusive. At the Minnesota Historical Society, staff usually label artifacts in the lower right-hand rear corner if possible. The numbers are applied in less photogenic locations of the artifact, as these areas are less likely to be visible during exhibit. The selected position avoids the label covering maker's marks, craftsman's hallmarks, or parts of the design of the artifact. Archaeological labels are not applied on diagnostic parts of artifacts, as this can make the artifacts harder to analyze later. As an example, placing accession numbers over broken surfaces such as ceramic sherd break-edges can make later analysis of the temper difficult, or make reassembly problematic. For stone tools, the label is applied to the least-worked side, or on the cortex of the stone if it is still visible. For clear or transparent artifacts, a clear label is applied (described above in section 5.5), on an edge or under a thick piece of glass where it is less likely to be observed.

Paper artifacts and photographs are labeled on the verso, in the lower right corner, using a pencil of hardness 2H, 3H (for hardy papers), or 2B (for soft papers). On photographs, numbers are placed on the margins, not behind the image area. Documents printed on both sides should be labeled on the side less likely to be used for exhibit. The pencils should be neither excessively sharp nor dull, and the writing should be done on a hard surface to ensure that the imprint of the writing does not telegraph through the paper. If a mistake is made in labeling the document, a white vinyl eraser can be lightly used to remove it. Table 3 provides guidelines for adhesive type and label location for different materials in a convenient chart.

Frequently, tweezers can be used to immerse the label into a particular adhesive. Any excess adhesive is wiped off the label prior to application. Leave a film of adhesive on the top surface of the paper label, to act as a protective layer and prevent abrasion and soiling. The label is then placed on the artifact and positioned

Table 3. A table for determining in general where to apply accession numbers to artifacts (adapted from Delfino 2004, with permission)

Material Type	Label Type	Label Location
Glazed ceramics, glass, metals, stone, ivory, bone	Paper label adhered with B-72 in acetone	Unobtrusive area, usually the bottom or the back
Some kinds of basketry, wood, shoes without leather soles, some plastics	Paper label adhered w/Rhoplex AC-33 (Primal), or Jade 403	Unobtrusive area, usually the bottom or the back
Leather or skin (fur), heavily corroded metals, unglazed ceramics, and other porous surfaces	No adhesive; use a paper tag and string or a loop of cotton twill tape	Unobtrusive spot that will not be harmed by the string; tie loosely
Plastics, wax, lacquered surfaces	Paper label adhered with Rhoplex AC-33 (Primal), or Jade 403	Unobtrusive area, usually the bottom or the back
Clothes with neckline or waistline	No adhesive; use cotton twill tape	Sewn inside center back of neck or waistband
Hats	No adhesive; use cotton twill tape	Sewn inside center back, where crown and brim meet
Socks, gloves	No adhesive; use cotton twill tape	Sewn inside the opening
Flat, long, or large textiles	No adhesive; use cotton twill tape	Sewn to the verso, lower right corner, if verso is discernable
Fine basketry	No adhesive; use cotton twill tape or a paper label and string	Tied to an unobtrusive area, usually bottom or back
Paper, photographs	Hand-number the artifact with a pencil	Verso, lower right corner
Fragile or fragmented objects	No adhesive; use a paper tag and string or a loop of cotton twill tape	Do not label the object itself, label the storage support instead

with the tweezers. Sometimes it is necessary to absorb excess adhesive around the label with a dry cotton swab. Allow the label to air dry for several hours.

5.7 THE ADHESIVES USED TO ATTACH THE LABELS

A variety of adhesives can be used to apply the label, depending on the substrate of the artifact. Certain adhesives are more appropriate than others for different artifacts. The author has found four adhesives that have served him well in all situations: wheat starch paste, Acryloid B-72 in various solvents (usually acetone), Jade 403 poly(vinyl acetate) emulsion, and

Rhoplex (Primal) acrylic emulsion. Do not use fingernail lacquer ("polish"), typewriter correction fluid, Elmer's white glue, or other commercial adhesives.

For certain three-dimensional objects made of paper it may be appropriate to apply a paper label with wheat starch paste. Wheat starch paste also works well for other cellulose-based artifacts such as baskets, or artifacts made of plants, cardboard, unvarnished wood, and tree bark.

For substrates such as glass, ceramic, and metal, Acryloid B-72 in acetone works well, though make sure that the adhesive will not be absorbed into the pores of the artifact, where it is more difficult to remove. A common problem with B-72 in acetone when applying these numbers is the formation of small

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bubbles during drying of the label. This indicates that there is too much acetone in the B-72 solution, and the solvent loss due to the evaporation of the solvent is causing the bubbles to form. If the amount of acetone in the solution is decreased, the problem will be reduced or eliminated. Alternatively, other solvents can be added that evaporate more slowly than acetone yet still dissolve B-72, such as amyl acetate, ethyl acetate, toluene, xylenes, or a small amount of alcohol. Of course, these solvents may cause other problems with the solubility of the artifact or with health and safety concerns, so they should be used only with caution. Excessive toluene or xylenes will also cause the polystyrene in the toner to dissolve and run. Aqueous adhesives such as poly(vinyl acetate) emulsions (e.g., Jade), or aqueous emulsions of Acryloid B-72 (e.g., Rhoplex or Primal) also work well on many substrates, especially those sensitive to solvents such as acetone (e.g., painted artifacts, certain plastics, and varnish-coated artifacts). However, these emulsions are not considered reversible when used on paper, most cellulose-based materials, and also on leather. Some substrates can be very difficult to get anything to adhere to, such as plastics and glass, but the author has found Jade 403 or Rhoplex (Primal) to usually work well. It is helpful to apply the accession number in a shallow protected area that will not bear abrasion when the artifact is set down. For example, many glass and ceramic vessels have a concavity on the underside, and the label is best applied here rather than the rough base that touches the surface it is stored or displayed upon (fig. 4). In general, avoid using aqueous-based adhesives on most metals, as the water phase can cause corrosion and staining of the label. It is best to use solvent-based adhesives on most metals, with the possible exception of the less reactive metals such as gold and the platinum series of noble metals (ruthenium, rhodium, palladium, osmium, iridium, and platinum).

Objects made of certain materials such as wax, lacquer, certain glasses, Teflon, and many other plastics, have surfaces to which it can be hard to find any adhesive that will adhere. In these cases, a tag should be tied to the artifact if possible. Artifacts that are highly porous, rough, friable or corroded should also not be labeled directly, as the adhesives are likely to get drawn into the pores. Leather, fur, and skin are particularly problematic substrates to label, and the author does not recommend labeling them directly if this can be avoided, as most adhesives will permanently stain the artifact, with rare exceptions such as patent leather. Leather, fur, and skin should be labeled

with a paper tag and a string, attached to a strong anchor point on the artifact. If this is not possible, the tag can simply be stored right next to the artifact in storage. Another possibility is to use a high-viscosity adhesive to create a nap bond to a sueded leather surface, or to the flesh side or polished leather. For this instance an adhesive such as Lascaux acrylic adhesive 360 HV (a water-based acrylic emulsion) might work well. Accession numbers applied with this adhesive can be removed mechanically or with solvent vapors. At times it may be more appropriate to only label the housing the object is stored in, which is also helpful in reducing handling (Cagley 2006).

5.8 CASE STUDIES

Case studies of the application of accession numbers are not presented here because this has been done well in many easily obtainable sources, including: Dudley and Wilkenson 1979; Wolf and Denton 1985; Fenn 1993; Sullivan and Cumberland 1993; CCI 1994a, 1994b; Alten 1996, 1998; Munyer 1997a, 1997b; Alten 1998; Segal 1998; Mailand 1999; Delfino 2000a, 2000b, 2004; and www.mda.org 2003.

5.9 REMOVAL OF THE ADHESIVES USED TO ATTACH THE LABELS

As always in conservation, whenever applying accession numbers, take into consideration the potential that the accession number label may need to be removed from the artifact at a later time. Removal of paper labels is usually very straightforward. If the artifact can withstand exposure to solvents, a swab, small poultice, or a solvent gel containing the solvent used to apply the adhesive will usually work. If mechanical removal is necessary, the author usually uses a sharp #15 scalpel blade at a very low angle to pry up the edge of the paper label. Frequently, the entire label will then cleave off, though sometimes it is necessary to peel it off with a tweezers. If the paper "skins" and leaves some paper fibers adhered to the artifact, the rest can be removed with swabs of the appropriate solvent such as acetone or ethyl alcohol, or if the artifact is sensitive to the solvents, it can be further removed mechanically with a scalpel blade at a low angle. Usually a small amount of adhesive residue will remain, which can usually be removed with a swab of an appropriate solvent.

6. CONCLUSION

While the procedures outlined in this paper are quite simple, they can be of great assistance to museum professionals who need to label their collections. This method complements other previously described methods of labeling artifacts, while helping to improve the readability of the labels. Since it is a one-step process, it offers significant savings in time, and a reduction in handling. A major benefit is the reduction in the size of the label, combined with an improvement in the legibility of the label. Permanence should be equal to or greater than that of hand-numbering. Additionally, since this technique requires less skill, a wider range of associates can complete the task. It is hoped that this article will be disseminated to museum professionals who are seeking more efficient methods of labeling their collections.

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