

A Guide to Pottery Reconstruction

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A. Ethical Considerations

In the conservation field, “less is better,” and ensuring the stability of artifacts is the primary concern. This may include cleaning and consolidating disintegrating materials. If consolidation of friable pieces is necessary, seek the advice of a professionally trained conservator. Mending or reconstruction and restoration of pottery vessels are secondary considerations because they are not necessary to ensure the stability of pottery under curated storage conditions.

A distinction is made between reconstruction or mending and restoration. Mending or reconstruction is undertaken to obtain data on vessel form and size, and for purposes of “crossmending,” to establish associational and chronological relationships among strata and features within a site. Restorations are usually carried out for purposes of exhibit, and may include infill of missing portions of the vessel to present a more complete artifact. Ideally, all procedures of mending or restoration should be reversible.

Some pottery vessels will be too fragmentary, with too many missing pieces to be mended successfully without further restoration of missing areas. A reconstructed vessel with many voids, or one that is friable and fragile will be better off boxed as sherds or fragments for curation and storage purposes.

In deciding to reconstruct a whole or partial vessel from a pile of sherds you should also consider whether or not the storage facility can accommodate the extra storage space that such vessels will require.

Detailed notes describing what was done to a pottery vessel (the type of adhesive, method of consolidation, etc.) must be recorded and provision for long term curation of such notes must be made. This information is necessary for ongoing care of the objects, and is critical should the need for further mending arise.

B. Before You Begin

1. All sherds must have been thoroughly cleaned.
2. All sherds must be labeled with a provenience number or catalogue number. The exception to this “number every sherd” rule is if all the pieces to a given vessel have the same provenience. In this case, only one sherd needs to be labeled and your notes must specify that the given number applies to all of the sherds.

Decorated sherds should be labeled on their undecorated side. Plain sherds should generally be labeled on the interior surface unless the vessel form is a plate or shallow dish, in which case the reverse applies. Labels should be placed close to the center of the sherds,

or near an edge, away from corners, as a corner may need to be broken off for technological analysis.

3. *Strategy.* One must try to know where every piece goes before gluing. It is helpful to photograph the proper arrangement of sherds. You may also wish to make a 2-D map of the pottery vessel by laying out the sherds in 2-D jigsaw puzzle form and tracing the outline of each piece in its proper position (Figure 1).

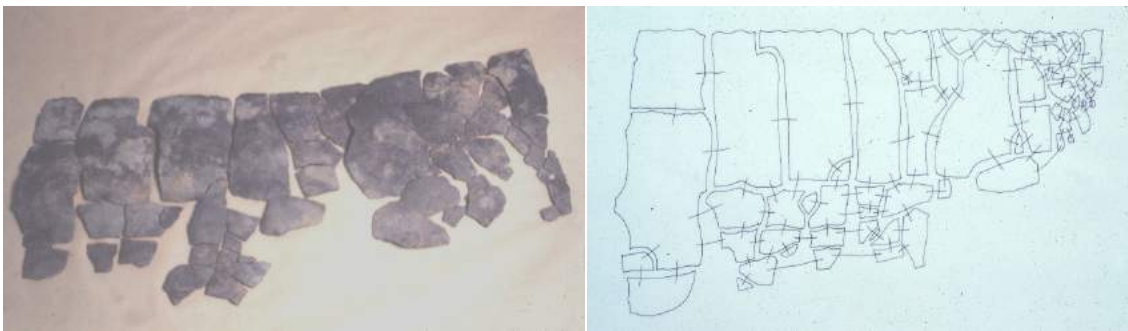


Figure 1. A 2-D layout of sherds to mend and map created to guide mending.

Mending should start with the vessel base, working up to the rim. There are exceptions to this rule. If basal sherds are missing, mend the pot upside down, working up from the rim. This also applies if the vessel has a restricted vessel mouth or opening. Since pottery vessels often warp when they break, a pot may not go back together perfectly. It is therefore easier to accommodate the lack of a good join at a less conspicuous area, such as the vessel base.

Do not create an acute angle during mending (Figure 2). It is nearly impossible to fit other sherds into such spaces, and a proper fit is usually not possible without causing serious damage or abrasion to sherd edges.

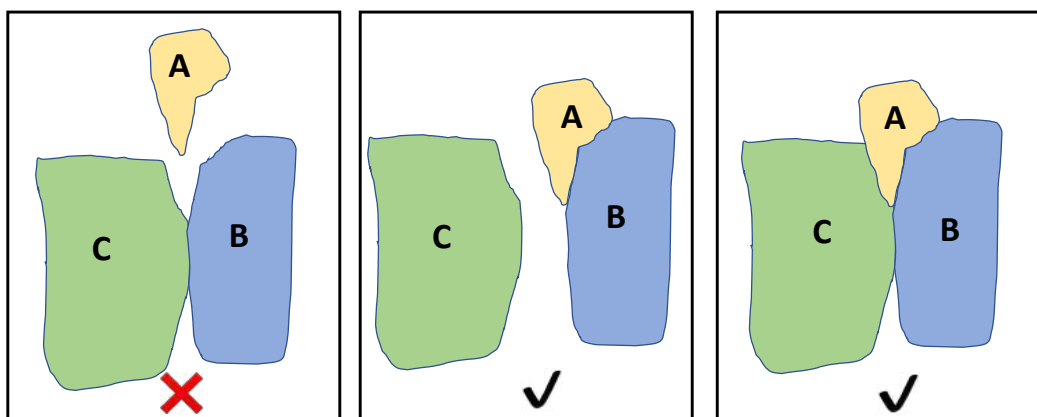


Figure 2. Correct order of sherd mending to avoid acute fit angles. Mending sherd B to sherd C first would make it difficult or impossible to fit sherd A. Instead, mend A to B, and then add C.

4. Clues to putting the pieces together
 - fresh breaks
 - design/decoration
 - vessel wall orientation of rim sherds
 - paste texture
 - paste composition
 - paste color (surface and core or cross-section)
 - sherd thickness

C. Materials/Supplies

- paper or note cards or laptop for recording the mending procedure
- box of coarse sand (>1mm diameter)
- soft bristled brushes (paint brush, tooth brush) for cleaning sherd edges
- fine paint brushes for consolidating sherd edges
- Suitable adhesive
- Cotton swabs or rags or paper toweling for clean up
- Water or solvent supply
- Sand bags/props
- Wooden clothes pins

Selecting a suitable adhesive

A suitable adhesive should remain flexible for a while after setting for purposes of adjustment of joins as new pieces are added. It should dry clear, and not yellow or change color with age, heat, or light. It should not shrink when dry or with age, and remain flexible. It should be stable under storage conditions; some glues react to heat and light and change their molecular structure with time, ultimately having destructive results.

Many professional conservators recommend Acryloid B-72 for mending sherds. It is soluble in acetone. However, it has a very short working range. It becomes stringy with evaporation, constantly needs thinning with more solvent. Also, acetone should be used under a fume hood. For these reasons, we at the FLMNH use an archival (acid neutral polyvinyl acetate or PVA) white glue that is soluble in warm water. This type of glue is available from a number of vendors, including Gaylord Archival and Lineco.

D. Mending Procedures

1. Map out the pottery vessel and plan the strategy for its reconstruction, as described above.
2. Before gluing, carefully brush the sherd edges free of dirt/dust to ensure the tightest possible joins (sherds with dirty edges will not stay mended).
3. Coat the edges with a dilute glue mixture; this will strengthen the joins.
4. Apply or paint a thin line of full-strength glue to each broken edge and press the two sherds together; pull apart for a few minutes and then fit them together again.
5. Wipe off any exuded glue immediately with a damp rag or cotton swab.
6. Use gravity to hold the sherds together until the glue sets and dried by balancing the smaller piece on top of the larger piece in the sand box (Figure 3). Sometimes wooden clothespins may be used to maintain the proper alignment of mends while the glue is setting.
7. Do not attempt to add any more pieces to these until the glue has firmly set.
8. To soften a join for adjustment, inject or swab the solvent into the join repeatedly until the join is flexible.
9. When the vessel is completed, double check to make sure all excess glue drips or smears are removed. Warm water works better than cold in cleaning up white glue smears.
10. For support, mended and restored vessels should rest on foam rings of archival polyethylene (Brand name Ethafoam) and be stored inside or under polyethylene bags to prevent dust accumulation. Notes describing treatments or modifications should be permanently curated with any other written documentation.



Figure 3. Mended sherds resting in sandbox to dry. Angle in the sand so that top sherd remains in contact with bottom sherd through gravity.

E. Final Thoughts

1. Patience. Pot mending is like a 3-D jigsaw puzzle with some of the pieces missing, and this can be a source of frustration. It is better for only one person to work on mending a particular vessel for purposes of consistency and continuity. When trying to sort out the placement of sherds, periodic breaks are recommended. Being away from the vessel for a while will freshen one's perspective and ultimately speed the mending process. The potential for mistakes and sloppiness increases if vessels are mended in a hurry. Dismantling a vessel in order to correct mistakes or sloppiness can be quite destructive to sherd edges. Patience is required so that proper mends can be achieved the first time around.
2. Extra tips/reminders
 - If you are unsure about a fit between sherds, do not glue them together.
 - Do not create an acute angle during mending.
 - Do not grind sherd edges or otherwise tamper with the sherds to achieve a better fit.
 - Do not put freshly glued sherds in the sand box sideways, or sand will stick to the join.
 - Do not use cellophane tapes, masking tapes, or tapes of any kind to reinforce joins while the glue is setting. Tapes leave a permanent, insoluble stain on sherd surfaces.

F. References

Bachmann, Konstanze

1992 *Conservation Concerns: A Guide for Collectors and Curators*. Smithsonian Institution Press, Washington, D. C.

Buys, Susan

1993 *The Conservation and Restoration of Ceramics*. Butterworth-Heinemann, Oxford, p. 20.

Conservation Research Laboratory, Texas A&M University

n.d. Conservation of Pottery: Removal of Salts and Stains. Electronic document, <http://nautarch.tamu.edu/CRL/conservationmanual/File4.htm>, accessed August 20, 2019.

Cordell, Ann S.

1983 Procedures and Annotated Bibliography for Conservation of Ceramics. In: Conservation of Archaeological Materials: A Laboratory Manual for Prehistoric and Historic Collections, edited by Charles F. Fairbanks, pp. 63-78. *Florida Journal of Anthropology Special Publication* Number 1.

Craft, Meg

1992 *Decorative Arts. In Caring for Your Collection*, edited by Arthur W. Schultz and Huntington T. Block, pp. 97-107. Harry N. Abrams, Inc., New York.

- Cronyn, Janey M.
2002 *The Elements of Archaeological Conservation*. Routledge, London.
- Dowman, Elizabeth A.
1970 *Conservation in Field Archaeology*. Methuen and Co., London.
- Field Museum
n.d. Restoring Pottery. Electronic document,
<http://www.fieldmuseum.org/science/research/area/conserving-our-collections/treatment/restoring-pottery>, accessed August 20, 2019.
- Hatchfield, Pamela
2002 *Pollutants in the Museum Environment: Practical Strategies for Problem Solving in Design, Exhibition and Storage*. Archetype Publications Ltd., London, pp. 98–100.
- Keel, Bennie C.
1963 The Conservation and Preservation of Archaeological and Ethnological Specimens. *Southern Indian Studies* 15.
- Koob, Stephen
1986 The Use of Paraloid B-72 as an adhesive: its application for archaeological ceramics and other materials. *Studies in Conservation* 31: 7–14. [doi:10.1179/sic.1986.31.1.7](https://doi.org/10.1179/sic.1986.31.1.7).
- 1979 The Removal of Aged Shellac Adhesive from Ceramics. *Studies in Conservation* 24: 134–135. [doi:10.1179/sic.1979.015](https://doi.org/10.1179/sic.1979.015).
- Little, Margaret
2000 *Chapter 5: Ceramics and Glass*. In *The Winterthur Guide to Caring for Your Collection*, edited by Gregory J. Landrey, pp. 57-66. University Press of New England, London.
- Plenderlieth, H. J. and A. E. A. Werner
1976 *Conservation of Antiquities and Works of Art*. 2nd edition. Oxford University Press, London.
- Sayer, G (1951). *The Potteries of China*. Routledge, London.
- Singley, Katherine R.
1981 Caring for Artifacts After Excavation—Some Advice for Archaeologists. *Historical Archaeology* 15(1):36-48.
- Williams, Nigel
2002 *Porcelain: repair and restoration, a handbook*. The British Museum Press, London.