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Author(s): Moore, S. J.

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Problems with glass museum jars solved.

S.J.Moore,
Department of Zoology,
British Museum (Natural History),
Cromwell Road,
London SW7 5BD.

Abstract.

Old and current techniques have been modified to produce an efficient routine for curators whose spirit collections are displayed in sealed glass jars. Problems of mounting wet specimens to glass are overcome and a technique for preparing lids and mounting plates is described. A tidy and reliable sealing technique is revised.

A museum collection usually contains a large number of spirit preserved specimens that give museum workers an unending task of refilling where evaporation has taken place. To reduce evaporation, sealed containers are necessary and as spirit softens many plastics, glass display jars are coming back into widespread use. Many old jars will have been sealed by a variety of materials including bitumen for its fine black finish, or Stockholm tar and red lead (lead sesquioxide). Unfortunately both sealants are rather messy for the preparator to use, the latter is toxic. Although the seals look good, they are usually effective only for a limited number of years before they deteriorate, becoming brittle and flakey. Leaks result and if the jar is lying down, it may empty rapidly resulting in dried out and distorted specimens.

The methods described below have been developed for sealing jars in the comparative anatomy collection of the BM(NH). The formula for the gelatin sealant was found written in one of the museum's old day books. The celloidin specimen-mounting technique was passed on by word of mouth and has since been improved to be longer lasting and easier to apply than previously.

Rehydration of dried-out specimens. (Cleave & Ross 1947).

1. Carefully remove the dried specimen to a warm bath of 0.5% to 2% solution of tri-sodium phosphate in distilled water. (The concentration of the solution must be decided according to the size and nature of the specimen. Distilled water must be used as tap water forms gel particles with the phosphate).
2. Incubate at 30°C until the specimen is suitably soft for represervation. As rehydration may occur within 10 minutes or several days; the specimen must be checked regularly.
3. Wash the specimen thoroughly in distilled water and then in tap water to remove all traces of the phosphate solution.
4. Immerse the specimen in Steedman's fixative for several days.
5. Rinse in water and transfer the specimen to Steedman's post-fixation preservative. If alcohol preservation is required, the specimen must be fixed and then gradually dehydrated from 30% alcohol to the desired grade leaving enough time in between each change for the specimen to have become saturated in that grade of alcohol.

Steedman's fixative.

5 ml of propylene phenoxetol is dissolved in
25 ml of propylene glycol. To the mixture add
25 ml of formalin and dissolve the mixture in
445 ml of distilled water.

For larger amounts:-

100 ml of propylene phenoxetol
500 ml of propylene glycol
500 ml of formalin (40% formaldehyde solution)

Dissolve 110 ml of this concentrate in 890 ml of distilled water - pH 6.8-7.0, non-hardening, non-shrinking, slightly swelling of tissues.

Steedman's post-fixation preservative.

5 ml of propylene phenoxetol is dissolved in
50 ml of propylene glycol, mixture dissolved in
445 ml of distilled water.

If making a 1% aqueous solution of phenoxetol, ensure that the water is hot, not boiling. Stir in the phenoxetol until dissolved. The addition of phenoxetol to cold water causes the formation of an irreversible colloid. Phenoxetol is avaliable from:- NIPA Laboratories Ltd.,
Treforest Industrial Estate,
Cardiff,
S.Glamorgan, WALES.

Mounting specimens.

At times, specimens become detached from their mounting plates making it necessary to remove the sealed lid and to re-attach the specimen. If it is small, fragile or there are many small specimens, they must be attached to the mounting plate without using thread.

To remove lids:

1. Remove the gelatin blob seal and "cork" from the filling hole with a blade. Wash the jar in warm water taking care not to lose any exterior labels.
2. Invert the jar into a shallow pan of warm water, allow the gelatin to hydrate (about 30 minutes). Return the jar to an upright position and carefully prise up the lid with a blunt scalpel by inserting the point into each corner.
3. Clean off old gelatin from the lid and edge of jar. Clean out the jar removing any unwanted objects and keeping interior labels.

To repair broken and detached small or soft specimens without thread:

Reagents required - 50-50 mixture of diethyl ether and isopropanol
"Necoloidine" (B.D.H.) diluted to 1% with above solvent)

1. Remove the specimens and mounting plate from the jar. Dry the plate and ensure that the specimens are not too moist.
2. Apply the ether-alcohol solvent to the specimens on the mounting plate. Arrange the specimens, or broken parts, as desired keeping them moist with solvent.
3. Carefully drip diluted celloidin (Necoloidine) around the specimen taking care not to breathe on the mixture or it will become opaque. Allow the mixture to dry until the surface has gelled (about 30 - 60 seconds at 20°C).
4. Slowly replace the plate and attached specimens into the jar filled with alcohol which will gel the celloidin to a colourless mastic film.
5. Leave overnight to check that the bond is firm before sealing the jar.

To make glass lids.

1. Dip a glass cutter into a flux of 20% camphor in xylene. This will reduce friction during cutting and will produce a cleaner cut.
2. Hold the cutter perpendicular to the glass and make a single firm stroke across it. Take care not to run over the edge of the glass as it will chip. For cuts of more than several inches, a straight edge must be used.
3. Tap the glass from underneath the cut groove until a fracture line appears and runs along the length of the cut. The glass will either break free or may be slapped across the edge of a bench, holding one end in a cloth. (This is useful for thicker pieces of glass).
4. Rub the corners and cut edges with an old oilstone until the glass is safe to handle.
5. Using a grinding mixture of medium carborundum powder in watered-down glycerol, rub the lid against this on a plate-glass lapping plate, using a circular motion until a smooth ground-glass surface is obtained. The key of the ground glass helps to provide a good seal.

To drill holes in lids and mounting plates.

1. A worn-out triangular cross-section file is sawn into two inch lengths and one end is sharpened into a tetrahedral point using a grindstone. Heat each bit in a bunsen flame until it glows cherry red (correct tempering temperature) and plunge it into cold water. A well-tempered bit will last for well over 20 holes.
2. Mark the glass with a writing diamond to locate the position of the hole.
3. Moisten the area marked on the glass with some camphor-xylene flux and hand drill straight into the glass, applying the mildest pressure, to establish the hole centre. Rotate the drill handle in a circle, whilst drilling, at ever increasing angles so that a conical pit is formed in the glass. Occasionally return the drill to the vertical and keep the area moistened with flux.
4. The progress of the hole can be observed through the edge of the glass. Eventually a light click will be felt or heard. Do not apply any pressure to the drill as this stage is approached or the glass will break.
5. Turn the glass over and drill vertically onto the hole to remove the sharp edges. Wash the glass.

Sealing of jars using gelatin sealant.

1. Weigh out 112g of gelatin sheet and soak it in water overnight to hydrate it.
2. Dry the hydrated sheets in a cloth to remove excess water, then measure out: 24 ml of glycerol & 12 ml of glacial acetic acid.
3. Heat the gelatin gently in a fume cupboard until it has melted. Stir it to prevent burning and add the acetic acid and glycerol already mixed together. Remove the heat and continue stirring until well mixed. Pour out the mixture onto a metal tray and allow it to set.

4. Cut the gelatin into squares and store in air-tight jars with a few crystals of menthol or thymol to prevent the growth of moulds.
5. Heat the glass lid in water until steaming but not boiling.
6. At the same time, melt the gelatin in a hot-water jacketed beaker. Apply the molten gelatin fairly generously to the outer edge of the jar.
7. Remove the lid from the hot water, dry it quickly and place the ground surface onto the setting gelatin ensuring that the filling hole is at the front (for convenience when filling).
8. Press down gently on the lid and then more firmly. Brush in extra gelatin where gaps appear in the seal, so that an even all-round seal is attained. Beware of applying too much gelatin as it may run down inside the jar and form an undesirable white mastic streamer with the alcohol.
9. Apply weights to the lid and leave for 24 hours. Metal weights heated in hot water can be useful for keeping the seal soft for longer so that no air remains trapped in it.
10. Remove the weights and check the seal over several days. An effective seal has a frosted appearance after this time.
11. Fill the jar using a hypodermic syringe to the desired level. Apply a piece of poly-propylene rod to fill the hole in the lid and cut it off flush with a sharp blade. Seal over this with a blob of molten gelatin and allow it to harden overnight.

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