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The Care of Musical Instruments in Canadian Collections



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TECHNICAL BULLETIN NO. 4

Care of Musical Instruments in Canadian Collections

by
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Abstract

The object of this Bulletin is to describe in some detail the general care and maintenance of a musical instrument collection. This information is intended not only for the museum which may have large holdings of musical instruments but also for the smaller establishment which may have only one or two items. The care of the collection from the acquisition of the items right through to their cleaning, care and maintenance is described and attention is given to complete and thorough documentation and to the problems of display and storage. Lists of supplies and references are also included.

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1. INTRODUCTION

Musical instruments, like all other museum objects, are subject to a wide range of potentially harmful agencies. The handling of the instrument, the physical environment in which it is stored, displayed or played and the repair work sometimes necessary for its upkeep are all potential sources of damage. In addition, for the full realisation of the historical significance of an instrument it is essential that its previous history and present condition be accurately documented. The chief aim of this Bulletin is to acquaint the museum curator with the variety of possible ways in which care can be given to the instrument or collection of instruments. It therefore encourages conservation in the broadest sense of the term even though the problems of restoration and repair fall, to a large extent, outside its scope. In order to serve the small museum which may have limited resources and access to information effectively, it is essential that the information contained here be concise and readily applicable to the real situation. To this end the main emphasis, in the Basic Care section in particular, is on general maintenance of the material based on the understanding that one of the major concerns of the curator is that of providing an attractive and well presented exhibit. Performances on old instruments are not emphasized here but this should not be regarded as a discouragement—the overriding function of any musical instrument, with rare exceptions, is for the production of music and wherever possible this function should be encouraged. However, the general state of preservation of old instruments is such that this should only be done at the discretion of the curator and then only when the historical integrity of the instrument is adequately safeguarded.

It should be emphasized that the same general principles of care and preservation are applied to all instruments regardless of their geographical origin. No distinction can be drawn between the instruments of European origin and those of the non-European cultures of North America and elsewhere. They are all treated together as exemplars of the wide and diverse range of instruments.

Before even basic care may be given to an instrument, aside from occasionally needed emergency treatment, it is necessary to identify it and to document its history and condition. For this reason the following sections of this publication are devoted to these two introductory aspects of musical instrument care. But, even before documentation begins a few notes on handling are in order.

2. HANDLING

Musical instruments have such a wide range of shapes and sizes that it is not always possible to describe clear-cut rules for their handling. Common sense is the best guide. For example:

- before moving an instrument prepare the place where it is going. Lay a soft padding, like foam plastic, on a firm, level surface to receive the instrument.
- wherever possible use trolleys or dollies for transporting heavy objects.
- do not lift a heavy object like a piano or pump organ by the cornice.
- never move a pipe organ in any position but vertical. The pipes are often free to move sideways. Move very carefully with no sudden jerks or stops.
- if the instrument is large get help in moving it.
- attach padding to the corners and edges of a large instrument before moving it.
- never wheel a keyboard instrument along on its castors—these are rarely built for regular use and often hardly work at all.
- when carrying an instrument let your hands be on the outside so that they, and not the instrument, bump into walls and doorframes.
- do not carry a string instrument by its neck.
- use the instrument's carrying case if it is in sound condition and pad it with thin Microfoam to prevent movement of the instrument. Check the case to ascertain that it is in good condition.
- place soft, padded blankets and padded packing blocks underneath an instrument when working on it.
- wear disposable cotton gloves when handling an object, *except* in cases where it might slip or where the gloves might catch on loose pieces.
- remove and place safely all loose components of an instrument when moving.
- secure or hold firmly all loose or movable parts and remember that a trombone slide . . . slides.

3. IDENTIFICATION

Musical instruments fall into four basic classifications which are derived from the general method of sound generation. These are as follows:

1. Idiophones—sound derived directly from material of fabrication.
2. Membranophones—sound derived from a stretched skin or membrane.
3. Cordophones—sound derived from stretched strings.
4. Aerophones—sound derived from air flow.

Each of these is then subdivided in order to describe the instruments more specifically:

3.1. Idiophones (Figure 1)

- An idiophone is a non-stretched three dimensional body which directly transforms the exciting energy into sound vibrations. It can be sounded by striking, scraping, plucking, shaking or bowing.
- Struck idiophones include castanets, which are struck together, and bells, gongs and xylophones which are struck with hammers or sticks.
- Scraped idiophones include rotary rattles and the notched stick.
- Plucked idiophones, also called linguaphones because the vibration is generated by a flexible tongue, include the Jew's harp and the mechanism of the musical box.
- Shaken idiophones include closed rattles made of wood, turtle shell, gourds, etc., and other rattling devices like deer hooves threaded onto a string.
- Bowed idiophones include the nail violin where nails of varying lengths are sounded with a bow.

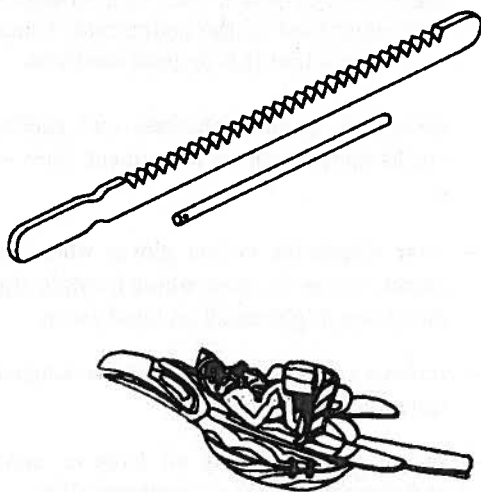


Figure 1: Idiophones: Rattle and notched stick with scraper.

3.2. Membranophones (Figure 2)

- Instruments in this group are sounded by direct action on a two-dimensional stretched membrane and are distinguished by the way in which the membrane is attached, the overall shape of the instrument and the way that the sound is produced.
- Drums form by far the largest group in this sub-heading. They are found in a wide range of shapes and sizes and are sounded with sticks, fingers or the flat of the hand.
- Friction membranophones, sometimes included in this section, constitute a small group of instruments where a stick or a length of waxed string causes the membrane to vibrate by rubbing.
- Instruments like the banjo, although they have a stretched membrane, are not included here because the membrane is not directly excited to produce the sound.

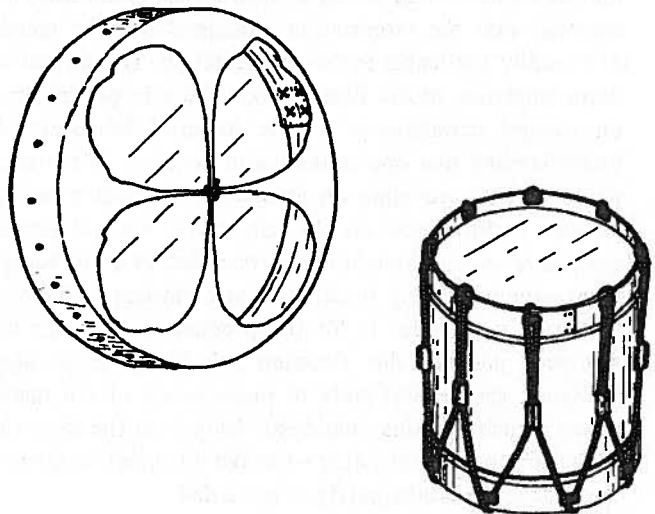


Figure 2: Membranophones: two drums.

3.3. Cordophones (Figure 3)

- Any instrument equipped with one or more stretched strings, (one-dimensional sound generators, which are set in vibration by the player) is a cordophone. The strings may be hammered, plucked, bowed and, very rarely, sounded by airflow.
- Hammered cordophones include the pianoforte and hammer dulcimer where either a mechanical action or a hand-held hammer causes the strings to vibrate.
- Plucked cordophones include the harpsichord and its attendant family of keyboard instruments, the guitar, the lute, the banjo and the harp. The strings may be sounded mechanically, with the fingers, or with a hand-held plectrum.

- Bowed cordophones include all those of the violin family, the viols and some forms of the dulcimer. The strings of the hurdy gurdy are also sounded by rubbing, as in the bowed instruments, but in this case the friction is caused by a rosin-coated wheel turned by a handle.
- The aeolian harp consists of a set of stretched strings inside a frame, which are sounded by the pressure of the wind, and as such is not truly a musical instrument.
- Some stringed instruments, usually bowed, also contain sympathetic strings which are set in vibration by the resonance of the played strings. The viola d'amore and the Norwegian hardanger violin are examples of these.

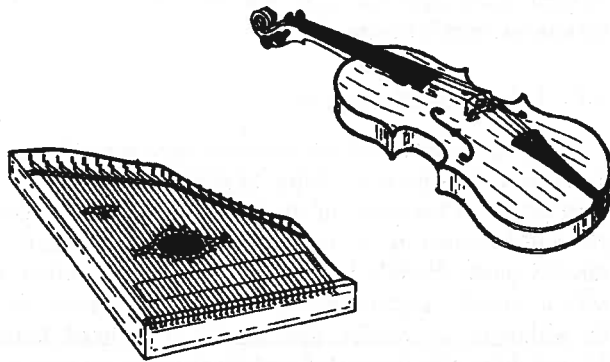


Figure 3: Cordophones: zither and violin.

3.4. Aerophones (Figure 4)

- An aerophone is a wind instrument with a well-defined air volume which is made to vibrate by air pressure, whether the air is derived from the player's lungs, as with the flute, or from bellows, as in an organ, or air bladders, as is the case with bagpipes. Wind instruments are subdivided according to the way in which the captive air column is made to vibrate. Vibration may be produced by the lips, by reeds or by air flow across a sharp edge. Vibrating frequency is determined to a major degree by the enclosed air volume.
- Lip vibrated wind instruments include all the members of the horn, trumpet and trombone families and many wood and natural horn instruments. The cup or funnel-shaped mouthpiece is their characteristic feature although some primitive instruments may be equipped with a simple mouth hole. Lip vibrated wind instruments can feature valves, pistons, keys or finger holes.

- Reed instruments are again sub-divided depending upon whether the reed is double, as in the oboe and bassoon, single as in the clarinet or saxophone, or whether the reed is free to move in an aperture as is the case with the harmonica and reed organ. The reed is therefore known as a beating reed or a free reed. Instruments of the oboe, bassoon and clarinet type have finger holes or keys which allow the player to alter the pitch of the enclosed air column.
- Edge tone instruments, where air is blown across a sharp edge to initiate vibration, include the transverse flute, the recorder and the pipe organ. In the transverse flute the vibration is controlled by the way in which the player directs a stream of air from his lips across an aperture or notch in the body of the instrument. The recorder has a built-in 'edge' upon which the player's breath impinges and both it and the transverse flute, in common with other woodwind instruments, have finger holes or keys. The pipes of the organ are also edge-tone generators, like the recorder, but their pitch is constant and the air is supplied, through a system of valves, from a pump or bellows.
- The pipe organ should not be confused with the more common "pump organ" which contains free metal reeds.

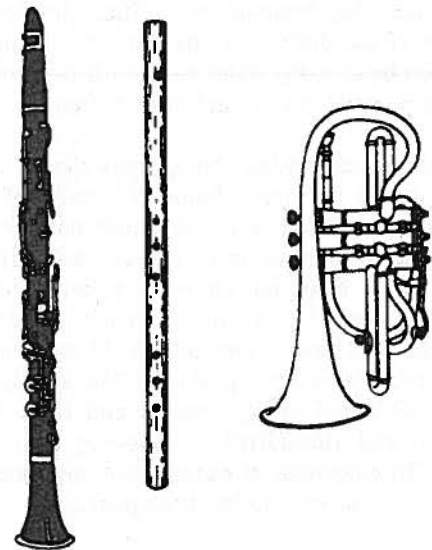


Figure 4: Aerophones: Clarinet, flute and cornet.

This brief guide to the classification of instruments illustrates the diversity of types that exist. It is generally very easy to identify and classify an instrument with the aid of a guide of this sort, although occasionally a more complicated case may be found. No attempt has been made here to give examples of every sub-category of instrument nor to illustrate them as this would fall well outside the scope of this Bulletin. In cases of doubt the reader is referred to the bibliography.

In the case of Canadian collections some justification could be made for the inclusion of a separate category for mechanical instruments; those in which the sound is produced totally by artificial means. Examples of this category include player pianos, mechanical organs and musical boxes. In general, however, it is possible to include these instruments under one of the four headings above, although complications arise in the case of mechanical instruments which have a variety of sound producing systems. These must be dealt with individually, as and when they occur.

A number of the guidelines which follow apply equally well to gramophones, melodions, juke boxes and other players and reproducers of music which are represented quite frequently in Canadian collections.

4. EXAMINATION AND DOCUMENTATION

When an instrument is examined as part of the identification and cataloguing process, all features of significance should be noted. These include maker's marks and identifying symbols such as labels, stencils and engravings, additional information added by repairers and restorers, and the wide range of alterations and adjustments that instruments may undergo. Of critical importance is the evidence of use during the instrument's history. This evidence can be so easily obliterated with incautious cleaning that it is essential to be aware of its existence.

During examination photographs should be taken and diagrams and drawings should be made of all notable features. Photographic equipment may not always be available to the curator but in its absence accurate line drawings in stable black ink on white paper or drawing film provide an excellent substitute. In many cases a drawing is worth far more than a photograph. Maker's marks, labels and inscriptions can be copied onto thin tracing paper using a very soft pencil lightly applied and these can then be inked in, and transferred to drawing film or paper if desired. Thoroughness of examination and documentation, both graphic and descriptive, is emphasized.

In view of the many adjustments to size and compass that instruments often undergo, and the changing pitch standards over the years, some estimate should be made of an instrument's original compass and pitch, if at all possible. The notation commonly used for this purpose is as follows:

- c' = Middle C on the piano, b is the note below.
- c'' = the octave above Middle C, b' is the note below.
- c = the octave below Middle C, B is the note below.

The notation for the keyboard shown in the diagram (Figure 5) is therefore;

C' — c'''

This is also seen expressed as:

c₂ — c⁴.

Several other systems exist and it is well to watch for variations on this theme.

4.1 Labels, inscriptions, etc.

Maker's identification methods vary with the type of instrument in question. With keyboard instruments it is most usual for the name of the builder, and occasionally his place of business, to be recorded on the name board—the vertical panel directly behind the keys. This is often done with a transfer applied between layers of varnish (Figure 6), although on earlier instruments it is hand lettered. Stencils have also been used and occasionally an inset panel has the maker's identification stamped or engraved on it. If the soundboard of a keyboard instrument possesses a sound hole, a decorative insert, called a rose, is often set in and can feature the initials of the maker worked into a design. It is also possible to find the maker's name written in pencil or ink on the bare wood part of one of the keys.

Other string instruments, like the violin or guitar, have a label pasted inside the body, or the name is occasionally stamped, and this is visible through one of the sound holes. The guitar label often lies directly below the instrument's circular sound hole while the label of the violin, and others of the same general type, can most often be found pasted on the inside of the back, below the 'f' hole on the bass side



Figure 5: Pitch notation.

On utilise également, dans le même sens, l'expression suivante:

$$c_2 - c^4.$$

Il existe plusieurs systèmes de notation et l'on se doit d'être sur ses gardes quant à ces variations.

4.1 Étiquettes, inscriptions, etc.

Les méthodes qui permettent d'identifier les manufacturiers ou les facteurs d'instruments varient selon les types d'instruments. Dans le cas des instruments à clavier, on indiquait le plus souvent le nom du facteur, parfois même l'endroit où il pratiquait, sur le panneau vertical qui se trouve tout juste derrière le clavier. On trouve souvent ce genre d'indication appliqué en décalcomanie entre deux couches de vernis (Figure 6); chez les instruments plus anciens, il s'agit souvent d'inscriptions manuscrites. On a également utilisé des pochoirs; à l'occasion, on peut trouver un petit panneau incrusté portant, imprimée ou gravée, la marque du facteur. Lorsque la table d'harmonie d'un instrument à clavier possède une ouverture de résonance, il arrive souvent que cette ouverture comporte un motif décoratif dénommé rose ou rosace; ce motif porte parfois, entrelacées ou autrement arrangées, les initiales du facteur. Il arrive également que l'on trouve le nom du facteur inscrit au crayon ou à l'encre sur le bois nu de l'une des touches.

D'autres instruments à cordes, comme le violon ou la guitare, portent souvent une étiquette collée à l'intérieur du corps de l'instrument; parfois, le nom est estampé à l'intérieur; dans les deux cas, il est possible d'apercevoir l'inscription par l'une des ouvertures de résonance. Dans la guitare, l'étiquette se trouve souvent directement en face de l'ouverture ronde; dans le cas du violon et des autres instruments de la même famille, on trouve le plus souvent l'étiquette en question collée à l'intérieur du dos, sous l'ouïe qui se trouve du côté des cordes basses de l'instrument. Dans le cas des violons plus particulièrement, il ne faut pas prendre les étiquettes trop à la lettre. Les fabriques de violons avaient et ont encore l'habitude d'étiqueter les instruments qu'ils produisent d'après le modèle qu'ils suivent (Figure 7). Par ailleurs, les restaurateurs et les réparateurs, lorsqu'ils ont terminé leur travail, ajoutent leur propre étiquette. On trouve également des inscriptions au crayon à l'intérieur de la caisse de résonance de certains instruments—par exemple, sur la table supérieure d'un violon.

Les instruments à vent faits de bois, portent le nom du facteur, ses initiales ou son symbole marqué au poinçon ou encore brûlé dans la matière même du corps de l'instrument, ou même sur chacun des joints, s'il s'agit d'un instrument qui en comporte (Figure 8). On utilise égale-

W. Doherty & Co

Figure 6: Marque du facteur sur un harmonium.

Antonius Stradivarius Cremonensis
Faciebat Anno 1721



Figure 7: Étiquette d'un violon moderne fabriqué en grande quantité. Remarquez que la date est imprimée plutôt que manuscrite.

BAINBRIDGE
& WOOD

35

HOLBORN

HILL

LONDON

PATENT



Figure 8: Timbre du facteur sur un instrument à vent.

PASK
MAKER
443 WEST STRAND
LONDON
3507

Figure 9: Marque gravée par le facteur d'un ophiclède.

FRANÇOIS PERINET RUE COPERNIC

Figure 10: Marque poinçonnée par le facteur sur le pavillon d'un cor.

ment pour ces instruments des étiquettes collées ou faites au pochoir.

Les cuivres portent ordinairement le nom du facteur et autres indications incisés, gravés, ou marqués au poinçon sur le pavillon, immédiatement sous la bordure (Figures 9 et 10). On trouve parfois d'autres inscriptions: un médaillon, des armoiries, le nom d'un vendeur, gravées plus bas sur la partie évasée de l'instrument, là où on peut le mieux les apercevoir lorsqu'on tient l'instrument.

On a eu recours à toutes sortes de moyens pour identifier les instruments; bien sûr, les facteurs ont intérêt à ce que les marques qu'ils y laissent soient assez évidentes. Pourtant, les instruments qui ne portent aucune marque sont assez fréquents, particulièrement chez les bois. En règle générale, les instruments de musique que l'on peut qualifier d'indigènes ou d'ethniques ne portent aucune marque, ce qui s'explique aisément par le fait que les considérations commerciales leur importaient peu. Il n'en reste pas moins que l'on trouve à l'occasion, peint ou sculpté sur l'un de ces instruments, le nom de celui qui l'a fabriqué ou encore de celui pour qui on l'a fabriqué.

Les inscriptions de la page précédente ont été reproduites grandeur nature. Elles ont été réalisées à partir des instruments faisant partie de la collection du Centre canadien d'études sur la culture traditionnelle, Musée national de l'homme, envers lequel l'auteur est reconnaissant.

4.2 Indices d'altération ou de restauration antérieures

Il arrive que les modifications de structure que l'on a fait subir à un instrument soient à peu près imperceptibles mais en règle générale, il suffit d'un examen poussé pour les retracer. Ces modifications peuvent comprendre l'addition de pièces destinées à augmenter le registre de l'instrument, des ajustements qui sont le reflet de l'évolution des techniques d'utilisation, le renforcement des parties affaiblies de l'instrument ou même la conversion d'un instrument en un autre. On a souvent altéré d'anciens instruments à clavier en leur ajoutant des touches et des cordes pour en augmenter le registre. Bien des violons anciens ont vu leur manche remplacé ou encore sa position altérée pour accommoder de nouvelles techniques de jeu. Certains violonistes, comme d'ailleurs certains bassistes, ont remplacé les chevilles de leurs instruments par des systèmes plus récents à vis sans fin. Il est souvent arrivé que l'on ajoutait des pièces à un instrument à cordes pour le renforcer et il est aussi souvent arrivé que l'on convertissait en viole ordinaire une viole d'amour démodée.

Il est très rare que les parties endommagées d'un instrument soient remplacées de façon à rendre la restauration invisible. Il a pu arriver que l'on ait enlevé des sections

d'un instrument de bois que des parasites avaient gravement endommagées, pour les remplacer par des sections neuves parfois différentes des anciennes par leur apparence ou leur structure. Tout au long de la vie active d'un instrument, des éléments comme les chevilles, les chevalets, les anches et les cordes peuvent être remplacés plusieurs fois. Le poli, la laque, la peinture ou le vernis, qui auraient pu y être appliqués, auraient aussi changé le caractère original d'un instrument. Chez les cuivres, on a souvent ajouté des corps ou tons de rechange de diverses longueurs pour adapter les instruments aux nombreuses normes de ton qui se sont succédées.

Il est important de procéder à un examen minutieux de l'instrument et de noter tous les détails sur lesquels on peut avoir des doutes. On fera bien d'utiliser pour cet examen quelques petits outils: miroir de dentiste, lampe de poche, brucelles, loupe, porte-aiguilles, pinceau en poils de chameau.

N'utilisez ces outils qu'avec soin, tout particulièrement lorsque vous procédez à cet examen par l'ouverture de résonance d'un instrument à cordes. Le vernis qui garnit le tour de cette ouverture est extrêmement fragile et pourrait facilement subir des dommages difficiles à réparer.

4.3 Indices de dommages

Lorsqu'on établit la documentation concernant un instrument, il faut prendre note de tous les dommages que l'on n'a pas déjà réparés, qu'il s'agisse de pièces pliées, cassées ou disparues, de fentes apparues dans le bois, de soudures de joints qui ont cédé, de la déchirure d'une peau, etc. Il faut également prendre note des cordes et des corps de rechange des embouchures qui ont disparu.

C'est également le moment de chercher les traces qu'auraient pu laisser des attaques de parasites: moisissures, insectes, etc.

4.4 Indices de l'utilisation d'un instrument

Tout au long de sa vie active, un instrument accumule des indices de l'usage que l'on en fait. Il peut s'agir de la façon dont les mains de l'instrumentiste ont sali ou usé l'instrument, de l'arcanson que les archets y ont déposé, de ce qui peut rester d'anciennes cordes sur les chevilles, de toutes sortes d'autres indices. Il faut être attentifs et tout noter soigneusement.

4.5 Numéros matricules

On doit attacher à chacun des objets d'un musée, son numéro matricule clairement écrit. On peut attacher à la

5. BASIC CARE

The following notes are intended as guidelines on minimum care. If an instrument requires any treatment which is not outlined here this should be done only under the guidance of trained personnel. If there is doubt as to the extent of treatment required, or the ability of the staff to perform the treatment, then guidance should be sought. Treatment is better left undone if there is even the slightest chance of causing damage. This is not to say that general maintenance, minor repair, cleaning and upkeep should not be done—they can be done, and done very effectively. Also, it must be remembered that the materials and methods of the commercial instrument repairer or restorer may not necessarily be compatible with those of the conservator. Only a repairer who is thoroughly grounded in the techniques and application of conservation to musical instruments should be consulted. There is no intention here to discourage the curator from providing the care that the collection may require by consulting with professional tuners and repairers but these people should come well recommended.

The notes on the care of instruments that follow are divided according to the type of instrument and its major material of fabrication. Some of the more complex instruments contain a variety of materials and the cleaning techniques used on some are therefore equally applicable to others in which the same materials are found. For example, the cleaning of brass instruments will also find applications in the realm of the woodwinds, some of which are, paradoxically, made of metal.

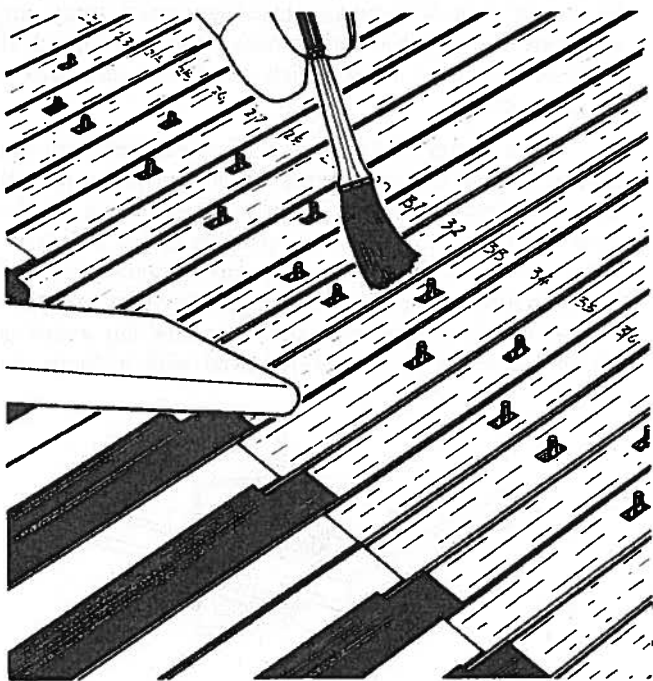
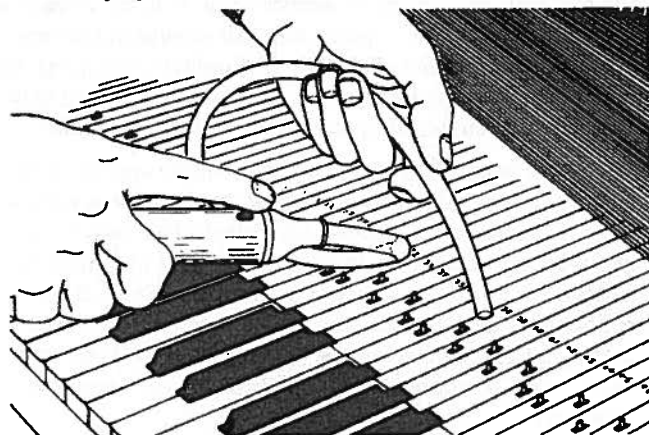


Figure 12: Dust is brushed towards the vacuum cleaner nozzle.

Figure 13: A finger hole in the connection provides an instant safety valve.



5.1 Keyboard Instruments

Surface dust should be removed from the casework and outer parts with a feather duster or a very soft, lint-free cloth. If the cloth is very slightly dampened it will remove the dust more efficiently. Be very sure that no moisture can be transferred from the cloth to the object—the cloth should hardly feel damp to the touch. When removing dust watch for sharp edges, nails, loose veneer, etc. which can catch in the duster and cause damage. Be sure that the surface is not flaking or blistered—dusting might increase the damage. If this is the case use the lightest feather duster. The interiors of keyboard instruments provide excellent traps for dust and loose debris (especially if mice have been allowed to occupy them—a not uncommon occurrence). Remove all access doors, panels, etc. by undoing screws or catches, take the dust out by hand and sift it carefully—there can often be interesting artifacts and loose parts of the instrument amongst the dust. Loose dust can then be removed with a vacuum cleaner. Do not vacuum clean the working parts directly for fear of damage. Hold the nozzle of the vacuum cleaner some few centimetres away and brush the dusty parts with a soft camel hair brush towards the nozzle (Figure 12). When a place is otherwise inaccessible a thin rubber hose can be connected to the vacuum cleaner nozzle with tape. Allowance should be made for a finger hole somewhere in the connection so that pressure can be instantly released if necessary (Figure 13).

It is often desirable to remove, or at least expose, the keywork and other parts of pianos and organs in order to gain access for efficient cleaning. It is possible to remove the nameboard of some instruments, either with the two screws at the sides or by sliding it upwards in its grooves, and the keys can then be exposed. It is possible to remove the keys from a pump organ once the name board is off by unscrewing the key strip which runs along the backs of the keys. The keys can then be removed and cleaned underneath. Be careful not to damage the felt packings that sit under the keys and be sure to return the stickers (wood pins

that operate the valves) to their respective places if they have been removed. Do not replace worn felt unless under the guidance of a keyboard service man. It is not as easy to remove the keys from a piano and this should not normally be attempted without instruction. Similarly, replacing the felts of a piano keyboard requires some skill and an excellent source of supply of appropriate replacement parts.

If the pedals of a pump organ are loose and fail to stay in the raised position it is probable that the canvas webbing strap attached to the bellows has failed. This can be easily removed and replaced with similar material and marked as a replacement. At this time it is also possible to check the bellows for air-tightness and general repair. The strip of pigskin across both exhauster bellows which acts as an exit valve can be checked for tightness and replaced if necessary.

The fabric coverings of the pedals of a pump organ might be badly worn or completely destroyed. These can be replaced with new material, matched as closely as possible to the original, and if the instrument is to be used regularly they can be covered with an additional layer of thin acrylic sheet. Retain the original pieces and label them.

The ivory, bone or celluloid facings of the keys can be cleaned with a small swab, only slightly dampened with water to which has been added a few drops of liquid detergent. Avoid excess wetting, especially on the wood surrounding the key facings. Do not attempt to bleach yellowed keys—if they are yellowed they are probably ivory. No technique for bleaching ivory is totally successful and some can cause damage. Celluloid keys, usually found on organs and pianos made after 1880, can be effectively cleaned with liquid silver polish (Silvo) if they are very grimy and if the detergent is insufficient. Once silver polish has been used regular cleaning with a slightly damp swab will prevent excessive build-up of dirt.

If any evidence of distortion or damage due to string tension is noticed the strings must be slackened using the correct tuning key carefully applied (Figure 14b). Pianos with metal frames may be left tuned as they will not suffer from distortion. Slackening of strings only applies to those instruments substantially made of wood. In most cases slackening of the tension will not cure distortion, but it will prevent it from getting worse.

Reeds of pump organs often fail to sound because of loose debris preventing free vibration. These reeds can be removed by raising the swell shutter by pulling the 'forte' stop and exposing them in their cells on top of the windchest. They are slid out using a reed hook (the proper instrument) for gripping their ends (Figure 14a). A reed hook can be ground to shape from an old screwdriver—make sure that it fits snugly in the groove provided. Reeds can be very gently dusted with a soft brush and tapping the end of the reed block against the thumbnail will dislodge loose grit from the mouth. Do not, on any account, bend

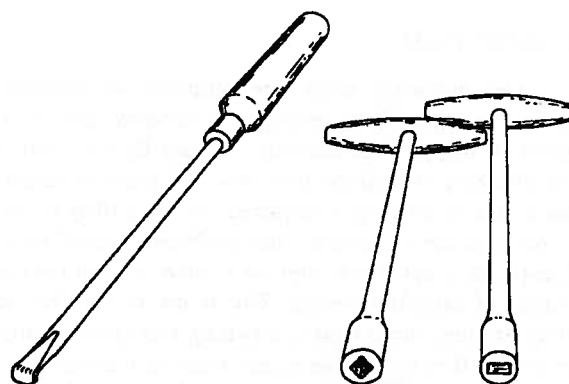


Figure 14a: A home-made reed hook.

Figure 14b: Tuning keys.

the reeds themselves in order to remove dirt as they are very delicate and difficult to revoice when distorted.

Never operate the bellows of an organ without first checking the leatherwork. If the leather is at all dry or hard it can easily become cracked. To soften leather bellows, and only leather bellows, swab the surface with Neat's Foot Oil and leave it to soak in for some hours. Do not coat the surface excessively and make sure to wipe dry after application. Never apply oil to a bellows which has any painted design on it. The mechanisms of instruments should never be operated until their condition has been thoroughly ascertained for fear of causing damage to worn or defective parts.

In general a varnished or polished surface should not require waxing. However, if a pianoforte or an organ has a casework with a very high, smooth finish a coat of wax may be desired. Use a domestic paste wax, not a spray, apply sparingly and polish off vigorously. Be sure to check that there are no loose edges which can accumulate wax and catch the duster.

Loose veneer and trim can be re-adhered with liquid hide glue. This is best injected under the loose area with a disposable plastic syringe. First make sure that the loose area will return to its original position and if it fails to do this it will be necessary to clean any accumulation of dirt and wax from underneath. When glue has been injected the area should be pressed with the finger and any excess glue which oozes out should be removed with a damp cloth.

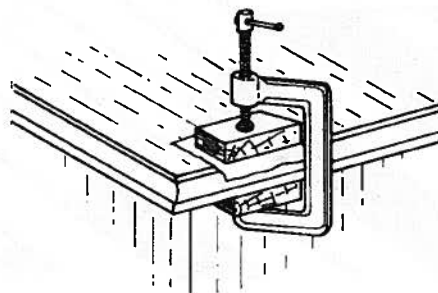


Figure 15: Clamping a piece of re-glued veneer.

Remove the finger, place a piece of white paper over the area, then place a clamp or heavy weight with a soft wood pressure block underneath and leave for 24 hours (Figure 15). The paper and any excess glue can be removed carefully by moistening with a damp cloth.

When a non-mechanical part like a moulding or decorative trim has been damaged beyond reasonable repair, or is missing altogether, and the overall appearance of the instrument is diminished because of this, by all means make a replacement part if it is felt possible. This should be as close a copy of the original as can be managed, both in material and execution, and should be clearly marked as a reproduction in some unobtrusive place. When fitting the replacement part make sure that it is not permanently attached and that the original fabric of the instrument is in no way damaged or altered. Use liquid hide glue as an adhesive and use it very sparingly. Always retain for documentation the remains of any damaged part, clearly labelled as to origin. In general, avoid repairs to delicate areas, especially the soundhole rose of stringed instruments.

5.2 String Instruments—Non-Keyboard

Dust can be removed from these instruments in the same way as described above. Again, be sure that the varnish, lacquer or other surface coating is firm and can stand dusting. If in doubt, gentle dusting with a feather duster or nothing at all.

The insides of string instruments like guitars and violins accumulate dust very readily. In most cases a vacuum cleaner with an attached thin rubber hose can be used for removing dust, but be very careful and stay clear of labels and other marks with the hose. An extremely elegant way of removing light dust from the interior of an instrument involves the use of rice grains. A small number of grains are poured into the instrument and when gently agitated the dust will adhere to the grains and can thus be easily removed. Because rice is an excellent nutrient for all manner of organisms great care should be taken to ensure that all the rice grains are removed. If it is considered difficult to remove dust conveniently, for example through the 'f' holes of a violin, leave it there.

Surface cleaning of string instruments can be done with a swab slightly dampened with water/detergent and only where the material being cleaned has a stable varnish or other surface coating. Bare wood can be cleaned with draughtsman's erasing powder which is either supplied loose or in a cloth bag. The loose powder can be sprinkled on the area to be cleaned and rolled around with the fingertips. Or the bag itself can be rubbed on the object to effect cleaning. Erasing powders can contain corrosive substances so they should not be used in areas where metal parts exist. Around hitchpins, nails and other metal parts an art gum eraser can be used. All these erasing techniques

are known as 'dry cleaning'. This cleaning must be done evenly and uniformly and must be well dusted afterwards. (Commercial violin cleaning preparations are not recommended.) Avoid handling uncoated wooden surfaces with the bare hands and never use water. Examine the surface thoroughly to make sure that there are no maker's marks or other marks of identification before cleaning. On some instruments, in particular the violin, the surface deposits can be of value to the study of the instrument and in some cases styles and techniques of playing are reflected in the condition of the surface. As a general rule do not remove more than loose dust from the surface of a violin or other bowed string instrument.

Never try to re-set the soundpost of a bowed instrument. This is a very delicate operation and requires special tools and knowledge.

String instruments should not be left with the strings at playing tension unless they are being regularly used, in which case it is essential. For static display purposes or for storage the strings should be slackened—not enough that they lose their straightness, but enough to release most of their tension. Check carefully that the tuning pegs, machine heads, etc., are free to move before doing this. A drop of light machine oil should be used on worm gear tuning heads. Be sure not to get excess oil on the wood parts as this is both damaging and disfiguring. Apply this sparingly and wipe off the excess. Tapered wood tuning pegs should only be tight enough to hold tension on the strings—over-tightness of tapered pegs can cause cracking of the peg box or head. Pegs may be lightly rubbed with paraffin wax to prevent binding. If the pegs fail to hold they may be lightly rubbed with powdered chalk. In those instruments with a loose bridge—the violin and viol family—two of the strings are better left at nearer playing tension. Often the nut, the grooved block at the top of the fingerboard, is held in by string tension alone. In some large harps the string tension is all that holds the neck to the soundbox and loosening of strings should be only done with caution.

For display purposes only, all strings which are obviously not original and which are obtrusive should be removed and replaced with monofilament nylon of near correct diameter. Missing strings may also be replaced in this way. The spurious strings should be retained as part of the documentation of the instrument.

5.3 Woodwind Instruments

Surface clean with a soft, lint-free cloth and use a thin strip of the same cloth to get under key levers, axles, etc. Be sure to avoid all but the lightest brushing or dusting in the vicinity of the tone producing edges of flutes. These are very delicate and the tone of the instrument can be easily impaired. Instruments made of bare wood with no surface finish should be dry-cleaned with eraser powder, except in the area of the tone edge.

If it is possible to detach the removable sections, or joints, of an instrument easily then this should be done for better access. Do not force them if they are apparently stuck. Grip both parts firmly and pull apart, applying a rotary motion. On no account rock the two components in relation to each other as fracture may result. Lubricate the cork or thread binding between individual components with a very thin film of soft beeswax or wind instrument cork grease before re-assembly.

Bores of wind instruments can be cleaned with a piece of soft, lint free cloth or chamois leather tied to a string. This is pulled through making sure that the cloth or chamois does not fit the bore too tightly. It is far better to pull through a loose cloth a few times than risk a tight one getting stuck. Never oil the bore of an instrument unless under expert guidance.

Unless the instrument is to be played it is unnecessary to lubricate the key work and other mechanical parts. Excess dirt and oil can be cleaned from these parts with a cotton swab moistened in mineral spirits. Do not over wet the surface and blot well dry afterwards. Make sure that the solvent does not get on any wooden parts.

Reeds and staples (the tube to which the reed is attached) should be gently removed and cleaned separately but only if it is possible to remove them easily and without risk of damage.

Organ pipes are made of either metal or wood. If it is possible to remove them easily then this should be done, although the wooden pipes of some small organs are glued to each other and should be left in place. Metal pipes in sound condition may be cleaned in the same way as other metal components and should only require gentle dusting. Wooden pipes may only be dry cleaned. For both types great care is needed around the mouth parts as the voicing of the pipes is very delicate and easily upset. Do not interfere with any tuning devices on the tops of the pipes. Loose parts of wood pipes, like the pipe stem and the attachment blocks, may be cleaned and replaced with liquid hide glue sparingly applied but never re-glue a loose cap—the piece just below the mouth of the pipe. The positioning of this piece is critical and should be done by a person fully acquainted with the repair of organs. Never try to repair damages to metal pipes—their melting point is usually very low and they can only be soldered with great skill.

5.4 Brass Instruments

Brass and other metal instruments can be dusted simply with a soft dry cloth. If the surface is greasy it may be cleaned with a swab of cotton slightly moistened in mineral spirits. Do not apply in excess and wipe off well with a dry cloth after application. If the instrument is lacquered, check that the lacquer is stable and does not tend to flake off before trying to clean it. Proceed very

carefully if it appears that the lacquer may come away from the metal. In extreme cases no surface cleaning should be attempted.

When handling metal instruments always wear a pair of clean disposable white cotton gloves.

Usually, metal instruments in museum collections should never be cleaned with abrasive polishes. No matter how carefully polishing is done, some metal is always removed. In time the metal, especially around the widest part of the bell, can become extremely thin and maker's name engravings and decorative designs can also be worn off. In practice, there is occasionally a need for a slight polish, particularly on silver or silver plated instruments where a disfiguring tarnish is present. This can be removed with plate powder, an extremely fine abrasive polish, but on the understanding that once this treatment is performed the instrument must then be protected from further tarnishing. Protection from tarnishing entails the correct procedures of storage and display, explained later, and until these conditions can be met it is not advisable to do any polishing.

Lacquer should not be applied to instruments unless there is an absolute assurance that it will be removed before it begins to break down and flake off by itself. A poorly applied lacquer will begin to flake off the metal surface inviting local corrosion which can leave unsightly patches on the instrument. If the instrument is already lacquered, as is the case with many 20th century brass instruments, this should be left intact.

Valves, pistons and other moving parts should be removed where this can be done easily and with no risk of damage and all excess oil and other deposits removed with mineral spirits. Watch out for leather packing washers when cleaning and remove if possible. A variety of lubricants may be used on a brass instrument during its playing life but these are often not suitable for museum use. With sporadic and infrequent use some lubricants become gummy and prevent free movement of closely machined parts. Once the parts are thoroughly cleaned a very thin film of light machine oil can be wiped on before re-assembly. It is stressed that, when undoing bolts, nuts or other threaded components, the correct tool should always be used and the component left tightened if it cannot be easily removed. Mouthpieces should be removed if possible and cleaned. If a mouthpiece has 'seized' in place it is best left—forcing can cause damage.

Do not try to repair broken or cracked solder joints unless great skill can be exercised. Never try to re-solder a lacquered instrument. Never try to re-solder a plated instrument—the plating is on top of the solder and can easily flake off if the solder below is melted.

5.5 Percussion Instruments

Drum heads are best dry cleaned with rubber eraser powder. No fluid should be allowed to come in contact with them as this may easily be absorbed into the surface and carry dirt with it. Be very cautious when dealing with painted drum heads as the colours may well be fugitive. Test any cleaning technique thoroughly on a tiny, unobtrusive spot before attempting overall treatment. This is a rule for any cleaning process on any material.

The heads of drums must be left slackened but not enough to cause wrinkles or surface deformations. They should remain essentially flat but not tight to the touch. When the drum head is attached and tensioned with ropes these should be slackened so that any shrinkage of the head will not cause excess strain. Be careful with leather parts on the tensioning devices as they can be very brittle. In some cases drum heads are attached with strings made of hide, sinews or roots; these should be very carefully examined before any slackening is attempted. When in doubt do nothing. In addition the head of this type of drum is almost invariably nailed into place as well, making slackening nearly impossible.

When a drum head is attached and tensioned with turnbuckles or other mechanical tighteners these should be slightly slackened. Check that the moving parts are free to move and lubricate with light machine oil as necessary.

It is not advisable to apply any substance to drum heads to increase their suppleness or prevent cracking as these preparations often cause marked changes in appearance.

Cymbals, bells and gongs may all be treated in the same way as other metal instruments. Cords or leather strips are often used as attachments for these instruments and they should be protected from contact with cleaning solvents.

Occasionally ceramic drums have to be dealt with. Unless the ceramic surface is glazed these drums should never be cleaned with water or solvents. Simple dry cleaning should be all that is required.

Native rattles occur in a wide variety of shapes and materials of fabrication and their treatment will depend upon the material in question. Gourds with a few loose seeds are very often used and the stem is often bound with leather or roots. They should be treated very carefully and only dry-cleaned if absolutely necessary. Carved wooden rattles are usually painted and, again, great care is needed in testing before any cleaning is done.

5.6 Mechanical Instruments

The cleaning problems of mechanical instruments are generally dealt with in the preceding five categories. Dirt in delicate mechanisms may be all that prevents proper func-

tioning and if it is feasible to clean a mechanism without dismantling then this should be done. Cotton swabs moistened with mineral spirits can be used for removing old oil or grease and when the object is thoroughly cleaned a little light machine oil should be applied to all bearings and moving parts. Any further treatment should be referred to a specialist in this kind of machinery. Do not wind any spring mechanism unless its condition is known to be sound beforehand. Do not make any adjustment to a mechanism with a wound spring. If possible mechanisms that are not in use should be kept with the spring unwound.

6. REPAIR AND RESTORATION

As a general rule no major repair or restoration of any musical instrument should be carried out without the guidance of a restorer who is fully conversant with the aims and intentions of conservation. Some minor repairs may, of course, be done from time to time but only if these can be easily and simply executed without the slightest chance of further damage to the fabric of the instruments, and only where damage is likely to occur if the work is not done. Materials used in the repair of these damages must be compatible with the practices of good conservation, particularly with regard to their reversibility. It is hoped that the notes on Basic Care provided previously will cover a wide range of possible problems and that extensive restoration and repair will be rarely required. If there exists the slightest doubt, either on the feasibility or the necessity, of the need to do more work than is covered in these guidelines, then the advice of a professional conservator should be sought.

7. STORAGE AND DISPLAY

For both the storage and display of musical instruments it is critical that the total environment provide the objects with adequate protection. This total environment comprises: atmospheric moisture level, temperature, mode of display and accessibility, mode of storage and accessibility, light level and protection from moulds, insects and other infestations.

7.1. Atmospheric Conditions

7.1.1 Relative Humidity and Temperature

Generally, for wood and other organic materials an atmospheric moisture content of 45% RH at 20°C is the optimum value. In practice it is more realistic to suggest a range of RH values and for Canadian conditions this is generally agreed to fall between 35% and 55%. On the other hand, metal objects are best kept in a drier atmosphere because it is the water vapour in the air that is partially responsible for initiating corrosion. However, musical instruments present special problems with regard to humidity levels in that, in many cases, the range of materials used in their construction would argue against

one specific humidity level. In the case of an instrument where both metal and wood components exist, such as an upright piano with a wood carcase and a metal frame, a compromise is necessary. Then, when one considers a woodwind instrument where the body may be of wood to which is attached ivory rings and keys of metal with leather and felt packings, the situation becomes excessively complex. If a compromise is needed, as indicated by the above examples, then it is better to bias conditions in favour of the organic substances whose dimensions and physical characteristics are influenced by the moisture level of the environment. The metal components will generally give no problems at a relative humidity near that optimum for wood and organic materials but they should be periodically observed for slight changes.

It is important to emphasize that with wooden objects the actual relative humidity is not as important as its stability. Rapid changes in relative humidity cause the most damage to wooden objects. Properly constructed display cases and storage facilities with accurate control of humidity and temperature are the answer. Where it is difficult to control the humidity effectively it may be necessary to create a "microclimate" in which to keep the objects. This can be done by enclosing the instruments in polyethylene bags to which have been added packages of prepared silica gel. Further information on this is provided in the bibliography.

More detailed information on climate control is contained in C.C.I. Technical Bulletin No. 1 "Relative Humidity: Its Importance, Measurement and Control in Museums" by K. J. MacLeod.

7.1.2 Air Cleanliness

Airborne chemical and particulate matter, which is most prevalent in industrial areas, can be excluded partially from the instrument collection by ensuring that the majority of items are kept in cupboards or drawers with close fitting doors or in correctly constructed display cases. If metal items can be kept in a relatively dry atmosphere by the use of desiccants in sealed environments almost all corrosion can be inhibited. The metal parts on composite instruments, where there may be a majority of organic materials requiring a higher relative humidity, must be checked periodically.

Larger dust particles which have a disfiguring rather than damaging effect can be easily controlled by regular and efficient housekeeping.

7.2. Mode of Storage and Accessibility

Because of the range of materials of fabrication and the physical sizes found in the average musical instrument collection adequate storage is often difficult to organize effectively. The following guidelines should provide at least an introduction to the problems and a suggestion for their convenient solution.

Small objects like woodwind instruments, rattles and bells are best kept in drawers lined with small size bubble pack sheeting or Microfoam. Be sure to obtain a stable, nondegradable plastic foam sheeting. Objects should be arranged so that their long axes lie at right angles to the drawer front in order to minimize rolling and sliding when the drawer is opened and closed. They should be arranged in order according either to their size, or preferably to their material of fabrication and each drawer should be labelled with the complete contents. Drawers should run freely and preferably be of enamelled metal construction and lockable (Figure 17). Wood drawers are a very acceptable substitute, but steer clear of composition boards which are sometimes cemented together with acid adhesives. The use of wood components in storage facilities, and also the use of cellulose packing materials in drawer linings, has been advocated as an aid to buffering changes in relative humidity. While it is not absolutely necessary to provide buffering materials of this sort, or indeed to construct the facilities from a material like wood which has these properties, their use can certainly be recommended.

Medium sized objects like the bowed and plucked string instruments or the larger brasses may be kept in large, shallow vertical cupboards or on flat shelves (Figure 16). If a vertical cupboard is chosen, the instrument must be well supported on padded hooks attached firmly to the back of the cupboard. It is not sufficient to hang a string instrument in the cupboard by its neck—the body must also be well supported even to the extent of providing a padded cradle shaped to the lower part of the instrument. Padding for all supports should be made from Microfoam or thick, soft felt wrapped with polyethylene sheet. If flat shelves are chosen the instrument must be laid so that the greater part of its surface is in contact with the padding. Padding for flat shelves should be similar to that recommended for drawers. Brass instruments should be laid so that the valves, keywork and other such parts are uppermost. Where the rim of the bell prevents the instrument from being laid flat suitable blocks made from clean, dry wood covered with padding must be arranged beneath the object to spread the load.

Large objects like keyboard instruments, concert harps and mechanical organs must be kept at floor level although if they have flat bottoms they should be raised on padded blocks. The larger harps, because of their inherent instability, should be attached to a firm support by a padded wire or rope passing around the junction of the soundbox and neck.

Wherever an original carrying case exists with an instrument it should be used provided that it is clean and in good condition. String instruments are often wrapped in a soft cloth, like silk, before being placed in their cases.

It is essential that all stored instruments be easily accessible and that an instrument may be taken from storage without the necessity of disturbing others. To this

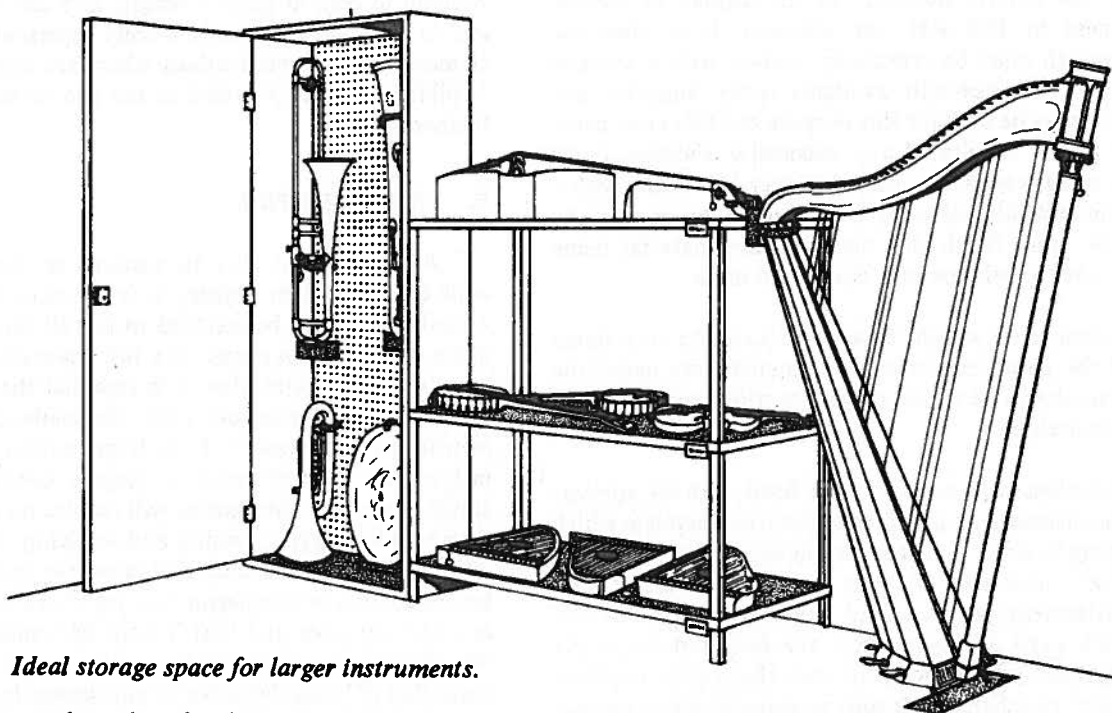


Figure 16: Ideal storage space for larger instruments.

end shelves and cupboards should be shallow and the spacing between shelves wide enough for easy access. Instruments should be lifted from shelves, not slid out sideways.

7.3 Mode of Display and Accessibility

Small instruments should be displayed in glass cases, if possible. Mounts and supports can be made from a variety of relatively inert materials, such as acrylic sheet, and objects can be suspended with securely fastened monofilament nylon line. The design of display cases and supports for artifacts falls outside the scope of this Bulletin but sources of information on the subject are given in the bibliography.

It is impractical to display the larger musical instruments in cases and, in addition, these will often detract from their appearance. Adequate protection from accidental (and deliberate) damage must be given to the object by physical barriers. In the absence of these, continuous surveillance while visitors are present is unfortunately necessary.

Objects which sit or stand directly on the floor are vulnerable to damage from mops, polishers and vacuum cleaners. Guidance and instruction to museum staff are the best preventative measures.

Displayed musical instruments should always be easily accessible to museum staff when the need arises and removal of an object from the display must be straightforward and easy to execute.

Descriptive labels should never be attached to the instrument itself although free standing label holders may

be placed on the horizontal surfaces if the bases are sufficiently padded to avoid scratching. As an alternative, with keyboard and other large instruments, labels can be attached to walls adjacent to the object or to the upright posts of barricades in front.

7.4 Fungus and Insects, etc.

Fungal attacks, insect infestations and other problems of a similar nature can be eliminated by good housekeeping and maintenance of a stable, clean environment. Fungus will grow on any substance which provides nutrient but only in conditions of high humidity. If it is not possible to

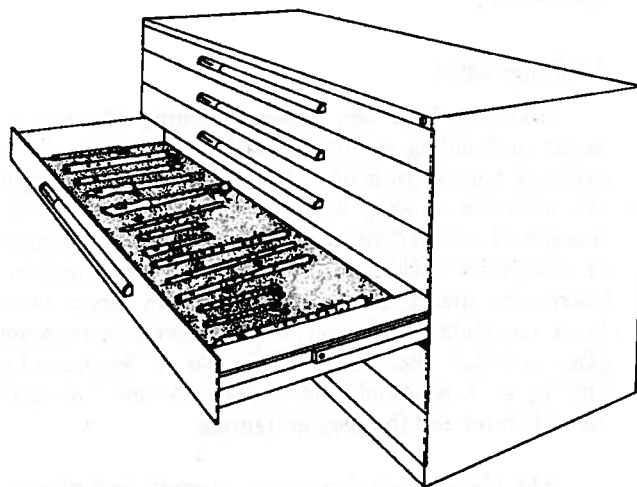


Figure 17: Ideal storage drawer for small instruments.

decrease the relative humidity of the display or storage environment to 45% RH, the optimum level, then the fungal growth must be repeatedly treated with a suitable fungicide. A commercially available spray fungicide and insecticide may be used for this purpose but this must never be used in the vicinity of any decorative finishes. Local growths on bare wood, leather, etc., may be treated with a mixture of 30% ethanol in water but, again, never near any varnish or other finish. Do not soak the material being treated—use the solution on a dampened cloth.

No instrument should be allowed to stand on a damp floor. If the dampness cannot be immediately cured the instrument should be raised on blocks which are sitting on polyethylene sheets.

Infestations of insects are best dealt with by application of naphthalene or paradichlorobenzene crystals which can be hung in small cloth bags in the storage cupboards or cases. These may even be hung inside the backs of keyboard instruments as an added protection. The felt and other cloth parts of instruments are favoured by carpet beetles and moths and should be very thoroughly checked. Never allow paradichlorobenzene to come in direct contact with varnishes or paints as it can act as a solvent. Always ensure that it is in an enclosed porous container. All insecticides and fungicides are potentially hazardous to health. Always consult the manufacturer's instructions before use. It is far better to prevent infestations of fungus and insects by vigilance, good housekeeping, and climatic control than to try to eradicate them with toxic substances.

The larger pests like rodents and birds are easily dealt with by regular cleaning and elimination of any means of ingress.

If any doubts or uncertainties arise with regard to any case of infestation, professional assistance should be sought immediately.

7.5 Light Level

Excessive light can cause bleaching of certain pigments and fading or discolouration of finishes. Regular exposure to sunlight is often recommended for maintaining the whiteness of ivory keys on keyboard instruments but this should not be done at the expense of fugitive pigments or susceptible finishes elsewhere on the instruments. An instrument should never be displayed in direct sunlight. More complete information on light levels in museums is given in C.C.I. Technical Bulletin No. 2 "Museum Lighting" by K. J. Macleod, and Bulletins 5 and 7 on environmental norms and fluorescent lighting.

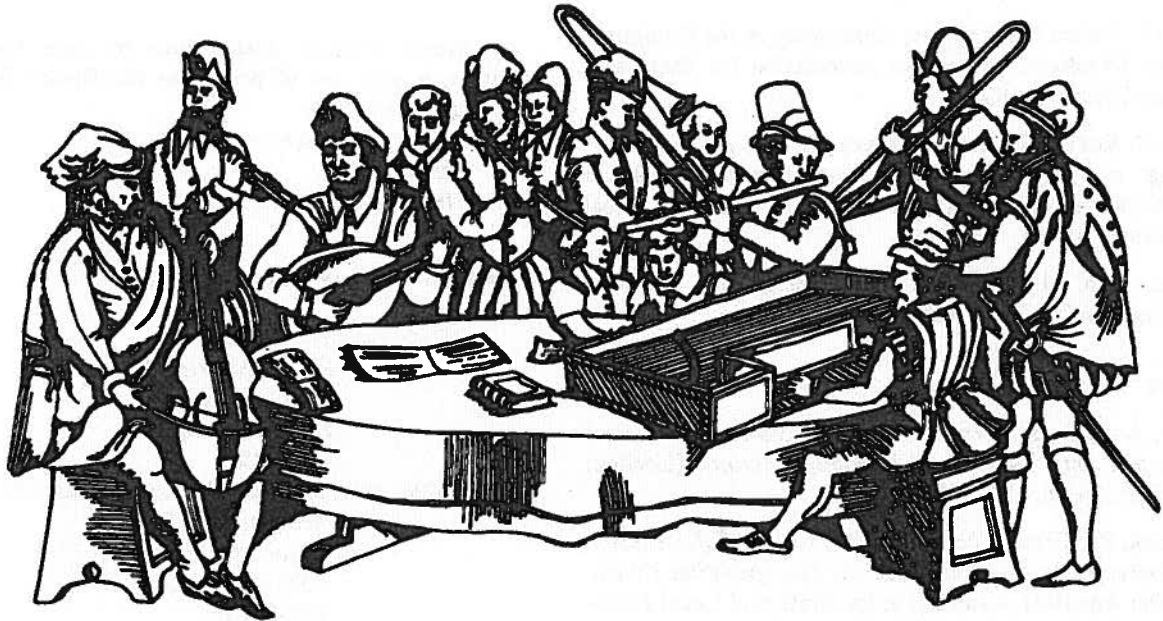
The above general notes on storage and display are intended simply as guidelines. It is outside the scope of this

Bulletin to deal at greater length with any of these topics and in most cases it would merely represent a duplication of more detailed publications which are already available. A bibliography is provided at the end of this Bulletin for further reading.

8. PERFORMANCE

An instrument may be restored so that, in common with other museum objects, it is pleasing and instructive visually or it may be restored to its full intended function as an instrument of music. If a full restoration of the latter type is contemplated then it is essential that all phases of the process be carried out under the guidance of a musical instrument conservator. In a large number of cases the instrument, once returned to playing condition and in a stable museum environment, will require no more attention than regular playing, tuning and servicing. It is the exceptions to this generalisation that cause the problems. It must be understood by the player that the instrument in question is a historic piece and that it must be treated accordingly. No attempt should be made to play an instrument that is suspected of being defective or untrustworthy. Do not allow any compromise to be made to any historical aspect of the instrument in order to bring it into the line with modern playing techniques. If the instrument is to be played it must be played in its original state and unless the curator and player are both aware of this the performance will be worthless. Instruments that have been played must be thoroughly checked and cleaned after use and if any defect or damage whatsoever is noticed performance on the instrument must be immediately discontinued until remedial action can be taken.

Although these guidelines appear extremely binding it must be borne in mind that the alternatives are much more undesirable. An instrument can easily be ruined through negligent use. Damage to musical instruments through misuse is not uncommon but with the exercise of care and attention, and particularly reasoned caution, this need not occur. The curator must use discretion and if, in his judgement, there is any doubt or question with regard to the playability of a musical instrument professional help is always at hand.



SUPPLIES

Wherever possible the supplies listed here are easily available in small quantities as commercial products.

Hardware Store:

Liquid detergent (Lux or Ivory)
Paste Wax
Mineral Spirits (Shellsol, Varsol, etc.)
Light Machine Oil
Polyethylene Sheet
Spray Fungicide (Lysol, etc.)
Paradichlorobenzene (or Mothballs as alternative)
Liquid Hide Glue (Lepage's Liquid Strength, Franklin's, etc.)
Beeswax
Paraffin Wax
Plate Polish (Goddard's)
Silver Polish (Silvo, etc.)

Drug Store:

Cotton swabs (Q-tips)
Disposable Gloves (cotton)
Disposable Syringes

Art Supplies:

Art gum erasers
Rubber Erasing Powder
Artist's Brushes
Indelible Ink
Tie-on tags (Stationary dept.)

Special Items:

Neats Foot Oil—leather goods store
Monofilament Nylon—fishing supplies
Ethanol—liquor store
Piano Felt—organ or piano tuner
Acrylic Sheet—plastics supply
Bubble pack (Air Cap)—plastics supply
Microfoam—plastics supply

REFERENCES

Only a small selection of books on the subject of musical instrument care is listed here. These are in general the ones which will be of most use in conjunction with this bulletin.

a) Identification

Baines, Anthony, *European and American Musical Instruments* (New York: Viking Press, 1966).

Cseleny, Ladislav, *Musical Instruments in the Royal Ontario Museum* (Toronto: R.O.M. Publications, 1971).

Jenkins, Jean, ed., *Ethnic Musical Instruments* (London: Hugh Evelyn, 1970. ICOM)

Langwill, Lyndesay G., *Index of Musical Wind-Instrument Makers*, 5th ed., rev., enl. and illustrated (Edinburgh: Langwill, 1977)

Mačák, Ivan, "A Preliminary Typology for Folk and Ethnic Musical Instruments Known to Have Been Used in Canada (Unpublished manuscript, 1977. Available from National Museum of Man, National Museums of Canada).

b) Examination and Documentation

Chenhall, Robert G., *Museum Cataloging in the Computer Age* (Nashville: American Association for State and Local History, 1975).

Chenhall, Robert G., *Nomenclature for Museum Cataloging: a System for Classifying Man-made Objects* (Nashville: American Association for State and Local History, 1978).

Jenkins, Jean, ed., *Ethnic Musical Instruments* (London: Hugh Evelyn, 1970. ICOM).

c) Care

Berner, A. et al., *Preservation and Restoration of Musical Instruments: Provisional Recommendations* (London: Hugh Evelyn, 1967. ICOM).

Guldbeck, Per Ernst, *The Care of Historical Collections: a Conservation Handbook for the Nonspecialist* (Nashville: American Association for State and Local History, 1972).

Hellwig, Friedemann, ed., *The Care of Musical Instruments: a Technical Bibliography for Conservators, Restorers and Curators* (CIMCIM committee of ICOM, 1977).

d) Storage and Display

Jenkins, Jean, ed., *Ethnic Musical Instruments* (London: Hugh Evelyn, 1970. ICOM).

Lafontaine, Raymond H., *Recommended Environmental Monitors for Museums, Archives and Art Galleries*, Technical Bulletin no. 3 (Ottawa: Canadian Conservation Institute, 1980. MNC).

Macleod, Kenneth J., *Museum Lighting*, Technical Bulletin no. 2 (Ottawa: Canadian Conservation Institute, 1978. MNC).

Macleod, Kenneth J., *Relative Humidity: Its Importance, Measurement and Control in Museums*, Technical Bulletin no. 1 (Ottawa: Canadian Conservation Institute, 1978. MNC).

Ward, Philip R., *Getting the Bugs Out* (Victoria: Friends of the Provincial Museum, 1976).

Ward, Philip R., *In Support of Difficult Shapes* (Victoria: British Columbia Provincial Museum, 1978).

Addresses

Ethnic Musical Instruments by Jean Jenkins, 1970 edition, is now out of print, but the British Book Centre reprinted it in 1974.

British Book Centre
Fairview Park
Elmsford, NY 10523

The following may also prove useful:

ROM: Publications Services
Royal Ontario Museum
100 Queen's Park
Toronto, Ontario
M5S 2C6

ICOM: International Council of Museums
Maison de l'Unesco
1, rue Miollis
75732 Paris Cedex 15
FRANCE

Note:

These books may be obtained from your local libraries or through interlibrary loans.