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CENTRE FOR THE
STUDY OF
MANUSCRIPT
CULTURES

WRITTEN ARTEFACTS AS CULTURAL HERITAGE

CENTRE FOR THE STUDY
OF MANUSCRIPT CULTURES
UNIVERSITÄT HAMBURG



STEP BY STEP GUIDE TO MANUSCRIPT SURFACE CLEANING AND MAKING E-FLUTE PHASE BOXES FOR MANUSCRIPTS

BIDUR BHATTARAI | MICHAELLE BIDDLE

NO 1

jalād rakṣet tailād rakṣed rakṣec chithilabandhanāt |
mūrkhahaste na māṃ dadyād iti vadati pustakam ||

‘Save me from water, protect me from oil and from loose binding, and do not give me into the hands of fools!’ says the manuscript.

(an anonymous verse found often at the end of the text in Sanskrit manuscripts)

Editorial

Research activities at the Centre for the Study of Manuscript Cultures (CSMC) largely revolve around how the production of written artefacts has shaped human societies and cultures and how these in turn have adapted written artefacts to their needs. The research into this interplay encompasses the exploration of the materials used, the contents, visual organization and the usage contexts as well as the cataloguing and storage of such objects.

Before they can actually start research, however, scholars are often confronted with the question of whether the physical condition of the artefacts at hand permits a thorough investigation or whether they need to be stabilized beforehand. Thus, research and preservation efforts frequently go hand in hand. Yet, as necessary as preservation measures may be to facilitate research in the first place, research results are also essential for preserving written artefacts as cultural heritage. Indeed, more than merely being objects of scholarly enquiry, such objects perform a crucial double function: as representations, they preserve the material cultural heritage of humankind. As generators, they continuously produce multifaceted meanings of cultural heritage for each new generation.

CSMC's new publication series, *Written Artefacts as Cultural Heritage*, is dedicated to highlighting precisely these aspects. A mix of practical guides, colloquium papers and project reports, the series is specifically intended for staff at libraries and archives, curators at museums and art galleries, and scholars working in the fields of manuscript cultures and heritage studies. Some volumes will target topics related to preservation with the aim of securing the continuous existence and safe handling of artefacts in the long term. Others will shed light on the identity-defining role of artefacts and follow their transformation over time, which maintains their significance as part of the cultural identity of future generations. Ethical aspects regarding the origin and ownership of artefacts and the responsibility of those handling them will also be raised.

Our first issue is a practical guide to manuscript surface cleaning and the making of archival boxes. This step-by-step manual is the result of hands-on workshops on preservation measures held in Kathmandu, Nepal as part of CSMC's project 'Safeguarding the Manuscripts in Nepal'. The overwhelming demand for continuous professional assistance in the daily work of taking care of collections in archives and libraries led the leaders of these workshops, Michaëlle Biddle and Bidur Bhattarai, to compose this manual. Although based on experiences in Nepal, this guide provides knowledge and skills that equally apply to preservation efforts in other regions.

Join us in our endeavour to amplify the voices of the past as we bring them into the future!

Sincerely,



Dr. Doreen Schröter



Prof. Dr. Michael Friedrich

Introduction

As exemplified in the initially cited verse often found at the end of Sanskrit manuscripts, handwritten artefacts should be preserved in their physical integrity and protected from man-made or natural disasters. The safeguarding and conservation of such manuscripts and manuscript collections is thus not a choice but a duty. Based on this considered opinion, the Centre for the Study of Manuscript Cultures (CSMC) of Universität Hamburg has carried out successful preservation projects around the globe in the past, among them ‘Safeguarding the Manuscripts of Timbuktu’ in Mali (2013–2018). Following this, CSMC launched the project ‘Safeguarding the Manuscripts in Nepal’ with the generous support from the German Federal Foreign Office and Gerda Henkel Foundation in July 2018. The aim of this project is to preserve the written cultural heritage of Nepal and to train local people in the making of phase boxes (sometimes also referred to as archival boxes) as well as preservation and digitization measures.

As a kick-off event for the project, CSMC organized a ‘Consultation on the Preservation of Palm-leaf Manuscripts’ at Universität Hamburg, on 7–8 August 2018. The topics discussed on this occasion included, among others, the preparation of palm leaves as writing support and their preservation. Regarding the latter, a panel of experts reviewed traditional materials and methods used for the preservation of palm-leaf manuscripts as well as the production of phase boxes.

Furthermore, CSMC organized two workshops: the hands-on basic workshop ‘Care and Conservation of Palm-leaf and Paper Manuscripts in Nepal’ on 17–18 and 24–26 July 2019, and the basic plus advanced hands-on workshop ‘Care and Conservation of Manuscripts and Artefacts in Nepal’ on 7–18 February 2020 in co-operation with the Āśā Saphūkuthi (Āśā Archives) in Kathmandu, Nepal. Staff members of various public and private libraries and archives participated in these training courses. At the end of the workshops most of the participants were able to produce various forms of phase boxes for manuscripts according to standard. Both workshops were conducted by one of the authors of this guide, Michaelle Biddle, a renowned conservator with extensive experience and permanent fellow at CSMC.

Since the conclusion of these events, various additional measures for the preservation and conservation of manuscripts have been carried out in Kathmandu. In this volume we focus on two vital issues, namely manuscript surface cleaning and the making of E-Flute phase boxes for manuscripts by visually demonstrating stages step by step with the help of photographic

examples. Conservation technicians Kedar Ghimire and Tej Maya Maharjan (CSMC) have graciously participated in the production of these photographs. This guide originated from the above-mentioned workshops and has primarily been designed to assist those who have attended the trainings. However, the measures described here may be applied to all types of pothi manuscripts, regardless whether they are made from palm leaves, paper, birch bark or other material. As such, it is the authors' hope that these instructions may prove helpful for a larger circle of librarians, archivists and curators, who maintain such valuable artefacts.



Participants of the workshop 'Care and Conservation of Palm-leaf and Paper Manuscripts in Nepal' (July 2019) and instructor Michaëlle Biddle discussing necessary steps of preservation for specific artefacts in order to prevent further damage.

1. STEP BY STEP GUIDE TO MANUSCRIPT SURFACE CLEANING

A focused conservation strategy, whereby collections or even single manuscript items are treated in stages or phases over a period of time according to a planned and logical sequence of procedures, will achieve economies of scale and utilize resources most effectively. Extensive conservation of individual artefacts should be secondary to collections' care procedures such as maintaining proper storage, display and usage environments and cleanliness.

Manuscripts are physical objects and as such contain historical and technological information beyond their contents and, like all objects, can be most useful when compared with other similar ones. We must be willing to accept written artefacts as we receive them from past generations. To a certain extent, damage and wear reflect their history. The task of collections' care and conservation is to make items stable enough to allow safe handling and study, repairing only where absolutely necessary. The most important principles of modern conservation are that any treatments should preserve an artefact whilst maintaining its historical integrity and all treatments should be reversible in case they prove unhelpful or inappropriate in the long term. Given these principles, a minimal intervention strategy is prudent. All materials will age and deteriorate with the passage of time, but cleanliness, constant control of humidity, temperature, and light, and properly enforced procedures regarding storage, handling, and maintenance will have the greatest positive impact on the long-term preservation of manuscripts.

WHY CLEANING IS IMPORTANT

Although it is neither necessary nor desirable to remove discolouration from manuscript folios, surface brush cleaning – using soft brushes or a variable speed control HEPA (High-Efficiency Particulate Air) vacuum – removes substances, such as dust, mould, insect and rodent remnants, that might eventually damage manuscript folios or that might be transferred to other folios during handling. Dust must be removed as it is as abrasive and as destructive as sand (glass) paper rubbing against manuscript folios. Dust is a major enemy as it provides nesting material for insects, an incubator for mould spores and a focus for acid precipitation. Motorcycles and cars spew nitrous and sulphurous oxides that precipitate onto dust as corrosive acid dots that can eat into folios.

HANDLING MANUSCRIPTS

Handle manuscripts with clean, dry hands. Cotton gloves are not recommended as they can catch on rough or frayed folios. Always use two hands to fully support manuscript folios. It is advisable to not wear rings or dangling jewellery as metal could catch and tear or mark manuscript folios. Clothing should be close to the body in order to avoid accidentally catching the edges of manuscript folios.

EQUIPMENT

- Soft flexible bristle brushes – Hake type with bamboo handles preferred
- Stiff bristle brush
- Variable speed control HEPA vacuum (Conservation by Design EQGSB0220); this (MUNTZ 888-MU-E GS) vacuum cleaner is a compact, lightweight, multi-functional device with micro-tools. Its suction level can be adjusted from very light to very strong.
- Photocopy paper
- Polyester screening
- Detergent (fragrance-free)
- Ethyl alcohol
- N95 masks or a mask modelled on a surgical mask made with outer layers of tightly woven washed cotton, an inner layer of tightly woven washed flannel and fabric ties. For reuse this type of mask can be washed in a 1% bleach (sodium hypochlorite) / water solution. After washing in the bleach solution, the mask must be rinsed multiple times before being used. This type of cotton mask is approximately 70% as effective as an N95.

BRUSHES VS HEPA VACUUM

When using brushes, one produces micro levels of dust, invisible to the naked eye, that float and settle on and around the space where the cleaning is being carried out. A Hake type six stem bamboo-handled brush can be used for surface cleaning. Brushes used for surface cleaning should not be used for any other work. Any brushes used on mouldy materials should either be labelled and kept separately to avoid spreading mould to other papers or should be dipped into alcohol to kill mould spores after a thorough washing. After washing, brushes must be hung from the handle, bristles down and air-dried.

HEPA vacuums differ from conventional vacuums in that they contain filters that are capable of trapping extremely small, micron-sized particles. A true HEPA filter can trap 99.97 percent of all airborne particles larger than 0.3 microns. The smallest mould spore size is 1 micron. This means that all mould spores will be contained in the internal HEPA vacuum filter. Variable speed control is necessary to adjust suction levels when dealing with manuscripts. Cleaning with this type of vacuum is safer for humans, more time efficient but the initial outlay is more costly.

Brushes, whether Hake or vacuum micro tools, should be washed when dirty or, at a minimum, after cleaning a complete manuscript. One will not necessarily see dirt. Hake brushes should be washed when the bristles become visibly dirty, stiff or if the brush becomes heavy as much of the dust and mould spores collected is microscopically fine.

STEP BY STEP

The manuscript used in the following photographic essay contains a text of the *Skandapurāṇa* written in Newari script and is held with the shelf-mark DPN 07252 by the Āśā Saphūkuthi (Āśā Archives) in Kathmandu, Nepal. The manuscript pictured is in pothi form, which is typical for paper and palm-leaf manuscripts throughout Nepal, India and adjacent areas. The methods portrayed may be used for both paper and palm-leaf manuscripts.

Traditional treatment of palm-leaf folios often involves recurrent oiling leaves. Due to lack of scientific testing these methods are not recommended at this time. Application of oil will also obscure original codicological information. If the palm leaves are brittle and/or dry then traditional humidification techniques would be more appropriate.



Fig. 1: The manuscript folio is placed on clean, white photocopy paper. The conservation technician uses a piece of paper to protect the folio from her hands, which is held firmly in place as she works. The brush is placed in the center of the folio and brushed gently but firmly in one direction (not back and forth), brushing beyond the folio edge and covering the entire folio. It is important not to flick the brush at the end of each stroke as that would disperse the dust into the air. If the white photocopy paper becomes soiled it should be replaced.



2

Fig. 2: After brush cleaning one side of the manuscript, the folio is turned over using both hands, safely supporting it.



3

Fig. 3: The conservation technician continues with the brush cleaning on the reverse side. A stiffer bristle brush may be required for removal of encrusted dirt such as mud. Once the hardened dirt is removed and the folio surface exposed, cleaning should continue with a softer brush. In cases where a large amount of dirt or debris is removed, the dirt should be brushed onto a paper dust-pan and discarded before continuing with the next folio.



Fig. 4: The manuscript folio is cleaned using the variable speed-control HEPA vacuum with micro tools. A piece of polyester screening is placed on top of the folio during vacuum cleaning to prevent damaging the folio, or in case it has brittle sections or parts that are coming loose. The suction level is set very low and the folio is cleaned through polyester screening in order to ensure that brittle or loose edges are not pulled into the vacuum.

Pothi

The term *pothi* (from Sanskrit *pustikā*; cf. *pustaka*) is used to refer to written artefacts constituted by stacks of oblong folios, i.e. they are longer than wider. These folios can be made of palm leaves, sheets of paper or bark, e.g. from birch. Each folio may have one or more holes, through which a string can run to keep the stack together. If there are no holes, the folios may be wrapped in a piece of cloth. Unbound/unwrapped pothis are also commonly found. Pothis have been used in Central, South and South East Asia from at least the first centuries CE until today, e.g. in restricted contexts in mainland South East Asia.

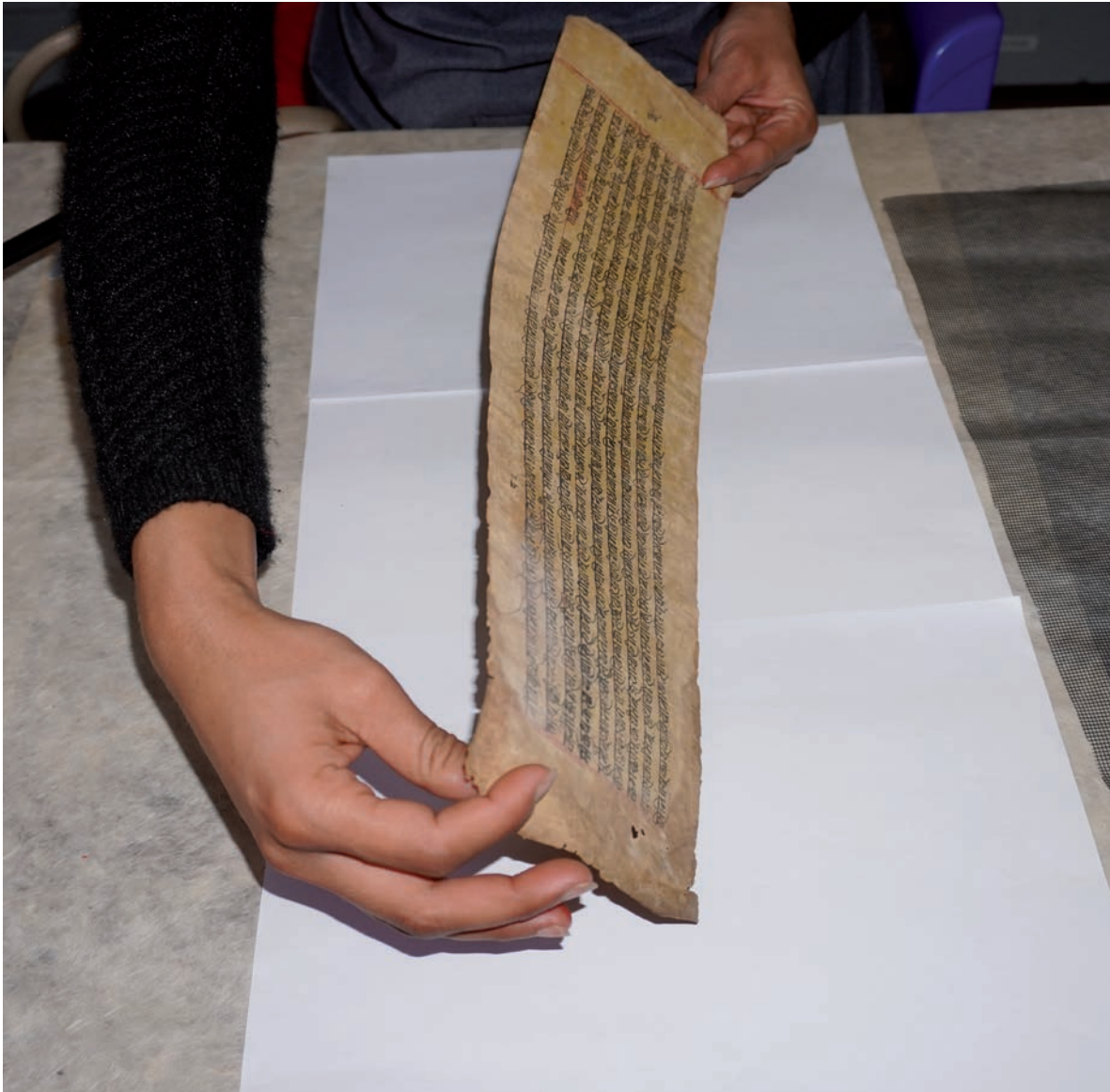


Fig. 5: After one side is cleaned, the folio is carefully turned over using two hands. The reverse is then cleaned as shown in Fig. 4. This process is continued until the entire manuscript has been cleaned, folio by folio, side by side.

SAFETY PRECAUTIONS

If the manuscript has mould the cleaning should be done outside and the conservation technician should wear a N95 or three-part cotton mask (see Fig. 6). After manuscript cleaning is completed, all brushes, polyester screening and hands should be thoroughly washed with detergent, rinsed multiple times and then sprayed or dipped in alcohol. After washing, brushes must be hung from the handle, bristles down and air-dried. The photocopy paper is discarded.

Surface cleaning is repetitive work and therefore finished work should be periodically checked for quality and thoroughness by using a clean white cotton cloth brushed over areas with no text.

2. STEP BY STEP GUIDE TO MAKING E-FLUTE PHASE BOXES FOR MANUSCRIPTS

Boxing is a fundamental part of maintaining proper storage for manuscripts. Boxes minimize handling during cataloguing, paging, research and cleaning. They also protect against light and provide a buffer to temperature and humidity fluctuations and polluted air. They provide a first line of defence against attacks by insects, mice and rats. Boxes are easier to keep clean than bare or fabric wrapped manuscripts.

The instructions for this type of one-piece E-Flute box were published in 1995 by Artemis Dea of the Alaska State Library in *Conservation Book Repair: A Training Manual*, and were revised in 2003/2019 by Michaëlle Biddle (see Supplement). These are the instructions and tools that Biddle has used for multiple projects in Mali, Nepal, Nigeria, the United States of America, Vietnam and Zanzibar. These boxes are snugly sized to fit individual objects and can be used for items that are shelved either vertically or horizontally. The E-Flute board used is acid-free, lignin-free and alkaline-buffered with a 3% calcium carbonate reserve. It is slightly water-resistant. It is approximately 1.6 mm (1/16th inch) thick, consists of three strong layers and is easy to cut with a breakaway knife. The E-Flute used in this project has a smooth outer grey/blue layer, an inner white layer and a white fluted corrugated middle layer sandwiched between the outer and inner layer. Another type of acceptable E-Flute is composed of three grey/blue layers. The corrugated layer is compact and small enough that it is not attractive to homeless insects seeking nests. Boxes made from this material are strong enough to be stacked to take advantage of available space (Fig. 54).

When handling a manuscript, it is advisable to not wear rings or dangling jewellery as metal could catch and tear or mark manuscript folios. This caveat does not apply to the box making process.

STEP BY STEP

The manuscript used in the following photographic sequence is entitled *Skandapurāṇa* and held with the shelf-mark DPN 07252 by the Āśā Saphūkuthi (Āśā Archives) in Kathmandu, Nepal. The manuscript pictured is the pothi form of paper and palm-leaf manuscripts found throughout Nepal, India and adjacent areas. These manuscripts should be shelved horizontally.

One should first read the instructions in the supplement in order to more closely follow the step by step photo essay.



Fig. 6: Tools – (clockwise from lower left) – standing steel squares, flat machinist square, mini Zona square, brush, straight edge (ruler) with cork back, rubber mallet, 1 cm punch, N95 mask (especially for cleaning), shears, needle awl, Olfa silver breakaway knife, white rubber, graphite pencil, large Teflon folder, tapered bone folder

TOOLS (Fig. 6)

- 60 x 90 cm (24 x 36 inch) self-healing cutting mat
- 60 cm (24 inch) stainless straight edge (ruler) with cork back
- Olfa silver breakaway knife
- Olfa knife refills (on average one blade is used whilst fabricating one box)
- Needle awl (made from a #18 Binders needle and a 5 cm wood dowel)
- Pair 13 cm (5 inch) or 21 cm (8 inch) standing steel squares
- Mini Zona square
- 13 cm x 8 cm flat machinist square
- 13 cm (5 inch) Dahle super shears
- Large Teflon folder
- Tapered bone folder
- 1 cm (1/2 inch) punch
- Fibreglass rubber mallet
- Jade 403 PVA adhesive
- 0.6 cm (1/4 inch) brush with stiff bristles
- Graphite pencil
- White rubber
- 150-220 grit sand (glass) paper - white, yellow or light grey



Fig. 7: The unprocessed manuscript



Fig. 8: Manuscripts should be removed from cloth wrappers but all parts must be kept together. This manuscript has no front or back cover boards, which is to be expected with such manuscripts. Cover boards help support the manuscript and keep it stable when being handled. This manuscript requires cover boards, which will be provided using the same corrugated E-Flute board that is also used for the E-Flute phase box.



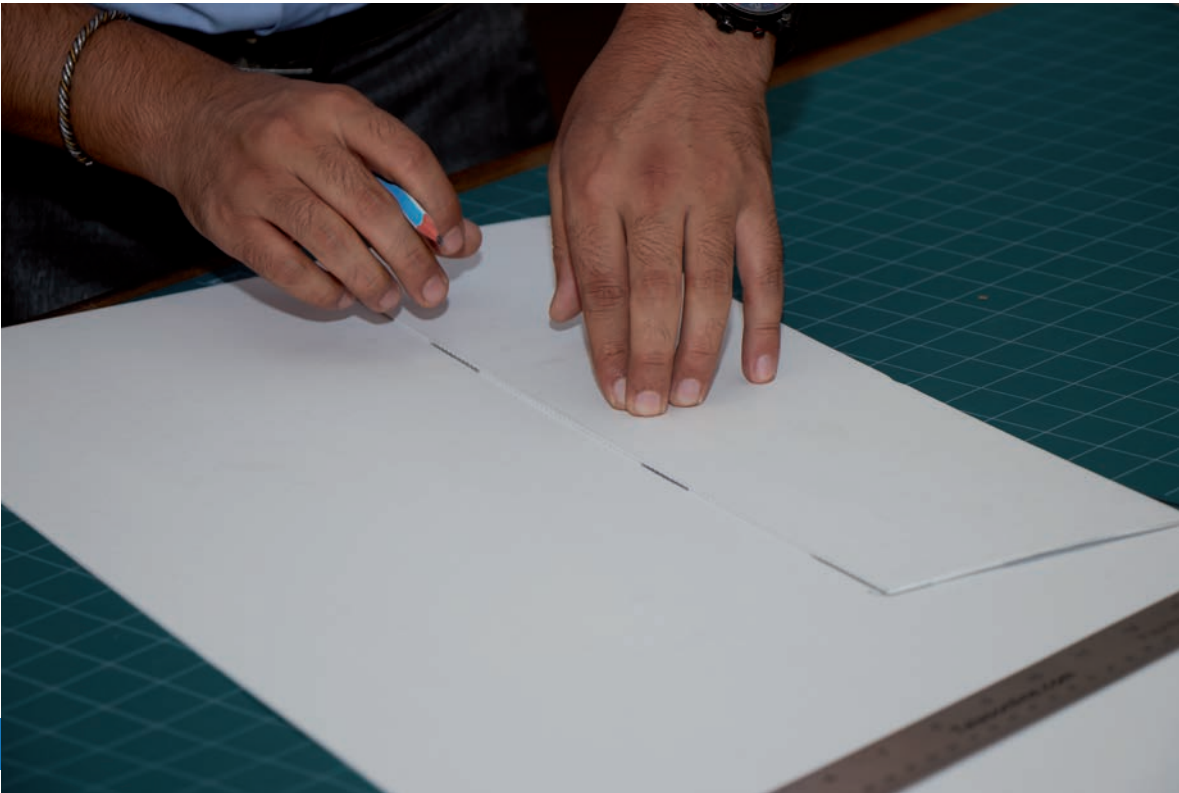
9

Fig. 9: Precise measurements are taken on the E-flute board in order to supply the first cover for the manuscript.



10

Fig. 10: The first cover board is cut out. A flexible stainless-steel straight edge (ruler) with an anti-slip cork backing is used to give the best support ensuring the cover is cut smoothly and accurately using an Olfa silver breakaway knife.



11

Fig. 11: The first cover board is used to measure the second cover board. Only graphite pencils are used as any unwanted marks can then be removed with a white rubber.



12

Fig. 12: The second cover board is cut out.



13

Fig. 13: E-Flute cover board corners are rounded to eliminate sharp points with a pair of stainless-steel shears. Covers with sharp points could potentially damage both the manuscript and the manuscript's wrapping materials.



14

Fig. 14: Manuscript with front and back cover boards

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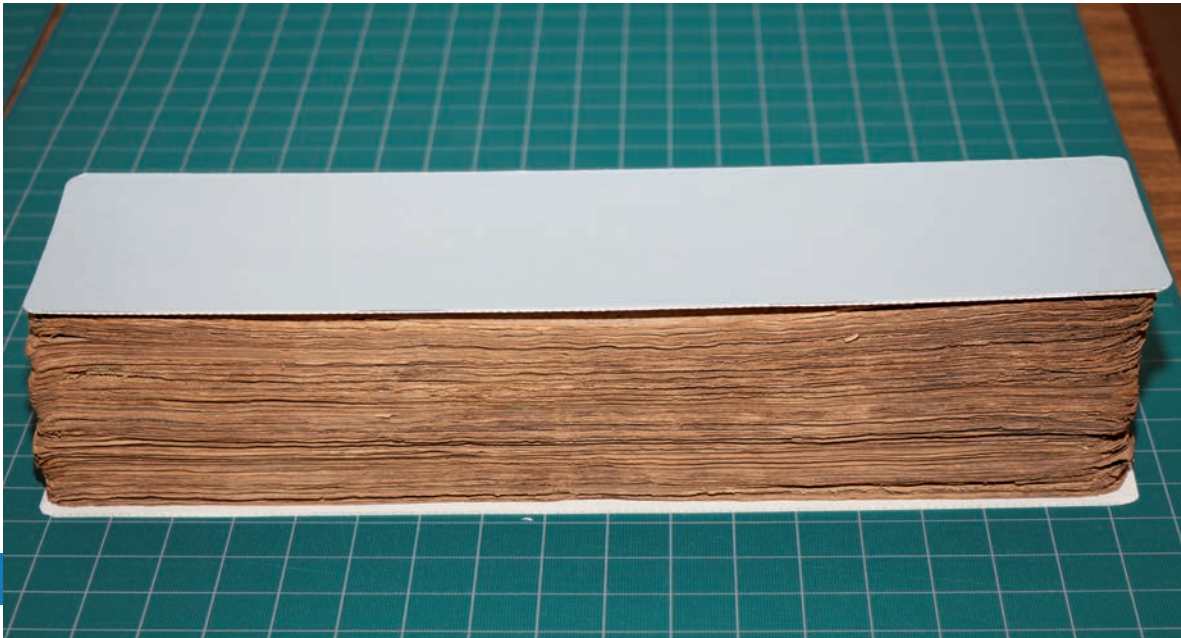


Fig. 15: Front and back cover boards in place protecting the manuscript

16



Fig. 16: After cleaning (see STEP BY STEP GUIDE TO MANUSCRIPT SURFACE CLEANING above), the manuscript is wrapped in a piece of acid-free, locally-produced lokta paper. The size of the lokta paper is matched to the size of the manuscript. Wrapping the manuscript in this paper adds a layer of protection and buffering for fragile manuscript edges.

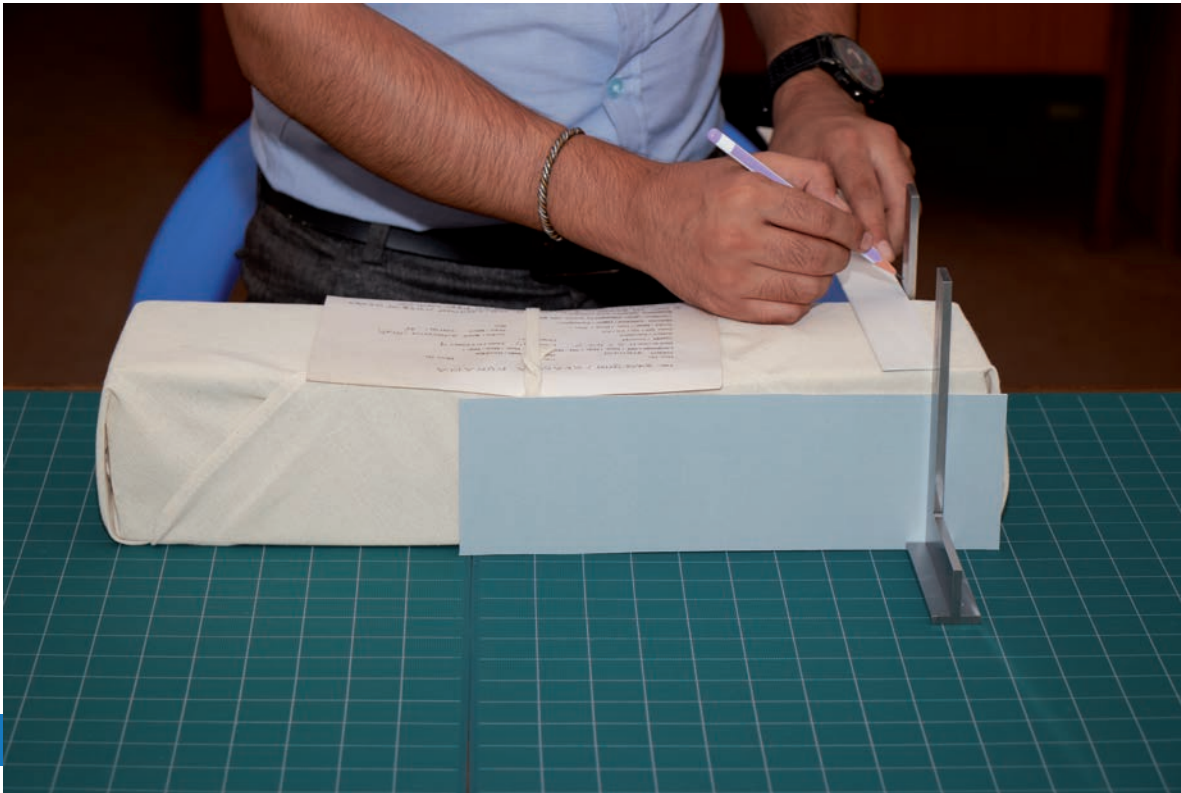


17

Fig. 17: At this point, the manuscript is wrapped up once more in a correctly sized, unbleached cotton muslin cover. In many South Asian countries and sometimes also in adjoining regions, a colourfully dyed piece of cloth (e.g. red, orange, yellow) is frequently used for wrapping manuscripts. Numerous samples of red cloth have proven the dye to be water-soluble with numerous cases of red dye transferred to the manuscripts. There is no scientific proof supporting the tradition of using coloured cloth to protect against insects.

The unbleached muslin cover must be sized to fit the manuscript. The sides and binding string of the covers must be smoothly sewn to avoid any unnecessary folds or wrinkles. After sewing the unbleached muslin covers are washed using detergents that contain no chemicals or fragrances that could harm the manuscripts. After washing, the muslin covers are ironed smooth.

Great care must be taken when wrapping the manuscript in its unbleached muslin cover, avoiding unnecessary folds or wrinkles. Impressions from folds or wrinkles could, over time, be transferred to the manuscript.

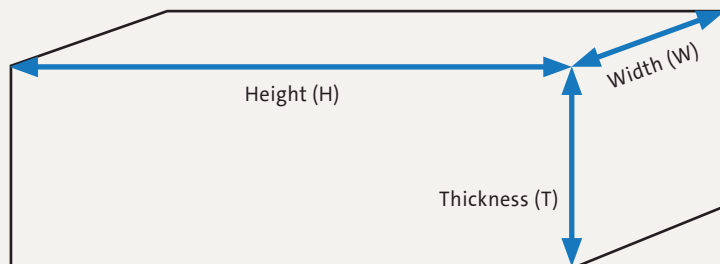


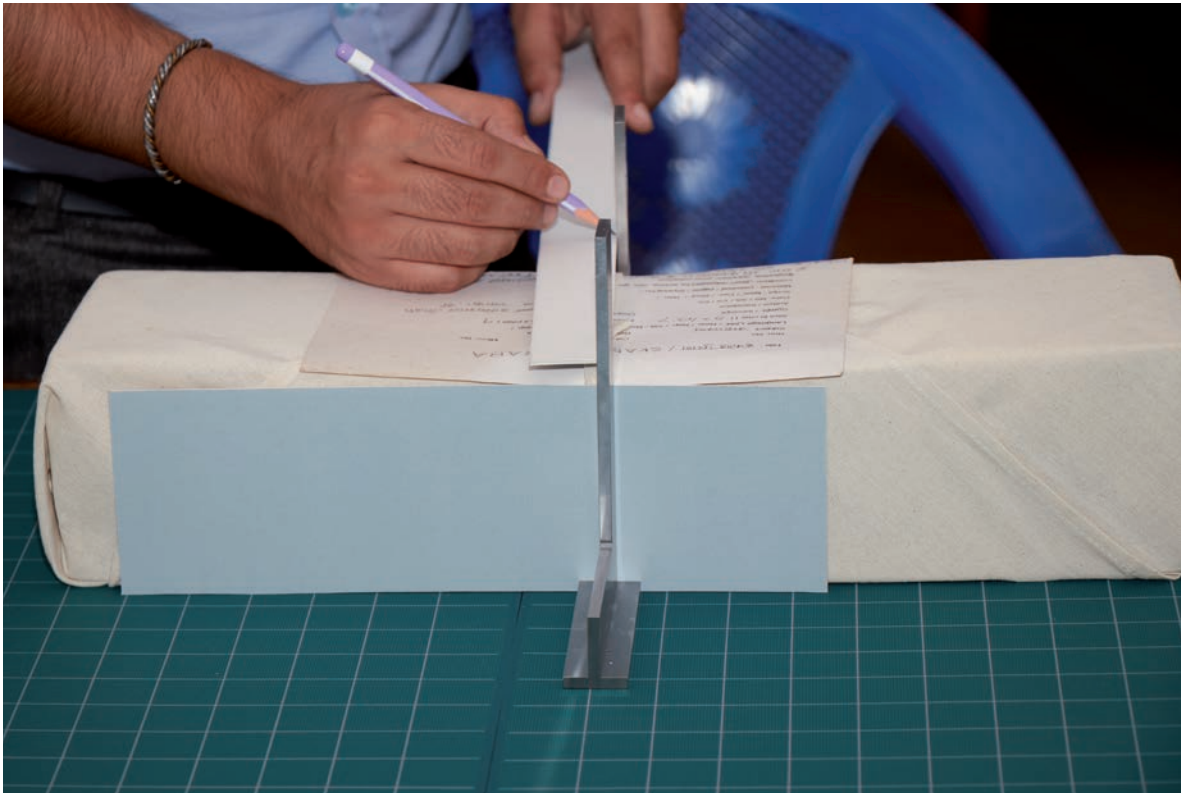
18

Fig. 18: A narrow strip of E-Flute board is used to record the width (W), thickness (T) and height (H) of the wrapped manuscript. A piece of E-Flute is added to the width of the manuscript in order to accommodate the inner tray flaps of the finished box (Fig. 51). Standing steel squares are used to assist in accurately measuring the width and height of the manuscript. Measurements are taken in at least three locations along both the long and the short side.

The instructions for this type of one-piece E-Flute box were published in 1995 by Artemis Dea of the Alaska State Library in *Conservation Book Repair: A Training Manual*. As the reference terms designating the spatial dimensions in these instructions are based on the codex form of manuscripts, they appear counterintuitive with regard to pothi. The diagram below shall facilitate orientation.

Diagram of Measurements





19

Fig. 19: The second width measurement is taken at the centre of the manuscript.

20

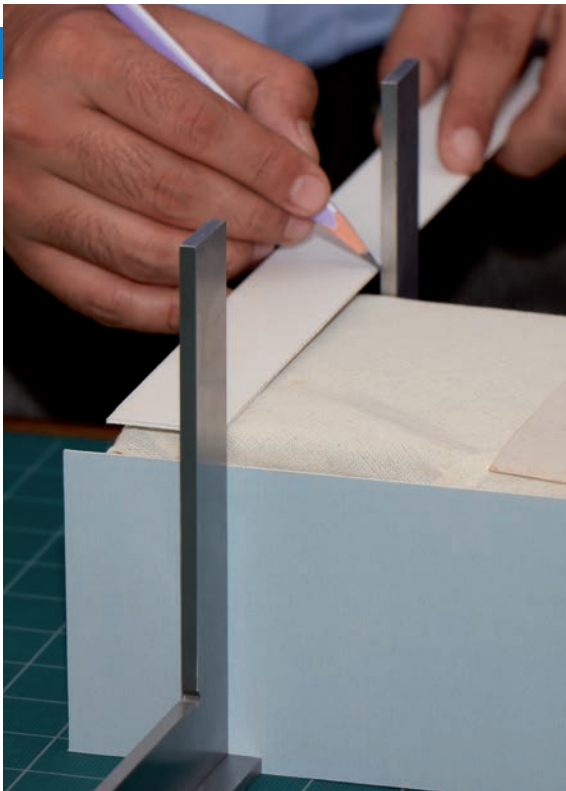
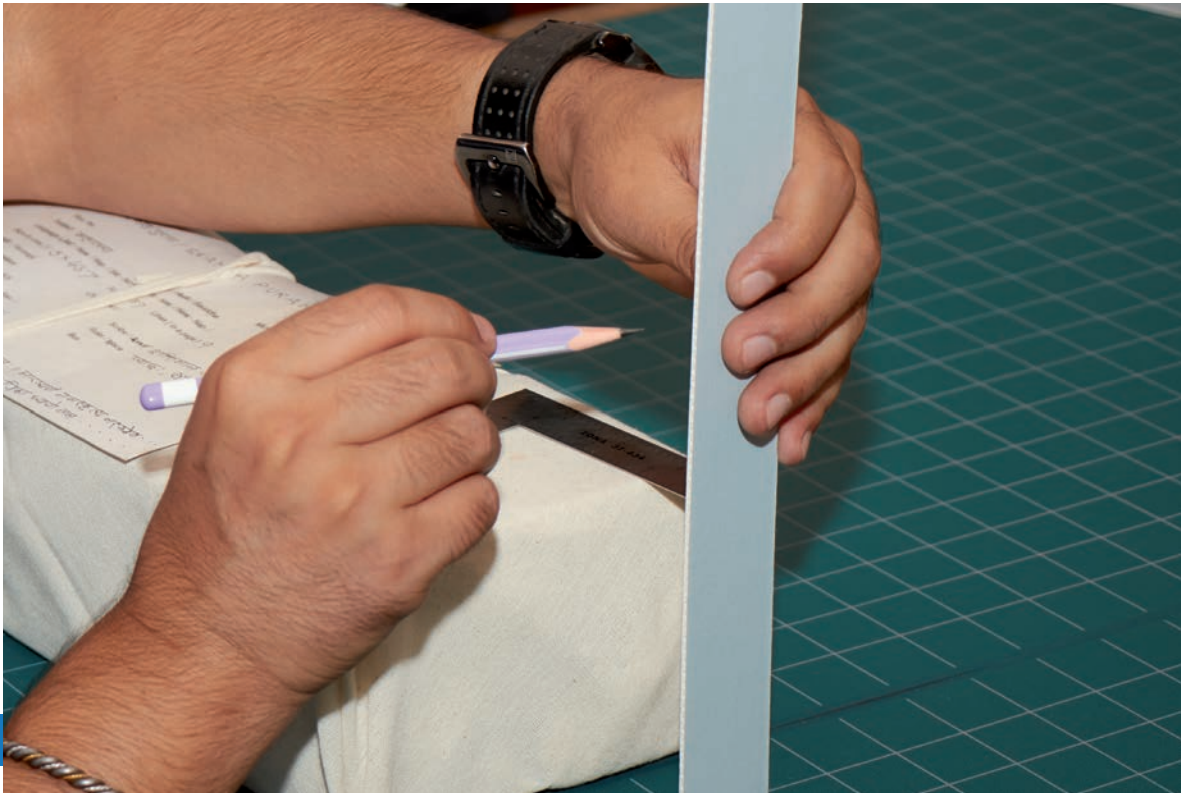


Fig. 20: The third width measurement is taken. The largest of the three measurements is the one that will be used for fabricating the E-Flute phase box.

21



Fig. 21: The height (H) is measured. This measurement is repeated at three points along the short side.



22

Fig. 22: The thickness (T) is measured at the side of the manuscript. A small, thin stainless-steel Zona square is used to take the measurement of the thickness of the manuscript. Here, one measurement is recorded from one edge of the manuscript. Another measurement is taken a few centimetres away from the edge of the manuscript.



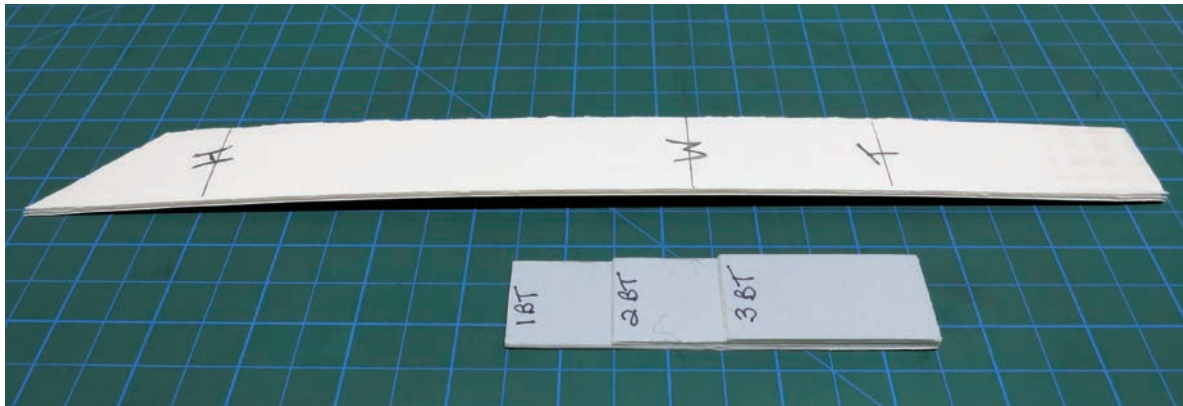
23

Fig. 23: A third measurement of the manuscript's thickness is taken.

This measurement formula is as follows:

Left side of board: T (thickness) + $1BT$ (1 board thickness); H (height) + $3BT$ (3 board thickness); T (thickness) + $1BT$ (1 board thickness)

Bottom of board: T (thickness) + $1BT$ (1 board thickness); W (width) + $2BT$ (2 board thickness); T (thickness) + $2BT$ (2 board thickness); W (width) + $1BT$ (1 board thickness); T (thickness) + $1BT$ (1 board thickness)



24

Fig. 24: Final measurement stick showing manuscript thickness (T), width (W) and height (H) and a BT (board thickness) jig. On the measurement stick, all measures (T , W , H) relate to the bottom edge of the stick, which is seen here at the right side of the picture.



25

Fig. 25: The machinist square is used to verify that the bottom left corner of the E-Flute board is a 90-degree square. This corner is marked in pencil with a small square at the bottom left corner of the E-Flute board (Supplement, page 1). Measurements are now transferred onto the E-Flute used for the phase box using the measurement stick and board thickness jig (Supplement, page 1 – Construct a measuring jig) according to the formula shown in Biddle 2019.

The formula in abbreviated form is:

Left side of board: $T + 1BT$; $H + 3BT$; $T + 1BT$

Bottom of board: $T + 1BT$; $W + 2BT$; $T + 2BT$; $W + 1BT$; $T + 1BT$

Using a sharpened graphite pencil, the first measurement is marked with a short line, the second measurement with a longer line. The longer lines are scoring and fold lines.

26



Fig. 26: Measurements are transferred onto the E-Flute using the measurement stick, the board thickness jig and a straight edge after the measurements made along the bottom and left side of the board are transferred to the top and middle side of the E-Flute (Supplement, steps 5 & 6).



27

Fig. 27: The first vertical score line is now marked using the (tapered) bone folder. This is creating the front wall of the box cover (Supplement, page 1). Here one has to press the bone folder in a manner that produces a score line but without tearing the E-Flute board or making unnecessary holes.



28

Fig. 28: The second vertical line is now made using the bone folder. The third and fourth vertical lines are also marked using the bone folder. The section between the second and third line will form the box wall between the cover and the tray. The section between the third and fourth line will form the base tray and the section between the fourth line and the right edge of the E-Flute board will become the wall of the box base tray.



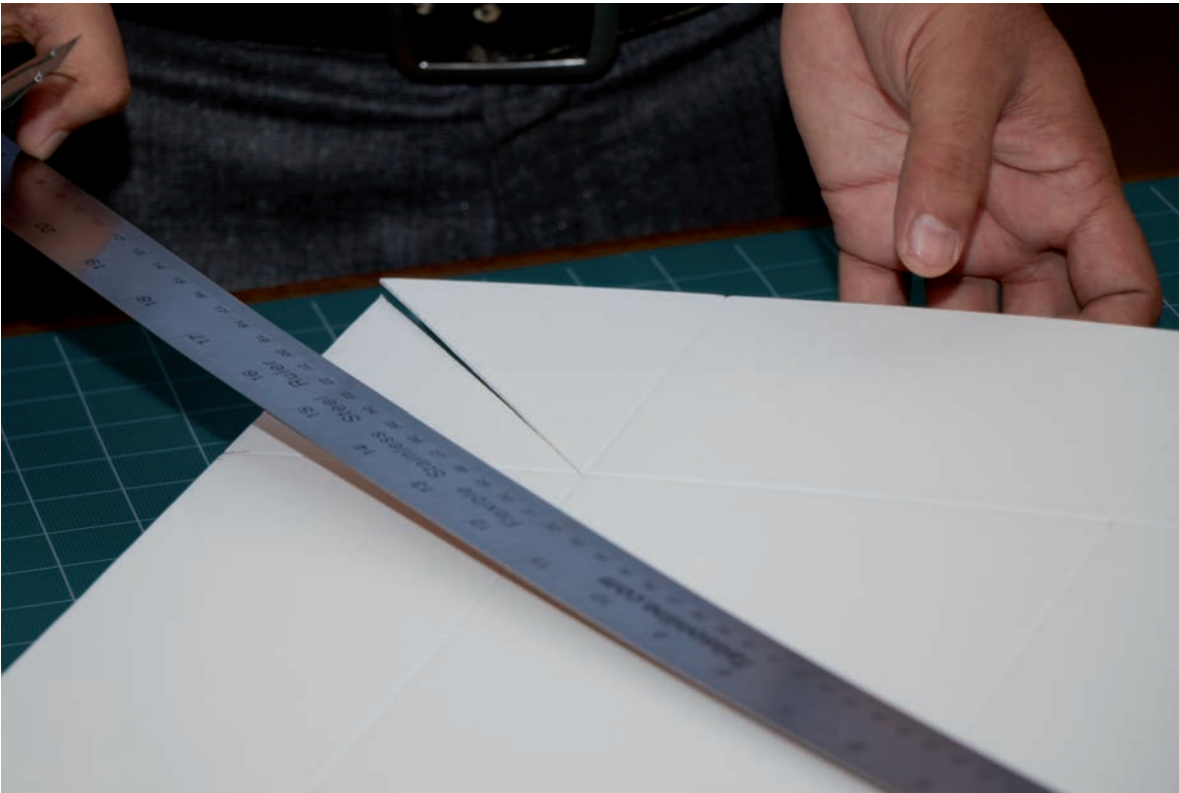
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Fig. 29: The last vertical line is now scored.



30

Fig. 30: After all lines have been made, a needle awl is used to mark the central point at the corner. Marking a small hole with the awl makes it easier to cut the downside of the cover tray and middle part of the bottom of the wall which, upon completion, will bend inwards while closing the box.



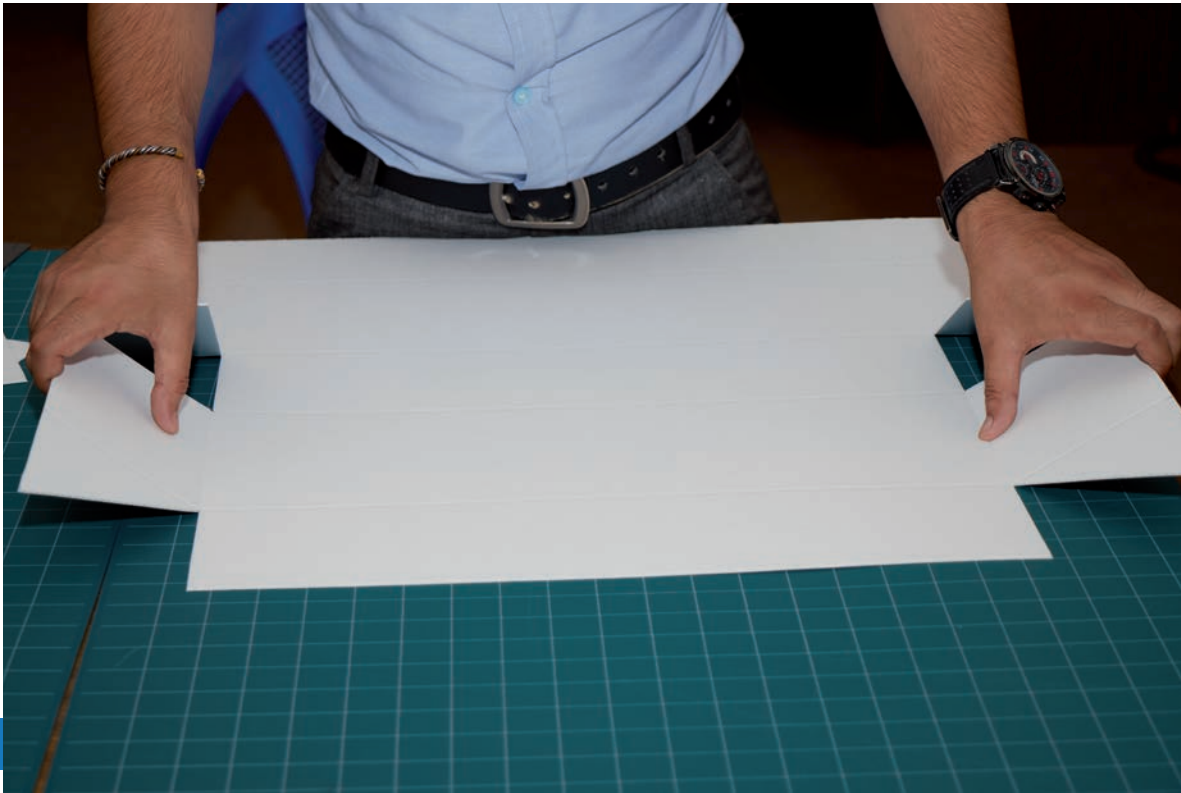
31

Fig. 31: Now the inside part of the corner at each of the four edges of the board has to be trimmed away (Supplement, step 8). An Olfa silver breakaway knife is used to trim the square corner of the board with the utmost care and precision.



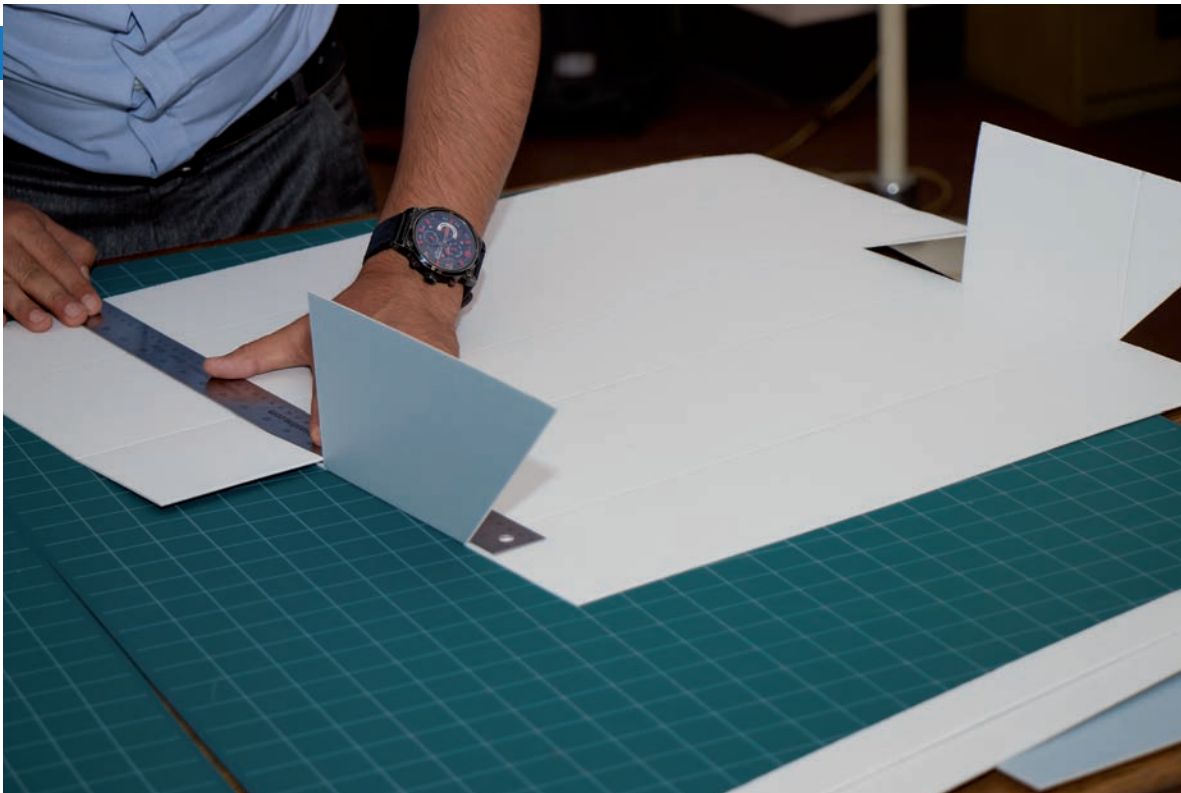
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Fig. 32: The result of trimming the inside triangle of the corner



33

Fig. 33: Both sides of the cover tray after trimming and cutting



34

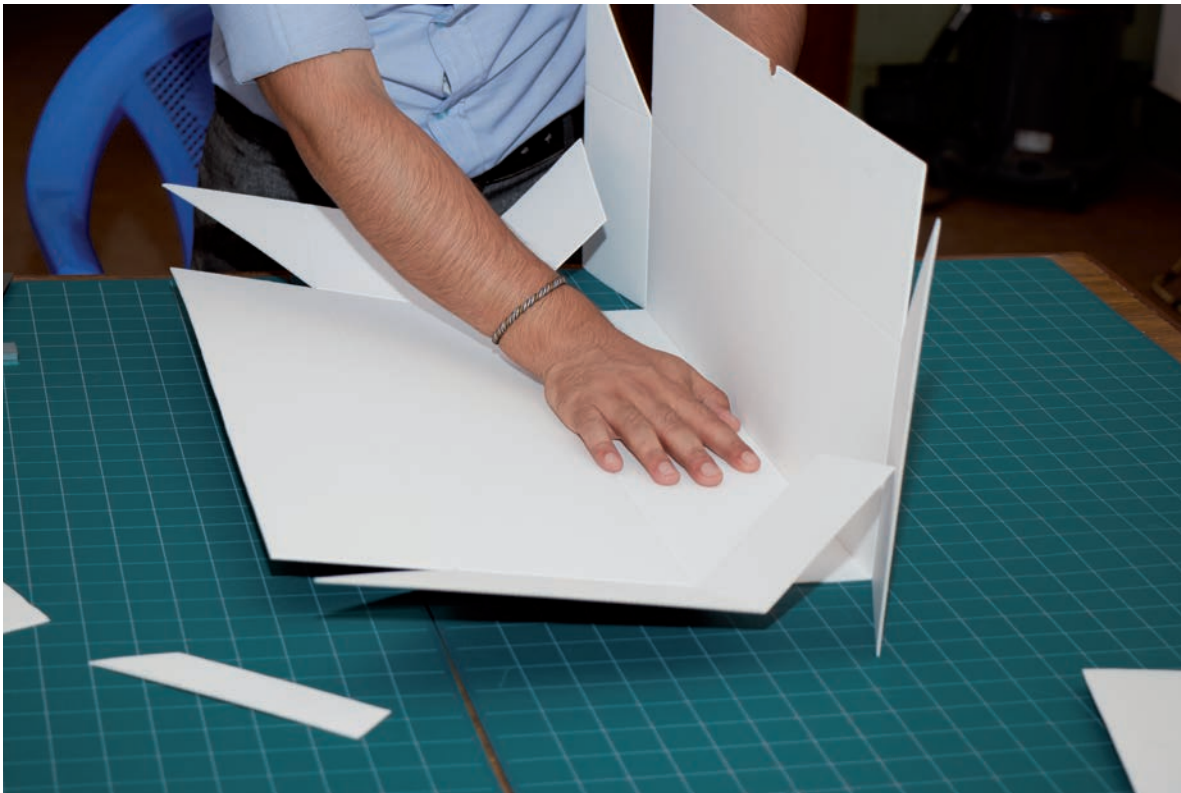
Fig. 34: The line for the base tray is now scored.

During the measuring and scoring, the line for the base tray should be 1 BT less inside than the cover tray. The base tray should be smaller than the cover tray so the two trays nestle inside each other upon closing the box (Supplement, step 7).



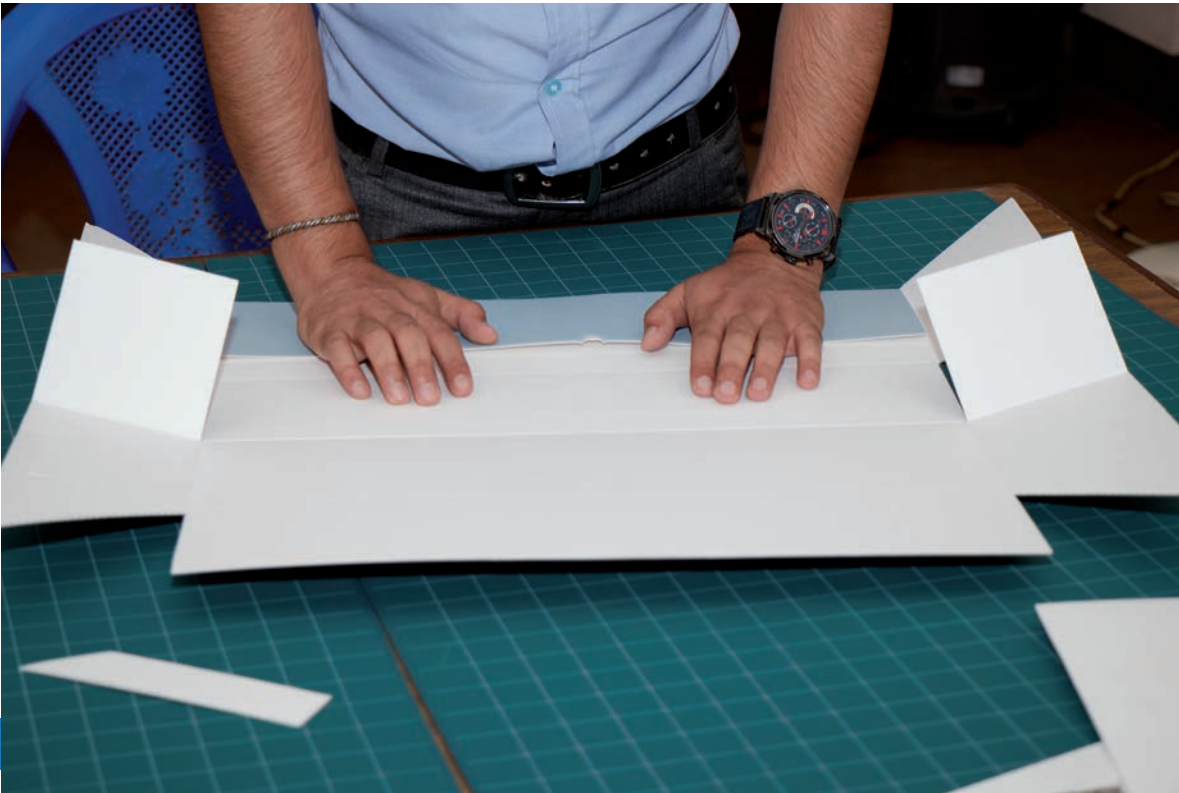
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Fig. 35: A thumbhole (half-circle) is punched on the cover tray using a punch and fiberglass handled rubber mallet. As one is striking metal, it is important to use a rubber mallet in order to avoid a dangerous spark. Making a thumb hole arc helps to open the box easily as these boxes are very tightly fitted. The thumb hole arc should be made in the centre edge of the cover tray.



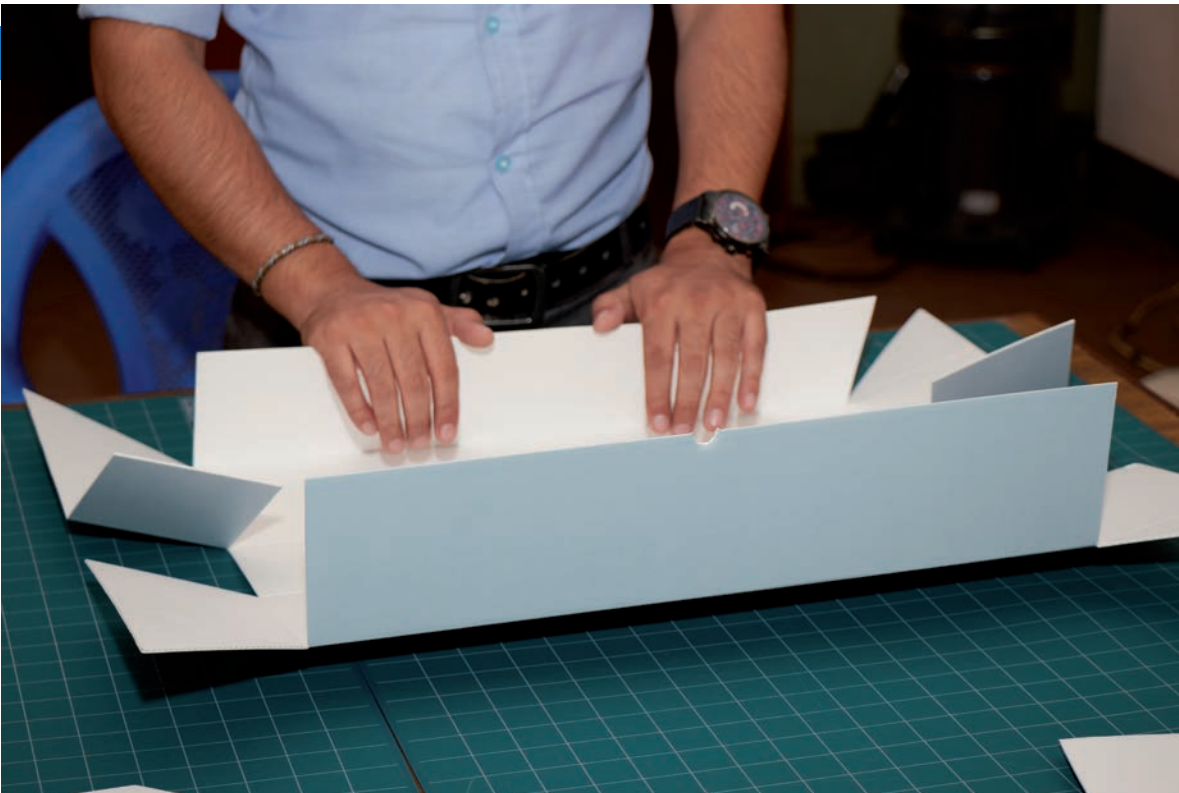
36

Fig. 36: The E-Flute board is now folded along the vertical scored lines.



37

Fig. 37: Each vertical score line is firmly pressed flat.



38

Fig. 38: Each part is folded along the scored lines.



39

Fig. 39: The corners are checked to make sure all sides are equal. Should that not be the case, they must be trimmed. This has to be done before gluing as once the corners are glued it is almost impossible to trim the corners smoothly. Smooth cuts are important as paper whiskers will hold dust, can catch and tear.



40

Fig. 40: The layers of the E-flute corner are separated.



41

Fig. 41: When separating the layers of the E-flute corners, it is necessary to trim away the middle-corrugated material (Supplement, step 9) in order to ensure proper gluing which is key in creating the phase box's sturdiness.



42

Fig. 42: The PVA Jade 403 is applied on the inner sides of the corner outer layers. Jade 403 is an acid-free, permanent adhesive that dries clear, mat and does not yellow over time.



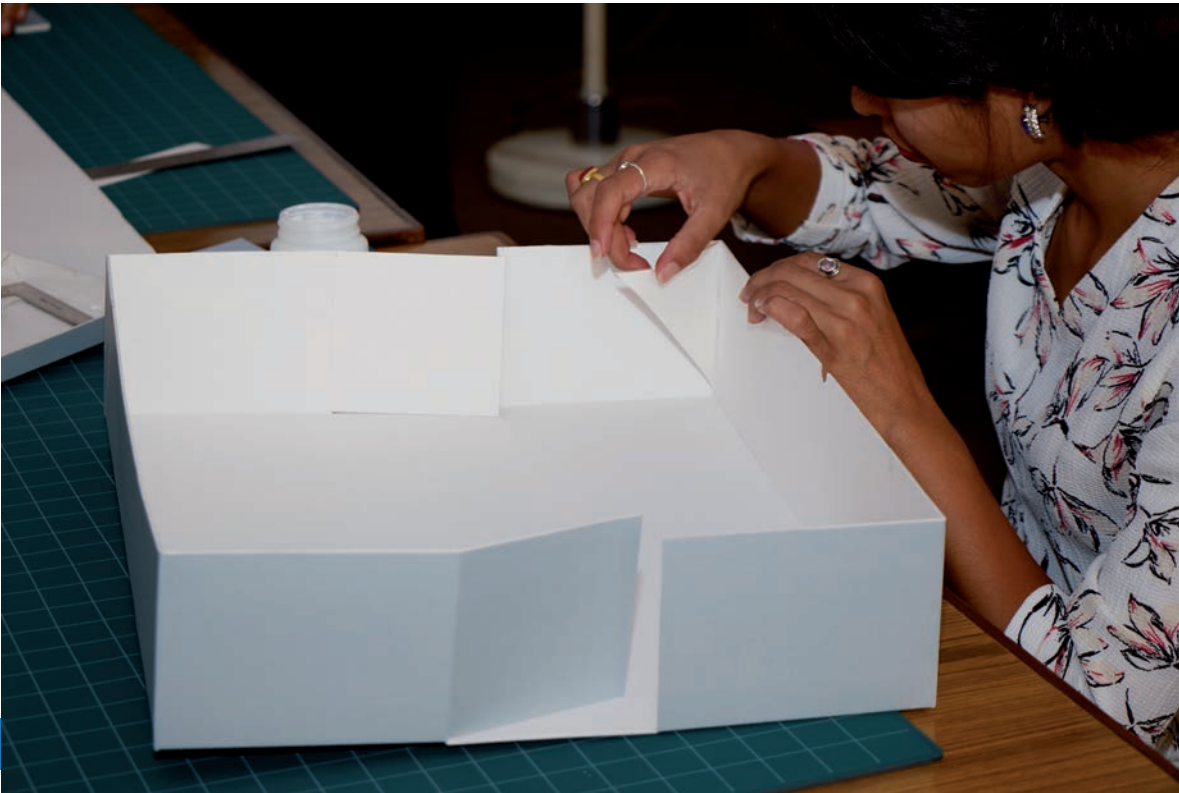
43

Fig. 43: The outer corner flap is connected to the outer board side after gluing.



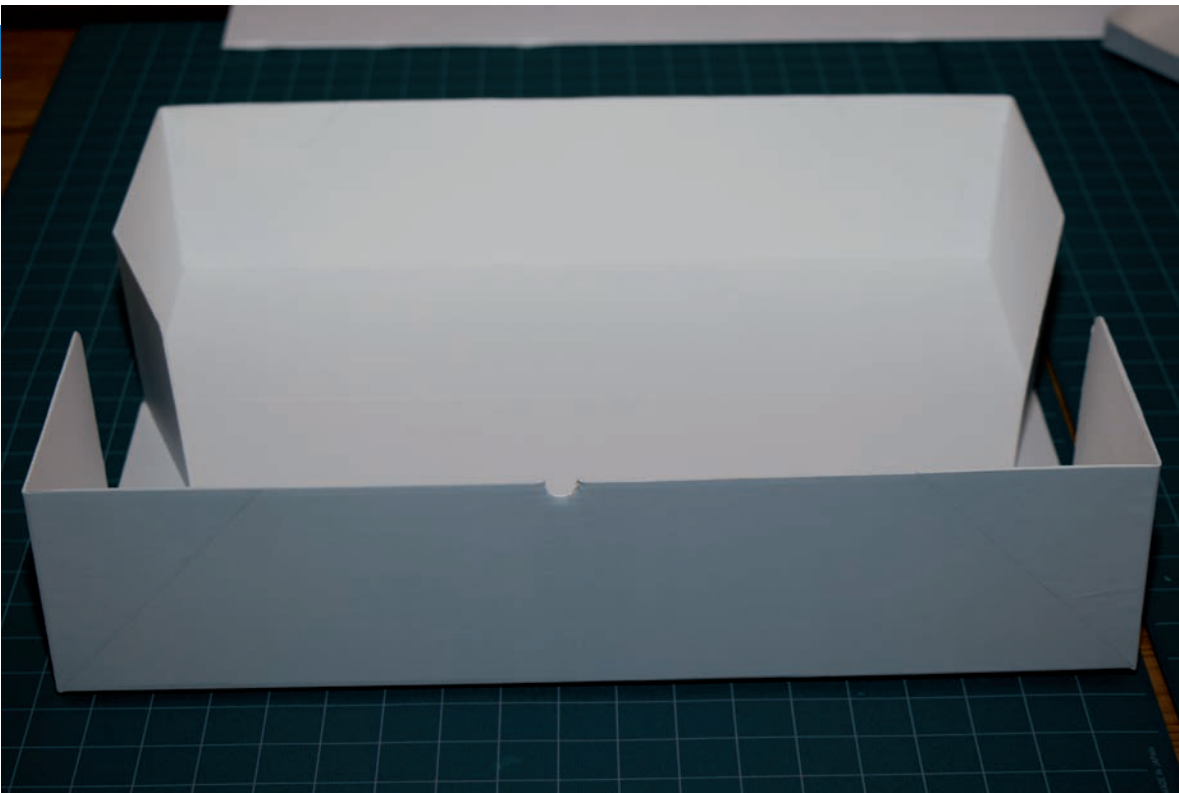
44

Fig. 44: The corner flap adhesion is increased, and wrinkles are smoothed out using a Teflon folder. The same process is applied for all four corners.



45

Fig. 45: The inner section of the corner flap is adhered with Jade 403.



46

Fig. 46: With all corners glued and connected, the E-Flute phase box is ready for the manuscript. Any rough, whiskery edges should be smoothed with 150-220 grit sand (glass) paper.



Fig. 47: The manuscript is now inserted diagonally, corner to corner whilst the box is left to dry for 24 hours. This ensures that the adhesive used on the corners is completely dry.

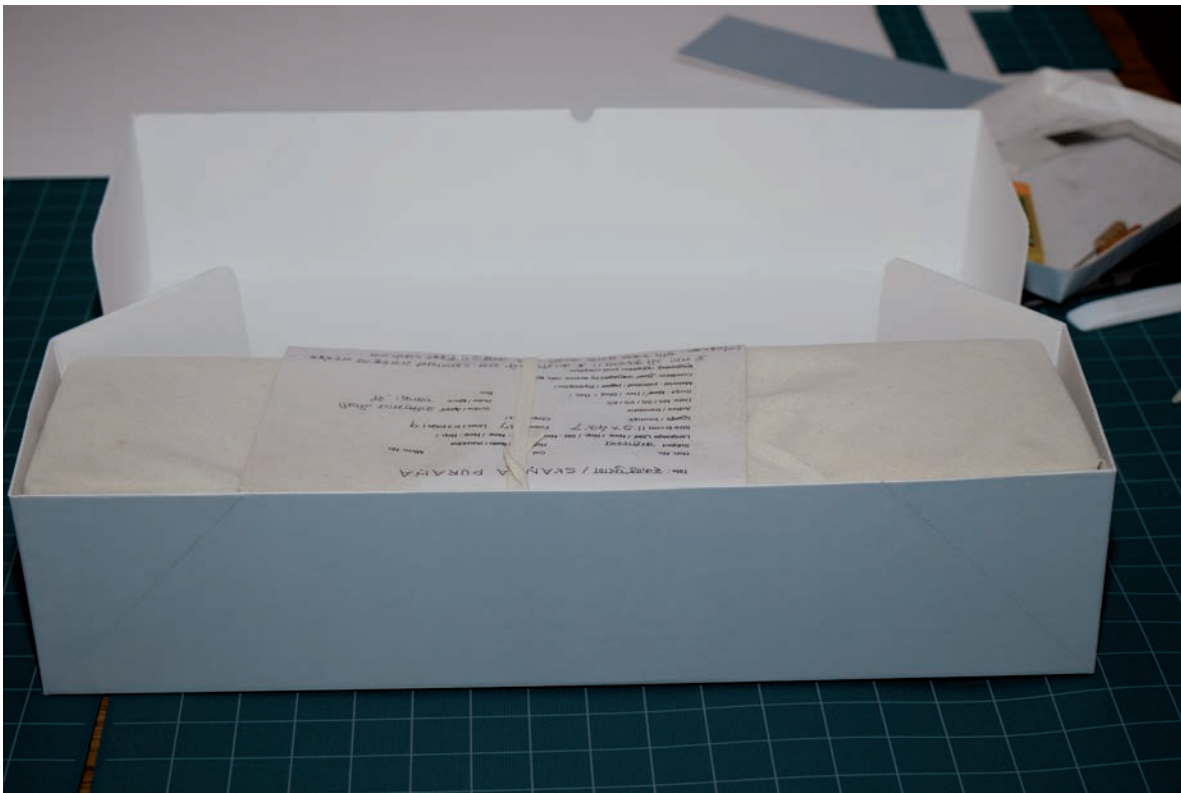


Fig. 48: After 24 hours the manuscript is placed in the E-Flute phase box, ready for safe, clean storage. Note that the corners of the cover and the inner flaps have been rounded.

BEFORE AND AFTER



Fig. 49: An unprocessed manuscript

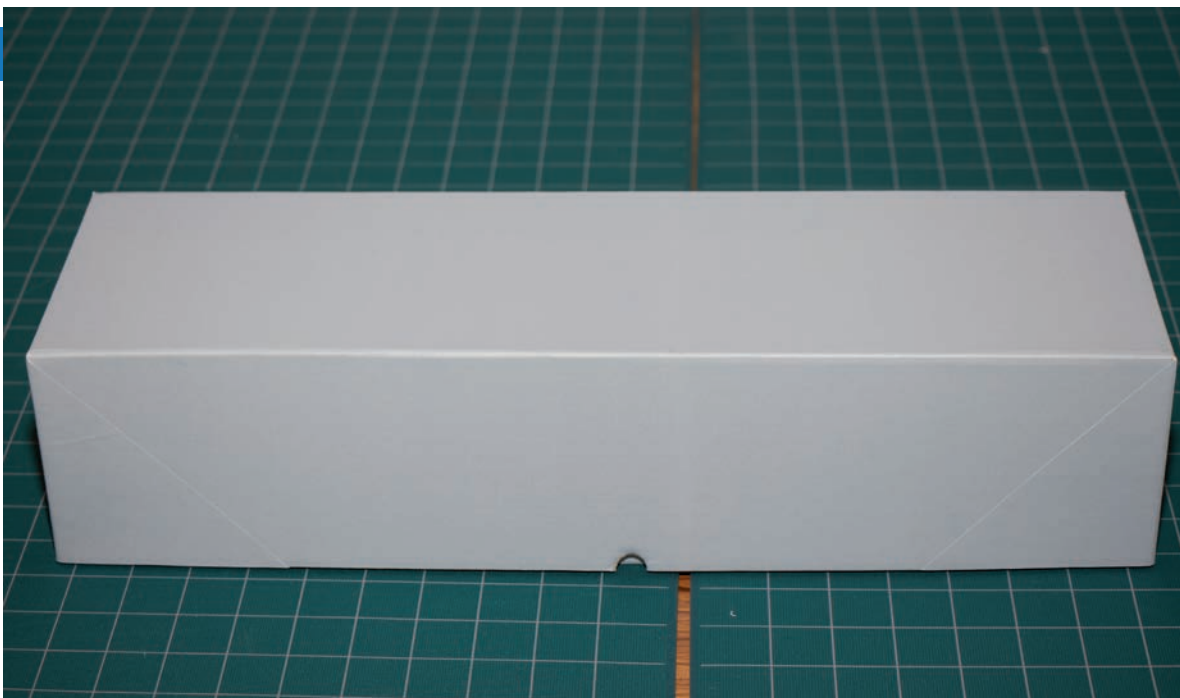
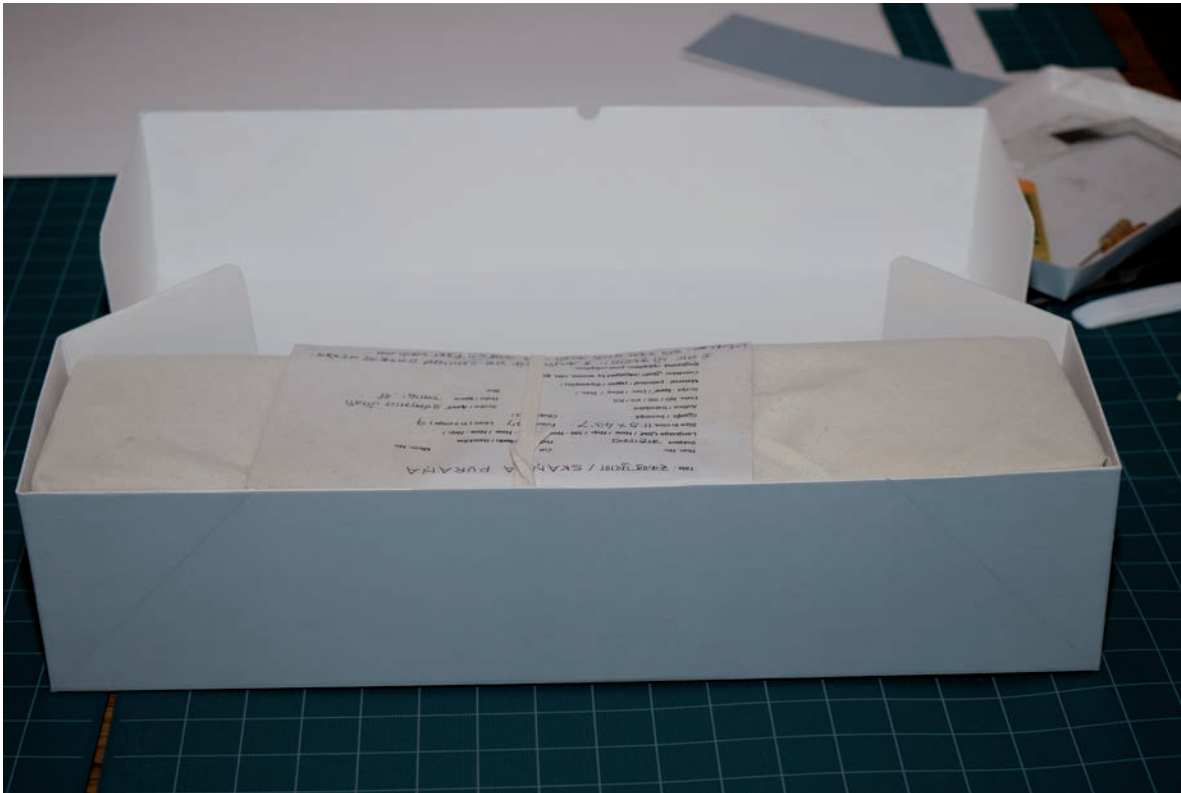


Fig. 50: The manuscript after cleaning and in an E-Flute phase box



51

Fig. 51: Phase box for a single manuscript showing inner flaps in the tray portion of the E-Flute phase box. These inner flaps seal the box.



52

Fig. 52: Multiple manuscripts in a phase box with an E-Flute bar separating stacks of small manuscripts.

TYPES OF E-FLUTE PHASE BOXES

Applying this method of phase-box making, a variety of box forms can be produced (see examples in Figs. 51–53) for manuscripts – safely stored, preserved and protected from the most prevalent and damaging circumstances.

53



Fig. 53: Album-type phase box containing small, thin manuscripts in individual trays

54



Fig. 54: Cleaned manuscripts kept in E-Flute phase boxes at the Āśā Saphūkuthi (Āśā Archives). All boxes are labelled according to the manuscript accession number at least two times – once on the front off-centre to avoid the thumbhole and once on the left end of the box. This labelling method allows for flexibility in shelving.

jalād rakṣet tailād rakṣed rakṣec chithilabandhanāt |
mūrkhahaste na māṃ dadyād iti vadati pustakam ||

**‘Save me from water, protect me from oil and from loose
binding, and do not give me into the hands of fools!’
says the manuscript.**

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