

Archiv für Papyrusforschung und verwandte Gebiete

Begründet von
Ulrich Wilcken

Herausgegeben von
Bärbel Kramer Wolfgang Luppe
Herwig Maehler Günter Poethke

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die klassische Konservierung/
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und neuere Verfahren

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Herausgegeben von
Jörg Graf und Myriam Krutzsch

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Fifteen years of papyri conservation at the Louvre: the influence of Japanese techniques

With plates XIV–XVII

Eve Menei (Paris)

The papyri collection of the Louvre extends from the beginning of the Pharaonic period right up to the Arabic period. Written in different Egyptian scripts, it comprises about a hundred books of the Dead, religious and literary texts, and administrative, legal and private documents. It also contains over a thousand Greek papyri amongst which fragments of the Iliad and a precious astronomical papyrus.

One essential characteristic of this collection lies in the fact that almost all documents have been treated. The treatment ranges from simply unrolling and stretching the papyri to more heavily invasive interventions such as cutting off, filling losses, repairing and lining. As a matter of fact, we encounter many large-size Pharaonic papyri which were cut off and lined on paper boards covered with a sheet of blue paper. This colour may have been chosen because of the colour of the mounts of the famous drawings collector Mariette which were widely reproduced in France.

Having been working on this collection since 1991, we would like to give a descriptive account of the protocols that have been used, very much influenced by Japanese methods in terms of products (gampi paper, wheat starch paste) and techniques (facing, mosaic lining).

We deliberately reduced the number of products used in order to allow an optimal control of their use as well as a better appreciation of their long-term aging: we use two pastes (wheat starch paste and seaweed glue) and mainly one paper (gampi).

Gampi

The word gampi¹ designates one of the three fibres used in paper making in Japan. The Japanese paper most currently used in Western countries is made from the bark of kozo², its fibres being the longest ones.

1 In fact, this fibre is obtained from the bark of various trees of the Thymelaeaceae family: *Diplomorpha sikokiana* Nakai, *Wikstroemia canescens* Meisn., *Wikstroemia trichotoma* (Thunb.) Makino, *Diplomorrpha gampi* (Sieb. and Zucc.) Nakai.

2 Fibres coming from the bark of trees of the Urticaceae family: *Broussonetia papyrifera* Vent., *Broussonetia kazinoki* Sieb. and *Broussonetia kaempferi* Sieb.

We made the choice of gampi paper because of its greater reversibility compared to kozo. Due to the quality of gampi fibres giving a smoother surface to the paper, the strips can be removed without fibres adhering to the surface of the papyrus. Although they are shorter than kozo fibres, gampi fibres are very strong (especially lengthwise) as proven by various tests. We purposefully cut the strips parallel to the direction of the fibres in order to maximize the strength of this paper.

Wheat starch paste

Wheat starch paste has the great advantage of being very adhesive, even in small quantities. It does not brighten once dry and does not discolour the papyrus. Its use is particularly suitable for Japanese paper because its macromolecules do not leak through the fibre network. It is also adapted to papyrus, a support which naturally contains particles of starch.

We make wheat starch paste with pure wheat starch powder. For larger quantities, it has to be cooked in a sauce cooker (100g wheat starch in 700ml water) for one hour. When only a small quantity is required for one day's work, we prefer to prepare it in a microwave oven (8 g to 20 ml). It is thus prepared every other day. We never put it in the fridge because it would lose part of its adhesive properties. Prior to use, we strain the paste once or twice through a strainer (Taf. XIVa) and thin it with the addition of water if necessary.

The combination of gampi strips and wheat starch paste is suitable for local consolidating of cracks, filling in losses on the edges or in the inner part of documents and also for fixing the restored document on to a backing board.

Funori seaweed glue

This adhesive paste is made from seaweeds of the *Gelidium* family. (See fig.1) They are harvested in summer by fishermen, then washed and dried as rough sheets. This paste has been used for a very long time in Japan, in various handicrafts and is well known for its smoothness and its limited shrinkage after drying. It however has a weak adhesive capacity. To prepare it, we simply soak a piece of seaweed web in water (Taf. XIVb). We strain the solution through a cloth. The viscosity of the product obtained may vary according to the year, the place or the period of harvest. Funori is essentially composed of various carrageenans. Today, tests are being carried out with pure carrageenans derived from the chemical industry which have not given such satisfying results. We have encountered problems of brightness. The mixing of various natural carrageenans (A, B...) enables the combination of their different properties.

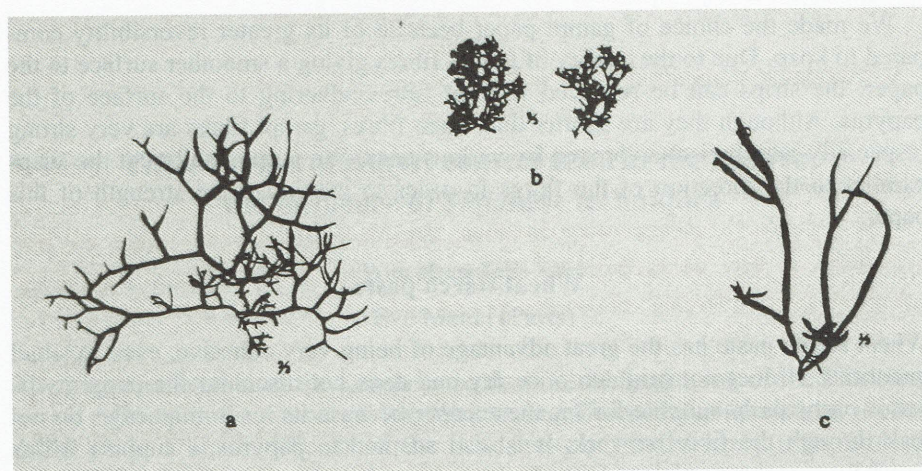


Fig. 1: Figures of the three species of gloiopeltis used in funori³

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In the restoration of papyri, funori can be used for different applications.

It can make it easier to loosen a lining: funori has a low surface tension compared to water and therefore a better penetration factor through old lining papers.

It can be used to consolidate the papyrus itself by impregnation of the verso and vaporization of the recto.

It is especially very useful in making facings.

Many documents in the Louvre collection were cut then glued on to cardboards, mostly blue, probably during the 19th century (Taf. XIVc). Curators at that time could thus easily manipulate the documents and display them vertically behind glass windows. They were kept simply piled one on top of the other on shelves. Some recto verso documents were also adhered on to a backing board.

At the present time, cardboards are distorted and dirty. Papyri suffer from distortions and surfaces are unprotected. Moreover, strains generated by this sort of mounting have produced distensions within the layers of fibres of the document: the surface layer becomes loose and tends to swell and crack.

When the state of the document allows it, the cardboard is removed during restoration. The work done is greatly facilitated by using facings.

³ a – gloiopeltis tenax, b – gloiopeltis complanata, c – gloiopeltis furcata

Facing

Facing is made, after cleaning and fixing the swollen fibres, with seaweed glue and rectangles of gampi paper. Paper rectangles have to be cut carefully so that the straining direction of fibres is parallel to the smaller edge.

The smooth surface of gampi is generously coated with seaweed glue then laid down on to the papyrus and pasted with an impregnated brush.

The rectangle is then put in place with an overlap of 5 to 10 millimetres.

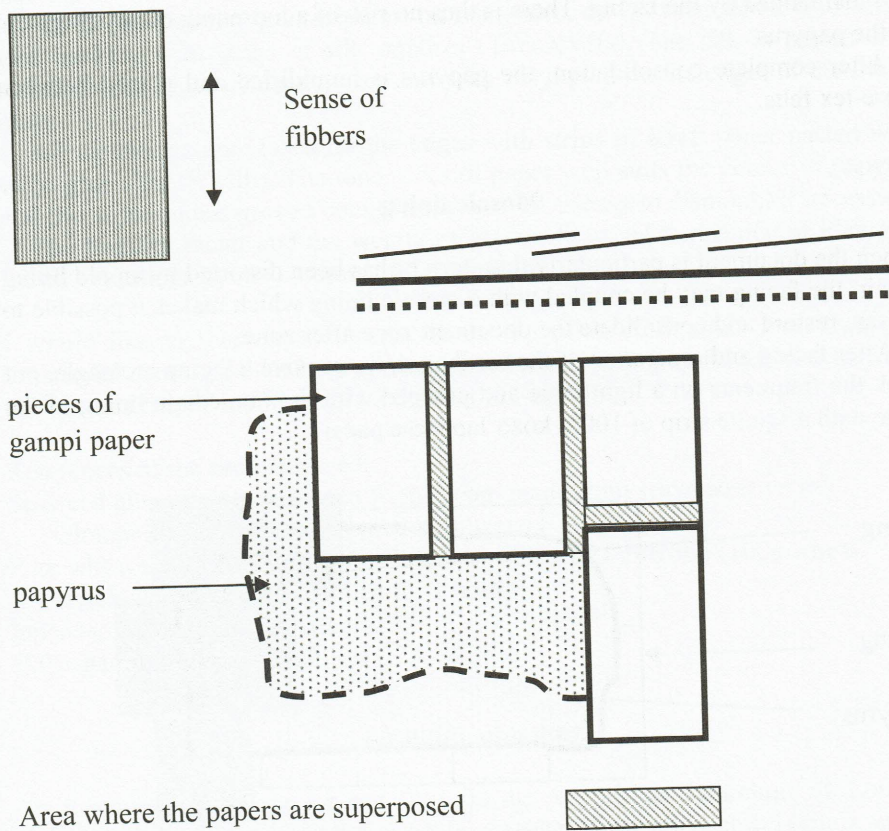


Fig. 2: Piece of gampi paper and disposition on the papyrus

Once the entire surface has been covered, the document is placed for drying under a light press of blotting paper.

It is then possible to work on the verso side and remove the lining little by little (dry or after dampening) without risking damaging the surface or losing a frag-

ment (Taf. XVa). Moreover, the use of the facing makes it possible to maintain all pieces together once the lining is removed.

Cutting the facing in rectangles avoids too hefty strains during the drying process and also permits gradual removal and consolidation.

In order to loosen the recto side, each gampi rectangle is dampened with a brush generously impregnated with water leading to a rapid solubilisation of the glue. It then simply can be peeled off with tweezers.

The document can then be turned over, recto side down, and the verso side above be consolidated. The rest of the document is either already consolidated or still maintained by the facing. There is thus no risk of a loosening of any fragment of the papyrus.

After complete consolidation, the papyrus is humidified and placed between Gore-tex felts.

Mosaic lining

When the document is particularly thin, torn or has been distorted by an old lining repair, the facing may be coupled with a mosaic lining which makes it possible to loosen, restore and consolidate the document zone after zone.

After facing and separation of the cardboard, we remove a facing rectangle, put back the fragments on a light table and proceed with the immediate lining of the zone with a square strip of 100% kozo Japanese paper.

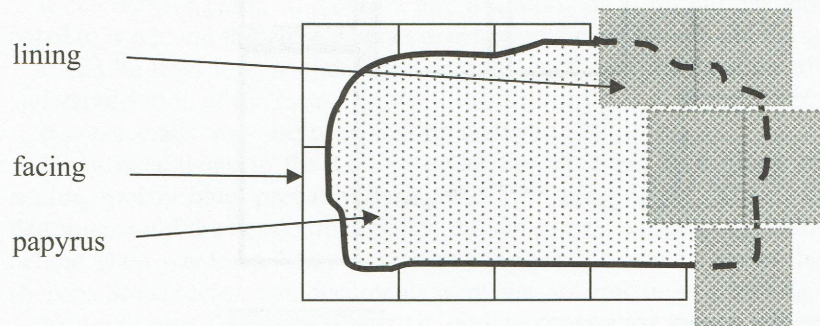


Fig. 3: The first pieces of lining

Every square strip is water cut on the edges in order to obtain thin joints. Kozo paper may be used in its natural colour and the fillings toned afterwards with watercolour (Taf. XVb). We also use Japanese paper toned with a dyeing for textiles, stable, indelible and approaching the colour of the papyrus.

Mountings

Different techniques are being used concerning mountings.

For the works bearing inscriptions on only one side, we chose to mount them on a neutral backing card toned with watercolour (Taf. XVI). We select a colour close to the tone of the lightest zones of the papyrus. This solution enables to totally protect the document and to attenuate the fragmentary aspects. The papyrus is then attached on to the backing by narrow strips of gampi paper and wheat starch paste.

For the works bearing inscriptions on both sides, we lay them down on a Plexiglas backing with strips of silk organza (Taf. XVIIa). The silk is pasted with starch on the edges of the papyrus and with vinyl glue on the edges of the Plexiglas.

All mountings are closed on the edges with strips of Kraft paper pasted with vinyl glue (Taf. XVIIb). The tone of Kraft paper well suits the colour of papyrus and this solution has proved being strong as well as easy to dismount if necessary.

The fragility factor and the weight of glass influenced the choice of Plexiglas for all mountings by the curators of the Museum.

I would like to thank the curators of the Egyptian Antiquities Dpt. from the Louvre Museum for their help and support. I am deeply grateful to Mrs. B. Brutin who has helped me to translate the text in English.

References of the products used:

Seaweed glue directly imported from Japan, made from seaweed from the Gloiopeltis family and prepared with water .

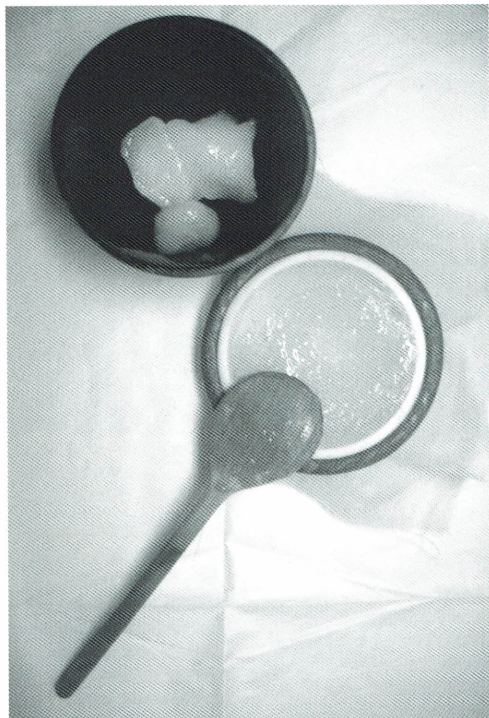
Pure wheat starch supplier: VWR International, ref 21 146.368 (100g wheat starch in 700ml water cooked for 1 hour.

Japanese paper supplier: Atlantis,
100% gampi fibres, 14g/m², ref G24.

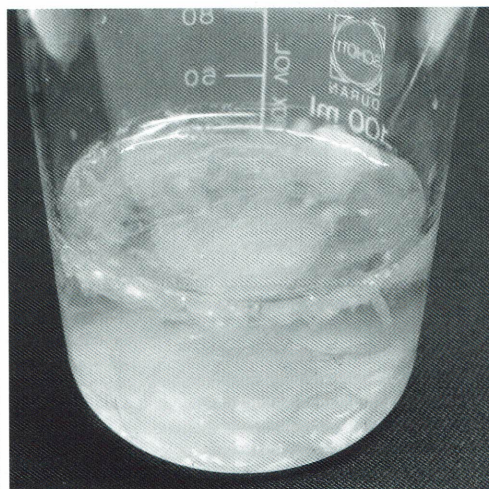
Zusammenfassung

Als Restauratorin arbeite ich seit 1991 für die Ägyptische Sammlung im Louvre, wo ich bei der Papyrusrestaurierung japanische Materialien und Technik angewendet habe. Dafür habe ich für die Festigung einzelner Stellen Gampifiberpapier und Stärkeleim täglich vorbereitet und für die generelle Festigung Funori Algenklebstoff ausgewählt. Für die zahlreichen zerbrechlichen Papyri, die auf blaue Pappe geklebt waren, wandte ich die japanische „facing“ Technik, mit Funori und Gampifiberpapier an. Bei sehr brüchigen Dokumenten wird das Verso mit einem Mosaik von kleinen Stücken aus getöntem Kozofiberpapier kaschiert.

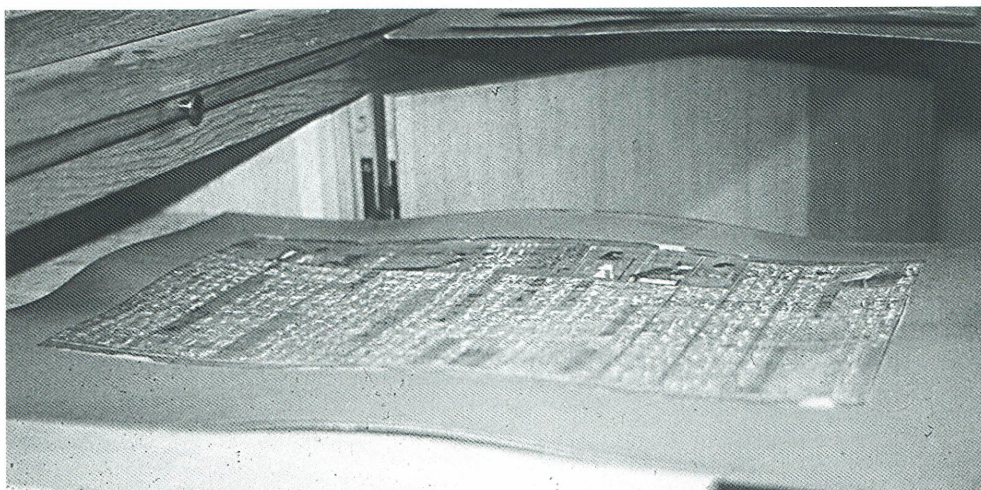
TAFEL XIV



a: Wheat starch paste during straining

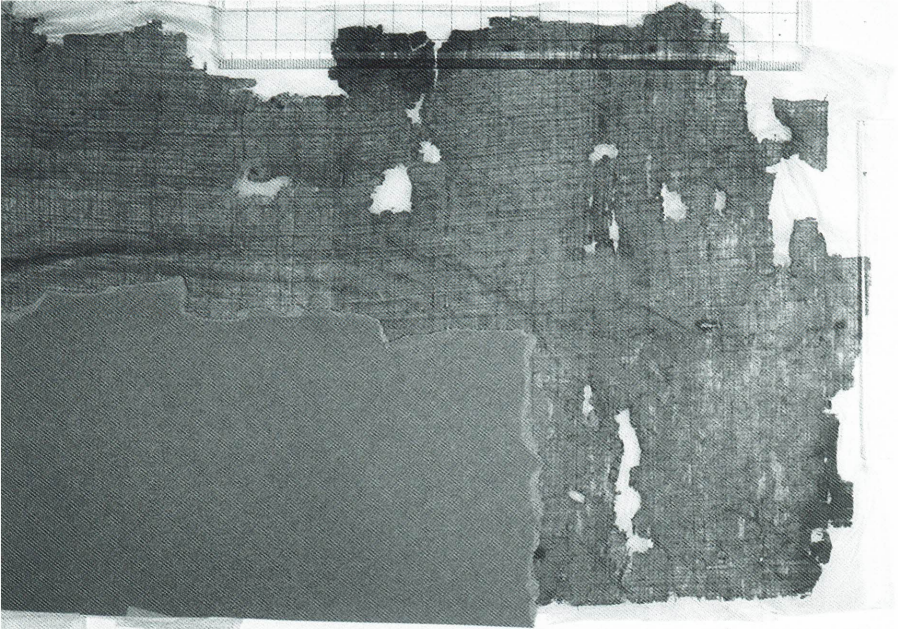


b: Seaweed funori in water

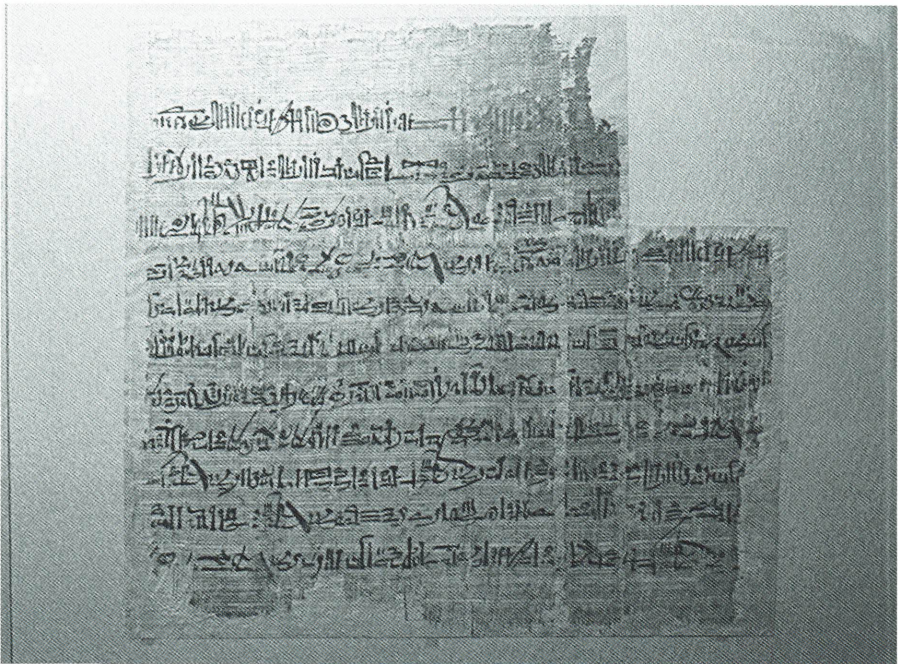


c: Piece of papyrus glued on blue cardboard;

zu: E. Menei, S. 62ff.



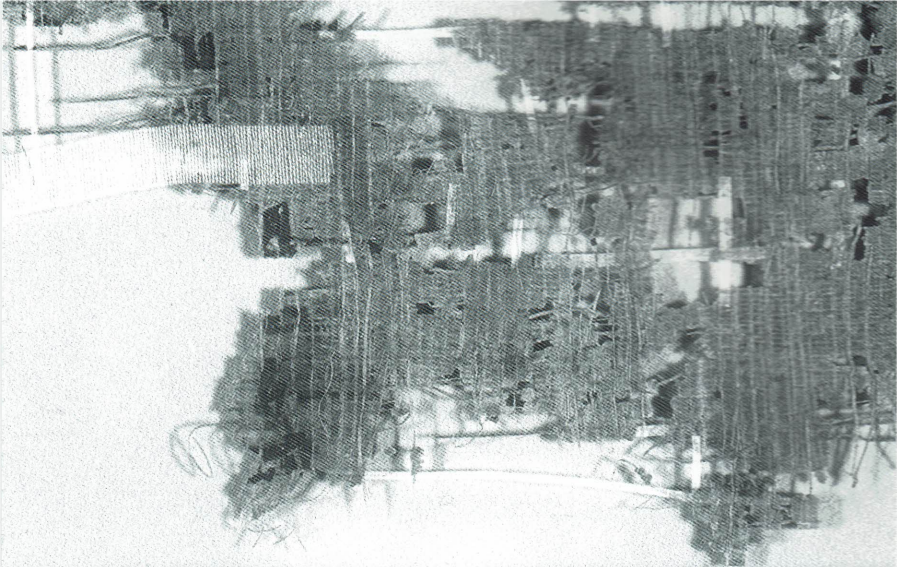
a: Removing the brown backing after facing (E 4889)





Vertical columns of text in an ancient script, likely Egyptian hieroglyphs. The text is arranged in approximately 15 columns, reading from right to left. The characters are small and densely packed, typical of ancient inscriptions.





a: Detail of papyrus mounted between two plexiglas sheets (E 25416 A)

