COLD GELATINE ADHESIVE

Book & Paper Conservation Studio • University of Dundee • Scotland

This poster describes an approach to the repair of iron gall ink documents, which was developed between 2003 and 2007 during the Linnean Correspondence Project. The project involved the preservation of almost 4000 letters, mostly written in iron gall ink, and provided an impetus for the reassessment of the adhesives used at our studio on this type of material.

The visual and mechanical effects of iron gall ink corrosion on paper-based documents are well known to book and paper conservators. The complex chemical reactions involved in the production and subsequent degradation of the ink, and ultimately the paper support, are well documented in the conservation literature.

Recent research at the Instituut Collectie Nederland has resulted in the development of iron (II) indicator paper (used to identify iron gall ink) and the most effective method presently available to retard iron gall ink corrosion - calcium phytate treatment. As a result of this research, the effects of aqueous treatments on iron gall ink documents is better understood. Consequently it is now generally accepted that the introduction of even a small amount of moisture, such as an increase in relative humidity during storage or humidification, is dangerous and highly problematic for this medium. If aqueous treatment of iron gall ink documents is unavoidable, calcium phytate has been proven to be an effective method of preventing further ink corrosion. However, this intervention changes both the ink and paper composition and is by definition irreversible. (1)

A minimal or non-interventive approach is therefore desirable for treatment of iron gall ink documents and, apart from storage and housing, could include the stabilisation of the mechanical damage resulting from iron gall ink corrosion by means of paper repair. This tends to be carried out with Japanese papers adhered with wheat starch paste. However, as an aqueous adhesive, this has potential for serious consequences to iron gall ink and alternatives have been sought for some time.

Although gelatine is an aqueous adhesive, in certain forms it has advantages when used with iron gall ink. Investigation by Gesa Kolbe into the effects of gelatine size on iron gall ink corrosion on paper indicates that type B gelatine with a high or medium bloom degree (>200g) has a considerable capacity to encapsulate free iron (II) ions thereby making them inert. (2) For the Linnean Correspondence Project, type B gelatine with a high bloom degree was therefore selected. A 3% solution was used as required to support areas of iron gall ink text. The letters received no other treatment apart from cleaning and re-housing. Traditionally, gelatine adhesive is used warm and in a liquid state for repair. However this can be problematic due to its working properties: as a liquid it is readily absorbed by the substrate, it initially lacks tack and requires some form of device to warm the adhesive in order to prevent it from setting. To counter these problems, we developed a technique using cold gelatine.

By repeatedly pushing cold gelatine through a horse hair sieve an adhesive with good working properties is achieved. It comprises of a very fine granular gel that can be further broken down to a film when brushed onto a repair paper..

Subsequently, informal tests were carried out to assess the effectiveness of sieved cold gelatine for repair of parchment. It was found that a 6% solution had a sufficient concentration of gelatine to successfully attach *kozo* paper repairs of up to 28gsm to sheepskin parchment.
No tests have been carried out as yet using parchment or goldbeaters skin as a repair material.

The following describe the methods currently being employed by the Book & Paper Conservation Studio, University of Dundee. The information is intended for assessment and application by qualified paper and book conservators. Our experiments with cold gelatine adhesives were carried out informally, under the working constraints of a commercial studio. We welcome the further testing and analysis of gelatine in its various forms currently being undertaken in order to determine comparative strength and ageing characteristics.

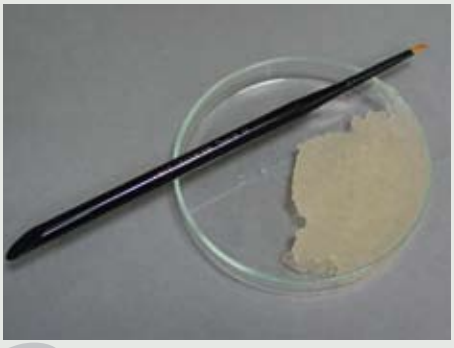
PREPARATION, USE AND STORAGE OF COLD GELATINE

1

The gelatine is made in deionised water, following the steps outlined on the ink corrosion website. (3) The concentration can be adjusted to suit different kinds of repair. However, higher than 6% results in a gel that is difficult to sieve. Once the solution has been prepared, it should be left to set; either by leaving to stand at room temperature for a couple of hours, or by placing in a refrigerator.

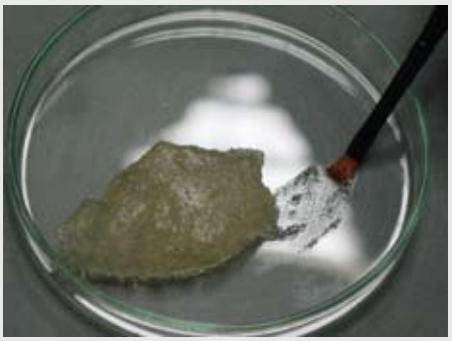
2

For use, the resulting gel should be pushed several times through a horse hair sieve that has been wetted with deionised water.



3

The resulting adhesive comprises of a very fine granular gel.



4

The grains in the adhesive can be broken down further by working it with a brush.

5

The adhesive can then be applied directly onto the surface to be adhered or brushed through a thin repair tissue. Excess adhesive can occasionally leave a glistening sheen on or around a repair when dry; this can be reduced by light swabbing with cotton wool moistened with deionised water.

6

Sieved gelatine can be stored for up to two days at room temperature in a covered container. The working properties improve as the gel starts to break down and soften. However, eventually the adhesive will become runny and malodorous, at which point it should be discarded. The gelatine will set again if it is stored in the refrigerator after sieving, so it is advisable to prepare no more than the amount required for a couple of days. Unsieved gel can be stored in the refrigerator for a few weeks, after which it starts to become runny.

REFERENCES

(1) For further reading on any of the subjects mentioned in this paragraph, please refer to:
Brown, A.J.E. (ed), The Postprints of the Iron Gall Ink Meeting First Triennial Conservation Conference,
The University of Northumbria at Newcastle, 2001

(2) G. Kolbe, 'Gelatine in Historical Paper Production and as Inhibiting Agent for Iron-Gall Ink Corrosion on Paper' Restaurator 25 (2004) p. 26 - 39.

(3) E. Eusman and B. Reissland, The ink corrosion website http://www.knaw.nl/ecpa/ink/ accessed 31 March 2009

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