A History of Fish Glue as an Artist's Material: Applications in Paper and Parchment Artifacts

Tatyana Petukhova

Received for publication Fall 2000.

Abstract

This article presents a brief historical overview of fish glue as an artist's material applied to paper and parchment artifacts. Artists and craftsmen have appropriated this natural glue since antiquity. Artists have used this material in the preparation of binding media and adhesives, the source for which was a commonly available fish protein. Scientific publications and practical recipe books refer to the use of animal and fish glues in the making and restoring of objects, icons, paintings, illuminated parchment manuscripts, and other artifacts.

In this article the author describes only applications of fish glue compiled from the records where it was mentioned as a separate entity.

Early References to Fish Glue

Glue can be extracted from fish by heating the skin or bones in water. The purest form of fish glue, made from the membrane of the air bladder (swim bladder) of certain species of fish such as the sturgeon, is also called isinglass (fig. 1). Isinglass can be produced from
various species of fish using diverse manufacturing processes. Depending on the manufacture, the purity of isinglass can vary. Historic sources do not always specify which part of the fish was used to make the glue.

There is no record telling us exactly when and where the first animal or fish glue adhesives were used. However, it is known that at least 3500 years ago these adhesives were used in Egypt. Even though Egyptian records do not describe in detail the adhesive preparation process, they do tell us that it was made by being melted over fire and then applied with a brush (Darrow 1930, 9).

From the first-century Roman scholar Plinius we learn that two kinds of glue were used in antiquity: animal glue (taurokolla in Greek, gluten taurinum in Latin), made from the skins of bulls, and fish glue (ichtyokolla) made from some parts of fishes. In references to the glue used by ancient craftsmen, both terms xylokolla (in Greek) and gluten fabrile (in Latin) are cited; however, it is not clear to which kind of glue these terms applied (Gug 1975, 37).

In an eighth-century European manuscript from the Cathedral of Lucca, fish glue is recorded as a material for painting. A. P. Laurie translated this manuscript into English in 1926; it tells that the pigments in fresco paintings were applied to wet plaster without mixing them with a binding medium, using only water. For panel paintings wax was mixed with the pigments, and for illuminating parchment manuscripts fish skin glue was used (Laurie 1926, 107).

In the Middle Ages in a twelfth-century treatise on methods and recipes for painting and illuminating by the German Benedictine monk Theophilus, fish glue appears once again. In his Schedula Diversarum Artium (Ch. XXX) he gives directions for grinding gold and then mixing it with fish glue for use in gilding of illuminated manuscripts. He continues, (Ch. XXXIII):

... on every sort of glue for pictures of gold, if you have not a bladder cut up thick parchment or vellum. ... Prepare also the skin of an eel. ... Prepare thus also the bones of the head of the wolf-fish, washed and dried, carefully washed in warm water three times. To which ever of these you have prepared, add a third part of very transparent gum, simmer it a little, and you can keep it as long as you wish. (Laurie 1926, 167)

In discussing ink preparation, Theophilus also mentions fish glue among such other materials as yolk of egg, white of egg, parchment, cherry gum, plum-tree gum, and linseed oil (Laurie 1926, 170).

In around 1390 Cennino Cennini (an Italian artist trained by Agnolo Gaddi), the author of the Craftsman’s Handbook (Il Libro dell’Arte), mentions earlier applications of fish glue in restoration: “This glue is made from various kinds of fish . . . it is good and excellent for mending lutes and other fine paper, wooden or bone objects” (Cennini [ca. 1390] 1960, 66-67).

Historical Uses of Fish Glue

As we can see from ancient and medieval records, fish glue was both a common and important adhesive for many special applications; adapted by artists, it was used from the time of ancient Egypt to twentieth-century France, in painting media, coatings and grounds, in the gilding of illuminated manuscripts, and in pastel fixatives.

Illuminated Parchment Manuscripts: Sizing, Gilding, and Repair

In medieval Europe, parchment was the main material for writing. It was usually made from sheep or calf skin, but occasionally from the skins of such other animals as goat, antelope, and gazelle. Preparation of the parchment was a time-consuming procedure requiring special skills. One of the many steps in the process was sizing of the parchment, which enhanced its strength and prevented the writing medium from penetrating too deeply, allowing the parchment to be reused. When the parchment was to be used over again, the old ink or gouache-like medium was removed from the surface by rubbing pumice over it; the area was then softened so it could absorb new writing.

Two types of size application, coating and impregnation, were employed. The sizing solution was generally produced from scraps of parchment or trimmings of the whole skin of an animal. Small pieces were then soaked and boiled in fresh water. Fish glue was also used to size parchment. According to D. V. Thompson, this size was prepared from the sounds (air bladders) of stockfish and sturgeon in a manner similar to that used for parchment preparation (Thompson [1936] 1956, 59).
Thompson also mentions fish glue in the context of stabilization (mending) of damaged sheets of parchment, ground preparation for laying gold or pigments, and as a binding medium (fig. 2). The purpose of the binder was to hold particles of pigments together allowing for the paint to be firmly attached to the surface of the parchment. The area on which the gold leaf would be laid was coated first with a solution of fish glue. The property of fish glue to adhere well to the porous parchment support made it a useful material for illumination of manuscripts with gold leaf and painting.

Oriental Painting and Calligraphy on Paper: Binding Medium

In China various kinds of animal glues were implemented as binders in paint media during the T'ang dynasty (618-906 a.d.). According to records of this period, for example, one of the essential components of lampblack ink was proteinaceous glue (Sze 1956, 67-68). One
Drawings: Pastel Binder and Fixative

The makeup of soft pastels has not been changed much since the fifteenth century when this medium came into existence. Pulverized color pigments combined usually with white chalk were rolled together into cylinders or other shapes with a small amount of binder. Gum tragacanth and methyl cellulose are probably the most favorable binders in modern manufacturing of soft pastels, although in early recipes, milk, beer, ale, or fish glue had been employed (Maheux 1988, 41).

Methods for fixing pastels have been a great concern for artists working in this medium. Various techniques, from powdering the surface of pastel with gum arabic and then fixing it with hot steam and spraying it with a mixture of water, glue and spirit, to spraying the verso of the pastel with skimmed milk, have been implemented by artists in order to protect this fragile medium from unavoidable deterioration. Milk, water, thin tempera, resin, spirit, and also glue solutions have been the main components of many recipes for pastel fixatives.

Among the artists seriously searching for a method to stabilize the pastel medium and experimenting with isinglass glue, as a component of fixatives are Latour and Degas. The following recipe described by Loriot, and perhaps also used by Latour, includes isinglass glue:

Melt about 150 grains of isinglass in about 3/4 pt. of pure water in a double saucepan over a low fire. Strain through fine linen and pour on to a plate while hot. Add 2 parts of wine spirit to 1 part of glue. (Bazzi 1960, 98)

The method of fixing pastel with this solution, as Maria Bazzi recommends, is by spraying the verso of artwork.

Besides its applications in graphic arts, fish glue material can be found in priming, binding paint medium, glazing, and coating of easel and encaustic paintings and icons. It proved to be an excellent adhesive for wooden objects since the time of ancient Egyptians, who knew the unique qualities of this material.

Conclusion

It is my belief that conservators have a responsibility to preserve not only the physical structure of an object but also the knowledge left to us by our fellow artists and restorers of an earlier age. Those materials that well served artists and restorers for centuries should not
We might find them very useful even today if we have a fresh look at their properties and methods of application. In this article I hope to reawaken the historic knowledge of the use of fish glue, one of the earliest artist’s materials, and to encourage its scientific research and its use in conservation of historic and artistic works.

Acknowledgments

The author would like to thank the Samuel H. Kress Foundation for supporting her research on fish glues, part of which is presented in this article; Barbara Prior, reference librarian at the Fine Arts Library of Cornell University, for her assistance in tracking down earlier references; and Joan Ormondyroyd for her advice, revision, and encouragement.

References


Darrow, Floyd L. [1930]. *The story of an ancient art, from the earliest adhesives to vegetable glue* Lansdale, PA and South Bend, IN: Perkins Glue Company.


Tatyana Petukhova
Paper Conservator
Cornell University Library
Ithaca, New York
tp16@cornell.edu

Publication History

Received: Fall 2000

This paper was submitted independently by the author, and was not delivered at the Book and Paper specialty group session of the AIC Annual Meeting. It has not received peer-review.