

Metropolitan Museum of Art Japanese Print Collection: Condition Survey, Computer Cataloging and Exhibition Concerns

Betty Fiske

THE COLLECTION

The Japanese woodblock print and illustrated book collection of the Asian Art Department at the Metropolitan Museum of Art comprises approximately 5000 objects. The prints range from the early striking monochromatic, so-called "primitives" of the 17th century, through the brilliantly aniline dye-colored, fascinating images portraying the westernization of Japan at the end of the 19th century. Almost all of the collection is the result of generous gifts from donors, beginning in 1911, and continuing until around 1975. The Japanese print collection is not presently actively acquiring.

Since 1972, the collection is maintained in the Asian Art Print Study Room. The prints are matted and housed in solander boxes or oversized portfolios. These are kept in cabinets made of baked enamel steel or coated wood. A card catalog is organized by accession number and also by artist and print series or subject matter. A visual reference catalog also exists, consisting of notebooks of black and white photographs of the majority of the prints, but not illustrated books.

For most of their residence at the Met, the Japanese prints were seldom handled or exhibited. Since 1986, a selection of prints are regularly visible in one room of the new Japanese galleries, rotating exhibits three to four times a year. Higher visibility has brought more requests for study use and loan.

A condition survey was started at this time using a handwritten checklist form. In 1991, it was proposed to consolidate all the catalog, exhibition and condition information in a computer database for easier record keeping and scholarly access.

CREATING A COMPUTER DATABASE

Creating a computer database, in this case, had three parts. First, defining what kind of information was desired in the database and how it would be used, or accessed. This was decided by a team of three curators familiar with the print collection and with salient scholarly issues, one of the Asian Art conservators, and myself as the condition surveyor.

It should be pointed out that there is a special qualification to surveying and cataloging Japanese prints. That is that the assessment of the physical condition of a Japanese print is integrally related to its historic and

esthetic significance. This will be evident at many points in the following discussion.

It cannot be emphasized enough how important it is to design a program according to how information will be used. For instance, exhibitions and study requests are often topical: portraits of women by Utamaro, or scenes of Edo (now Tokyo), or kabuki plays and actors. Thus, access to imagery becomes very important.

PROGRAM

Second, it was essential to find a software program that met our design and access requirements. At the Metropolitan Museum, a collection catalog database exists for the Robert Lehman Collection that has been in use since about 1989. It was created by Lehman staff member, Monique Van Dorp, using the Symantec Q&A database management program.

Q&A has working characteristics appropriate for a relatively small database of under 8000 records. Q&A requires at least a 286 computer with minimum 40MB of memory for adequate space and speed in searching that size database.

DESIGN

The menu-driven program is easy to use, having on-screen prompting and help screens for all functions. Designing the actual record template is just a matter of typing and saving. The kind of field (number, keyword, or text), and form of entry (uppercase letters, code letters, yes/no, and default settings, etc.) is fairly simply programmed through the menu.

While it is possible to change the design after data has been entered, and then mass update the database, this is somewhat problematic, and better to be avoided by thorough planning and an adequate trial run period before concentrated data entry begins. As an added safeguard, the database is protected by password, and only a few users are authorized to make changes in data.

DATA ENTRY DICTIONARY

The third, and very crucial part, was to write a comprehensive dictionary, or guide for data entry. This specifies, field by field, how to enter records into the database, without any expertise in Japanese prints. The purpose of the dictionary is to ensure consistent and there-

fore retrievable records. Errors in entries and misspellings are ultimately a hindrance to very specific retrieval requests. The 41 page dictionary provides many glossaries of terms, such as definitions of Japanese nomenclature for print sizes, image color classifications and special printing techniques that are historically used by scholars. It also specifies preferred spellings. Many references, such as print titles and series titles, for consistency follow what is published in Richard Lane's well-known dictionary-style book, *Images from the Floating World*.¹

Most database problems are only revealed by using the system. It is essential to test and correct this Data Entry Dictionary as well as the database design to reveal any problems in retrieval of the input before concentrated catalog entry begins. [Anyone who wishes to see the entire Data Entry Dictionary can contact the author.]

THE CATALOG

The information to be included in the Metropolitan's Japanese print collection computer catalog record is divided into four sections, as shown, comprising 55 fields, appearing in four separate template screens on the computer.

- I. Identification basic to the unique object
- II. References of scholarly interest
- III. Exhibition records and restrictions
- IV. Conservation condition information

The following sample record for a Hokusai print will illustrate features of the program design and use, and the following discussion will touch upon the meaning of some of the information included.

I. Identification

The first section contains all the basic identification of the object. This can save on repetitive typing for record-keeping lists and be printed out for use in exhibition labels and loan forms. The accession number is the one bit of data that makes each record unique; uniqueness is essential for retrieval. This field is programmed to refuse duplicate numbers to avoid error in data entry or updating.

The template design must sometimes accommodate the workings of a computer. The Japanese print and illustrated book accession numbering system includes letter prefixes to indicate the type of material (such as drawing, book, album, etc.) and letters or number suffixes to indicate parts in a set (such as a triptych or series of books). The sort fields allow the computer to separate the accession number from a prefix and suffix to put lists in number order. Similarly, artist sort allows differentiating between artists with the same last name, such as Hiroshige I and II.

MMA ASIAN ART DEPARTMENT JAPANESE PRINT COLLECTION		
I. IDENTIFICATION		RECORD DATE: 10/01/91
ACCESSION NUMBER: JP1290	ACCNUMSORT1: JP	ACCNUMSORT2: 01290
CABINET: 00004	STORAGE UNIT: B46	UNITSORT: 00046
DATE OF INVENTORY: 04/01/90	TEMPORARY LOCATION & DATE:	
ARTIST: HOKUSAI, Katsushika	ARTIST SORT:	
JAPANESE TITLE:		
ENGLISH TITLE: Two Large Heads of Women - one with cherry in her lips, one with a hand mirror, preparing to scrub her teeth with a cloth		
JAPANESE SERIES: Furoyu Naku-te Nana Kuse		
ENGLISH SERIES: Fanciful Presentation of Seven Useless Habits		
SIZE CM: 36.3 x 24.6		
SIZE IN: 14 5/16 x 9 11/16		
CREDIT LINE: Rogers Fund		
COLOR CATEGORY: Nishiki-e		
PRINT QUALITY: G		
SPECIAL TECHNIQUES: Mica		
DATE: 1795		
SIGNATURE: Kako ga UR		
PUBLISHER: Tsutaya UR		
CENSOR SEALS:		
COLLECTION MARKS: MMA LR		
II. REFERENCES		
IMAGERY		
SUBJECT CULTURE: Japanese		
TYPE OF SUBJECT: Figures; beauties		
SUBJECT REFERENCE: Pleasure Quarters		
SPECIAL TYPES OF PICTURES:		
COMMENTS:		
POEM OR TEXT:		
PROVENANCE: A. Rouart Collection		
OTHER MMA IMPRESSIONS:		
OTHER COLLECTIONS:		
BIBLIOGRAPHY:		
III. EXHIBITION		
LOAN CLASS: I	RESTRICTIONS: RARE	LABEL: N
EXPOSURE TIME LIMITS: EXTRA GUARDED		
EXHIBITION HISTORY: 1972, JUS, "Foreign Countries Preserving Ukiyo-e Masterpieces"		
1972, LACMA, "Japanese Prints of the Classical Period"		
CUMULATIVE EXPOSURE TIME & DATE OF ENTRY: 3 mos.		
MMA NEGATIVE NO. & FORMAT: 49430 8 x 10		
COLOR PHOTOGRAPHY & LOCATION:		
IV. CONSERVATION		
COLOR QUALITY: F-G	PAPER QUALITY: G-E	PRINTING QUALITY: G
CONDITION: Lined, inpainted		
MATTED IN 4-PLY: N	TREATMENT PRIORITY: NONE	
DATE MMA TREATED:	DEPT.:	

The presence or lack of artist's signature, publisher and censor seals, and their location on the print, are important to note for dating. Later editions sometimes omit these details or seals in the margin may have been trimmed off at some point in the print's life. In some cases these details can be a clue to authentication of the print as original or later copy.

Print Quality is an overall assessment of the relative condition of a print. This rating is a useful reference for choosing impressions for loan, exhibition and publication, and for scholarly comparisons. Further along in the form, under section IV, Conservation, we will see "print quality" further broken down into individual assessment of color, paper and printing.

Ukiyo-e history plays a significant part in the overall assessment of print quality, as well as in the determination of how much exposure a print can safely endure, as will be discussed in the section on Exhibition. For example, certain images, so famous as to be virtual icons, have

PRINT QUALITY	ENTER one or two letters for the four possible categories for the assessment of the overall quality of the impression, including technical aspects, color and printing, and physical condition. Fields 48-50 give individual condition evaluations of color, paper and printing quality. Indicate a range using two letters.
E = EXCELLENT	The color is not faded. Well cut lines with registration good in all color blocks. The inking is even, unbroken, not blurred, with no build-up of ink at edges of color areas. The paper is intact with little or no damage.
G = GOOD	The color is relatively unfaded. Basically well cut with only minor flaws in registration and inking. Little or minor physical damage to the paper.
F = FAIR	Color somewhat faded. General overall flaws in inking and registration, or unsightly localized flaws such as smudges or lines blurred together, and possible flaws in block cutting and wear from extensive printing. More than minor physical damage such as losses, stains, folds and abrasions.
P = POOR	Color considerably faded. Overall sloppy registration and printing, with obvious wear in the block. Major and unsightly damages to the paper.

most often received excessive exposure and handling and are in poor condition. Such important prints must be considered relative to other impressions of just that image alone.

II. References

This section includes the information about the print that is of scholarly interest, and is very central to accessing the collection. While the inventiveness of imagery in Ukiyo-e prints is a notable characteristic, there is also an identifiable iconography that may be generally categorized, and tends to be the basis for much scholarly study. This categorical approach to imagery was chosen to organize the database for search. The categorization here was developed by the curators and myself for this particular collection, and may not suit another collection or its users. Examples are presented here only to suggest a possible approach to access. This section is conceived of as always remaining fluid for both data entry and departmental use, i.e., to allow continued additions to and refinements of the categorization of images. (Actual changes can be done using a "mass update" feature, but only be made by password authorized staff.)

Subject Culture falls into one of three main categories: Japanese, Chinese or foreign. Type of subject gives one or more predominant category of image to give a quick sense of what the image presents: figures, land-

scape, interiors, nature, still life, abuna-e (risque subjects) and shunga (erotic images). Each type of subject may have as many subcategories as applicable, and remaining open for additions as desired. For example, under subject type "landscape" are bays, bridges, Edo, fields, forest, gardens, islands, Kisokaido road, Kyoto, lakes, Mt. Fuji, mountains, provinces, rivers, roads and streets, sea, Tokaido road, towns and villages, waterfalls. In the field entry all relevant categories and subcategories are included, as well as specific names of places. The more description the better for useful image retrieval; each listing is separated by semi-colon.

Subject reference gives a more specific breakdown of what is represented in the image, following predominant themes of the time. Subject reference categories are literature/poetry, myth and legend, history, genre scenes, pleasure quarters, theater, festivals and games, and religion. Examples of subcategories of genre scenes are artisans, boatmen, children, farmers, drinking party, fishermen, laborers, merchants, mother and child, officials, peasants, picnic, servants, and travelers. Again, as many entries as apply may be included in this field, each separated by semi-colons for retrieval.

Examples of categories of Special Type of Picture are book illustrations, egoyomi or calendar prints, mitate or metaphores, surimono or commissioned deluxe limited editions, and uki-e or perspective print.

Where the collection has more than one impression of an image, it is useful to indicate a relative quality of image (first, second, third) for scholarly interest and exhibition consideration. Such an assessment, along with the more specific ratings of color, paper and printing in section IV, (and in conjunction with the reference photograph catalog), may help to cut down on unnecessary handling of the prints.

III Exhibition

This section concerns exhibition tracking and restrictions upon exposure of specific prints. The restrictions and exposure limits established here are based on the international standard recommended by the museum exchange committee of the United States-Japan conference in 1980, published by the Japan Society in New York.² Many distinguished conservators and conserva-

UNITED STATES-JAPAN MUSEUM EXCHANGE GUIDELINE FOR EXPOSURE OF FUGITIVE ART OBJECTS TO LIGHT DURING EXHIBITION

No higher intensity than 10 foot-candles

No longer than an average 50 days per year at 10 hours
exposure per day

Maximum of 5000 foot-candle hours in 1 year

tion scientists participated in creating this standard.

In actual practice, in the galleries at the Met, as in many other major museums, light levels are limited to 5 foot-candles for sensitive materials and limited to a maximum of 16 weeks exposure per year. At six days per week this totals 96 days, but at the lower footcandle level totals 4800 foot-candle hours per year.

The following list defines print vulnerabilities to be aware of in considering Japanese prints for exhibition: rarity of impression, sensitive and/or exceptional color, best impression of duplicate images in a particular collection, and physical fragility.

It was Keiko Keyes' recommendation that Ukiyo-e prints in the best condition should be the most protected. The "Extra Guarded" category was created to recognize

EXHIBITION RESTRICTIONS

RARE	Unusual or few impressions exist
BEST COPY	Superior impression at MMA
COLOR	Superior or sensitive color(s)
FRAGILE	Structurally weak: unsafe to handle

EXHIBITION EXPOSURE LIMITS

SPECIAL	= 12 weeks every 3 years
NORMAL	= 12 weeks per year
EXTRA GUARDED	= 12 weeks every 10 years

this concept. Rather than creating a highly inaccessible collection, in actual fact, there are relatively few impressions in most collections with exceptional, unfaded colors, or that are extremely rare, that require this protective category.

However, the extremely fugitive nature of some of the organic colors in Japanese prints should not be underestimated, as demonstrated in research by Dr. Robert Feller and Keiko Keyes in 1984.³ Simple fading tests I conducted in Tokyo, using sample traditional handprinted woodblock colors published in a 1982 catalog by the Ota Museum in Tokyo⁴, dramatically demonstrated how fugitive some organic colors are. The samples were taped inside a window with south exposure during January. The ukon yellow (*Curcuma longa* L.) totally faded in only 10 days, and the benibana red (*Carthamus tinctorius*) faded 50% in 30 days.

Organic yellow and red were used in Japanese prints throughout the 18th and 19th centuries. Both yellow

and red are also used to make other colors, commonly achieved by overprinting rather than actual ink mixtures: overprinting blue over yellow to create green, and printing blue over red to create purple. Organic yellow and red, then, can function well as "telltales" in judging the relative condition of color in Japanese prints. With extreme fading these colors may appear as shades of pale beige or tan, greens and purples will shift toward blue.

Another element of the fragility of these water-based colors to be considered in their exposure is the sensitivity of a few organic colors to moisture. This sensitivity is found both in organic colors used before 1850, and aniline colors of the late 19th century. The sensitivity is extreme in the case of the light blue called aobana or aibana (*Commelina Communia*), which, after exposure to high humidity, may develop wavy blue tide lines that disappear into a pale beige in an area that used to read as a solid blue tone.

Furthermore, aobana is very fugitive to light and was used sometimes overprinted with benibana red to make purple, common during the second half of the 18th century. It is rare to find distinctive blues and purples still readable in prints of that period; more often one sees blue, red and purple faded to a light tan or beige.

Though not specifically included in this computer form, there are two additional color sensitivities of which caretakers of Japanese prints should be aware. Some of the very commonly used Ukiyo-e colors are alkaline sensitive. This includes indigo, used from the 1740's until the end of the 19th century, and the distinctive deep Prussian blue which was introduced around 1826, in Hokusai's "Thirty Six Views of Mt. Fuji" series. Therefore, these prints should not be stored or displayed long term against buffered materials.

Ozone and possibly other airborne pollutants may affect some of the organic colors in Ukiyo-e, as discussed in research published by the Getty Conservation Institute⁵. This includes indigo, a much-used color from the 1740's into the 20th century.

IV Conservation

The conservation information distilled from the condition survey is recorded briefly in this section. The connoisseurial appreciation of Japanese prints recognizes three separate physical aspects: quality of color, the condition of the paper support, and the quality of printing. These three ratings make up the overall print quality evaluation made in field 23 in the first section of the form. When considered along with the curatorial assessment of esthetic significance and/or rarity, the ratings of color, paper and printing complete the total understanding of the individual object.

As mentioned in the discussion of fugitive colors, to aid in assessing color quality, one can look for presence

and relative intensity and freshness of organic colors such as yellow, red and purple in particular. Freshness is used here to describe the ink reading on the surface, rather

glue may discolor the paper underneath it, therefore, handling must be minimized and variations in humidity are of special concern. To attempt to treat these special printing effects would irrevocably damage the media.

CONSERVATION: Fields 48-50. Enter E, G, F or P, or a range of two of these.

	COLOR QUALITY	PAPER QUALITY	PRINTING QUALITY
	Intensity of hand or printed colors	Physical integrity and damage to sheet	Image cutting, wear, registration, inking
EXCELLENT	All colors strong, especially fugitive organic colors: red, yellow, blue and purple.	The entire sheet is intact and strong, no folds or losses, not discolored.	Crisp impression, cutting and registration good, colors evenly printed.
GOOD	All colors relatively strong with some fading of fugitive organic colors.	Sheet intact with minor dirt, folds, creases, losses, minor local stains.	Impression generally even and clean, minor print flaws.
FAIR	Overall fading, especially in fugitive colors.	Some losses and weakness, considerable dirt and some overall discoloration.	Some misregistration, uneven color, lines not crisp, block worn, many printing flaws.
POOR	Extensive overall fading with loss of identity of fugitive colors.	Overall weakness due to numerous losses, folds, creases, obtrusive discoloration, dirt and stains.	Printing and registration sloppy, fine lines thick, blurred, breaks, wear in block, many obtrusive flaws.

than sunken into the paper fibers, as often occurs with lined or washed prints. Relative color intensity may be somewhat tempered by factors such as the numbers of impressions known to have been printed originally and/or surviving, and popularity of a few artists whose work, in general, has been exposed considerably more than most.

*Printing quality evaluates how well cut the lines are, whether the blocks show wear or splitting, care in color application, and accuracy of color registration. As mentioned earlier, these clues are very much a part of the curatorial determination of edition dating and market value.

*Condition addresses the physical condition of the paper support in the more familiar descriptive terms of damage and previous repair, as listed below. This is given an overall rating in the field above it, paper quality. Many of these condition problems, of course, have a direct bearing on storage and exhibition decisions, as well as conservation treatments.⁶

Knowledge of special effects in Ukiyo-e prints as well as some inherent material vices associated with certain periods or particular artist's work is essential to appropriate condition assessments. For example, handcolored prints prior to about 1765, may incorporate gold, silver or brass powders bound in animal glue. The metallic mixtures and the animal glue itself can be very corrosive, causing discoloration to penetrate to the verso. During this period, a technique called urushi-e was used to simulate the look of lacquer by mixing animal glue with black sumi ink color. The heavily bound "lacquer" black often shrinks and distorts the support and the animal

glue may discolor the paper underneath it, therefore, handling must be minimized and variations in humidity are of special concern. To attempt to treat these special printing effects would irrevocably damage the media.

Use of Mica powder is also a problematic special printing technique requiring extra care. The mica may be bound by animal glue, rice paste, or in rare cases, egg white. It is often weakly adhered and easily damaged by handling, and even by changes in humidity which cause movement of the very flexible, absorbent Japanese paper support.

In some cases, overall brown discoloration may be due to the darkening of the original animal glue surface sizing applied to the paper before printing. This may have been accelerated by extreme exposure to light, heat and humidity when prints were displayed on the walls and pillars of Japanese homes, or stored in wooden boxes or chests for long periods of time. This darkening of animal glue sizing is sometimes seen in prints done before 1770, and again in early 20th century prints for which a less refined animal glue was sometimes used. To remove the discolored sizing might be

CONDITION

Lined	Mounted	Patched
Inpainted	Trimmed	Margins Added
Tape	Adhesive residue	
Tears	Losses	Wormholes
Abrasions	Creases	Folds
Thin Spots	Dirt	Accretions
Stains	Discolored	Paper Weak
Faded	Sulfiding	Bleeding Colors
Flaking Media	Color Darkened	

destructive to both media and paper and inappropriate to the history of the artifact.

Among aficionados of Japanese prints there is generally a higher tolerance for certain conditions of age, such as wormholes, creases and surface dirt. Fortunately, most previous treatment, in Japan, was done following a very straight-forward traditional scroll moulder's approach. Fairly good quality Japanese papers (though occasionally foil paper and colored paper patches are seen) and wheat starch paste were used, with minimal use of moisture on the water-based colors.

A peculiarity of connoisseurship and, to some extent, the dating of these prints, is that the printing (baren) marks and penetration of ink visible on the verso is usually examined, often viewed in transmitted light.

Though lined or mounted prints may be stable from a conservation point of view, collectors prefer prints that are not backed or mounted. This connoisseurial concern must be weighed against any risks of backing removal on the one hand and vulnerability of an unlined damaged sheet on the other.

Corners or edges of the prints are often seen pasted to a heavy Japanese "vellum" paper backing or window mat. Occasionally, decorative paper border strips are pasted over the edge of the print to simulate a scroll mounting border. This presentation was common practice in the late 19th and early 20th century, prepared by dealers in Japan, perhaps as a concession to western tastes. Prints in these Japanese mats can be seen in all the major collections in America and Europe, and I have not yet seen any damage directly caused by them.

Highest treatment priority would be given to treatments required to structurally stabilize the paper, or to intervene to prevent further structural damage to the

though perhaps the best copy should not travel on loan. In the case of preparing a print for exhibition, refined cosmetic treatment might be a priority. In contrast, restraint from any treatment of rare prints or those prints with the freshest color should be urged.

DATA RETRIEVAL

The database can be searched in three ways:

- Field search asks for a field with anything entered in it.
- Keyword search looks for a specific number, word or phrase, such as accession number, artist's name, print title, or specific subject matter.
- Text search allows looking for specific words or phrases contained within prose, such as in fields for comments or annotations.

A catch in searching any database is that, in reality, one often doesn't know exactly word-for-word what the objective has been called, or to put it another way, how it is entered in the database. With this program, searches can also be done with only partial information, or "wildcard" search, as it is also called. For example, if the exact spelling of an artist's name is not known, or there are two similar names, a search can be made for part of a word: all artists whose name begins with TOYO. The retrieved records can be reviewed both record by record or, by using the Report menu, the user can custom design a retrieval list to put the information in another more useful format.

This paper can only be an introduction to the process and rationale used to create a database customized for one particular collection. It is hoped that it may be applicable in some part to other survey and cataloging projects, and encourage some appreciation for the special needs of Japanese woodblock prints.

TREATMENT PRIORITY:	This assessment should be made by a conservator. ENTER one of the following letters: H, M, L, or the word NONE. The full word will automatically be filled when the cursor moves to the next field.
HIGH	Major structural problems in the integrity of the paper, mounting on a substrate that is causing deterioration to the print, presence of pressure sensitive tapes or discolored adhesive, or obtrusive cosmetic problems such as stains, creases and dirt.
MEDIUM	Minor structural problems and some cosmetic problems.
LOW	Very minor cosmetic problems or mounting on an acceptable substrate
NONE	No treatment necessary, the object has already been treated, OR the risk of treatment is not recommended.

sheet. For example, prints with pressure sensitive tapes or damaging adhesives would be given higher priority in order to remove an active source of deterioration.

It is really more since World War II that modern materials, such as deleterious adhesives and wood pulp paper and board, have begun to appear in association with Japanese prints. Removal of destructive modern adhesives and woodpulp paper and boards is another treatment priority.

When there are several copies of the same image, the best impression is usually the one desired for exhibition,

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NOTES

¹ Lane, Richard. Images of the Floating World: The Japanese Print. New York, Dorset Press, 1982.

² Report of the Study Group on Care of Works of Art

in Traveling Exhibitions of the Museum Exchange Subcommittee of the United States-Japan Conference on Cultural and Educational Interchange. New York, Japan Society, 1980.

³ Feller, Robert L., Curran, M., and Bailie, C. "Identification of Traditional Organic Colorants Employed in Japanese Prints and Determination of their Rates of Fading". Japanese Woodblock Prints: A Catalogue of the Mary A. Ainsworth Collection by Roger Keyes, Allen Memorial Art Museum, Oberlin, Ohio, 1984, pp.253-266.

⁴ Ukiyo-e Hanga no Dekiru Made. Tokyo, Ota Museum, 1980.

⁵ Cass, G., Druzcik, J., Grosjean, D., Nazaroff, W., Whitmore, P., and Whittman C. "The Ozone Fading of Traditional Japanese Colorants". Protection of Works of Art from Photochemical Smog. Marina del Rey, CA, The Getty Conservation Institute, 1988, pp.34-57.

⁶ Keyes, Keiko. "Japanese Print Conservation - An Overview". The Conservation of Far Eastern Art, ed. Mabuchi, H. and Smith, Perry. Preprints of the Kyoto Congress, IIC, London, 1988, pp. 30-36.

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Betty Fiske was a member of the Metropolitan Museum of Art Paper Conservation staff from 1982 to 1992. She is currently Associate Paper Conservator at the Winterthur Museum, Winterthur, DE 19735