在外日本古美術品保存修復協力事業
The Cooperative Program for the Conservation of
Japanese Art Objects Overseas

檜・八橋図

Cypress Tree, Bridge over Iris Pond

インディアナポリス美術館（アメリカ合衆国）
本紙金地着色　屏風装　6 曲 1 双

The Indianapolis Museum of Art, USA
Color on paper with gold leaf, six-panel folding screens

No.2017-1

平成 29 年度修復事業
The 2017 Japanese Fiscal Year

目　次

Table of Contents

1 修復報告

半田　昌規、宇和川　史彦、下田　純平、佐々木　立美、伊東　静穂
株式会社 半田九清堂

1.1　名称等

名称	『檜・八橋図』
制作者	鈴木其一（1795～1858）
制作年代	19 世紀半ば
所蔵館	インディアナポリス美術館（アメリカ合衆国）
所蔵番号	1987.43（八橋図）、1987. 44（檜図）
品質・形状	紙本金地着色　屏風装（6 曲 1 双）
本紙繊維	楮

1.2　工期および施工者等

工期	平成 29 年 9 月 25 日～令和元年 5 月 30 日
施工場所	株式会社 半田九清堂　東京国立博物館内修理室
施工者	株式会社 半田九清堂

1.3　修復前の状態

・檜図および八橋図の緑青色の絵具部分で本紙の一部に裂けや糊浮きが生じており、絵具の剥落や本紙の欠失があった（Fig. 1.5(a)、Fig. 1.6(a)、Fig. 1.7(a)）。
・緑青色の絵具部分に黒色の変色が生じており、特に八橋図の燕子花の葉の箇所が著しかった。
・檜図で緑青色の絵具部分の本紙欠失部分に張り当てられた補修紙に、周囲に合わせた緑色の緑青と思われる絵具が塗られていた（Fig. 1.8(a)、 Fig. 1.9(a)）。
・金箔地の欠失部分に金箔紙、金泥紙が貼り当てられていた。
・入尾背部分に虫損があった。
・八橋図で本紙が捲れている箇所があった（Fig. 1.10(a)）。
・本紙端の折り曲げ部分で、金箔の押されていない本紙基底材の表面の素地が見えている箇所があった。
・屏風の構造に歪みが生じており、一部の画面に角皺や画面同士の擦れがあった（Fig.1.11(a)）。
・椽木の角がずれていた（Fig.1.12(a)）。
・裏貼りに擦れによる破れがあった。

1.4　修復方針

・原状保存、現状維持を基本方針とした修復を行う。
・使用する材料、技術及び修復環境は国指定品の修復と同等とする。
・修復前と同様の屏風装に仕立てる。
・全ての付属物、付帯物を所蔵館に返還する。
・修復中にはすべての工程に渡り写真撮影を含む記録を行う。
・修復中の当該美術品に対する各種調査は、本研究所担当者の指導のもと行う。

1.5 修復工程

修復材料は Table 1.3 を参照。

(1) 記録（Fig. 1.13.1）

・寸法や損傷状態などの修復前状況を記録し、本体の状態についてデジタルカメラ、4×5 リバーサルフィルム、赤外線撮影をし、細かな撮影記録を行った（付録 1.1）。

・墨の定着具合や汚れの移り具合を調べるために、水を少量含ませた筆で軽くなぞるパッチテストを行い、修復の作業順序や方法を検討した。

(2) 埃の除去

本紙表面の汚れや埃を刷毛で除去した。

(3) フノリと膠による洗浄（Fig. 1.13.2、Fig. 1.13.3）

絵具層の接着力の弱さと安全性を考慮して、フノリ抽出液と牛膠水溶液（1.0wt-%）の混合液を化学繊維紙（化繊紙）越しに小範囲で塗布し、重ねた吸い取り紙に汚れやシミを移し取った。同作業を全体に施した。

(4) 解体（1 回目）

椽木を外し、尾背を切り離して一扇ずつに解体した。

(5) 剥落止め（1 回目）（Fig. 1.13.4）

絵具部分に牛膠水溶液(1.0～1.5wt-%)を塗布し、剥落止めをした。絵具の状態によっては膠水溶液にフノリ抽出液を混合し、粘度を調整した。処置後は十分に乾燥期間をおいた。

(6) 解体（2 回目）（Fig. 1.13.5）

屏風下地から本紙を取り外した。

(7) 繊維組成分析

本紙裏面より微量の繊維を採取し、C 染色液を用いて繊維の分析を行った（付録 1.2）。

(8) 剥落止め（2 回目）

絵具部分に牛膠水溶液(1.0～1.5wt-%)を塗布し、乾燥させた後、兎膠水溶液(0.5～1.0wt-%)を塗布して、剥落止めを行った。絵具の定着が見られるまで、剥落止めの回数や膠の濃度を調整しながら行い、処置後は十分に乾燥期間をおいた。

(9) 絵具養生（Fig. 1.13.6）

本紙の取り外しや裏打ち紙除去作業が安全に行えるよう、絵具部分を保護するために、化繊紙をフノリ抽出液で貼り養生した。

(10)裏打ち紙の除去（Fig. 1.13.7、Fig. 1.13.8）

本紙裏面よりろ過水を少量ずつ与え、旧裏打ち紙を除去した。三層の裏打ちが施されており、層ごとに除去した。

(11)欠損部の調整（Fig. 1.13.9）

旧補修紙は除去せず厚みを可能な限り取り除き、また本紙との重なりが最小限になるよう調整した。本紙欠失個所について、絵具部分には本紙と同質の楮紙を染色したもので、金箔部分には似寄りの金箔紙で補紙をした。本紙の亀裂箇所には帯状に喰い裂いた薄美濃紙を貼り、補強した。

(12) 肌裏打ち（Fig. 1.13.10）

新糊を用い、薄美濃紙にて新規肌裏打ちをした。

(13) 増裏打ち（Fig. 1.13.11）

新糊を用い、楮紙にて 2 回の増裏打ちをし、仮張り乾燥した。乾燥後、絵具表面に養生のために貼った化繊紙を除去した。

(14) 骨木地と椽木の新調（Fig. 1.13.12）

骨木地は捻れや反りが生じにくい総枘組み構造で、留め仕上げの下地を製作した。椽木は、屏風を閉じた際に画面同士が当たることがないよう骨木地より厚みを付けた。

(15) 下張り（Fig. 1.13.13）

新調した骨木地に、細川紙を用いて骨縛り、蓑掛け（三遍蓑）、蓑押さえをし、紙蝶番を付けて 6 曲 1 双屏風の形にして、楮紙にて下袋掛け、上袋掛けをし、堅牢な下地を作製した。

(16) 本紙、裏貼りの貼り込み（Fig. 1.13.14、Fig. 1.13.15）

新糊を用い、屏風下地の表側に本紙を貼り込んだ。裏貼紙を新調し、屏風の裏側に貼り込んだ。

(17) 補彩（Fig. 1.13.16）

新規補紙箇所に、地色に合わせた補彩をした。

(18) 仕上げ（Fig. 1.13.17）

尾背部分は、表側に金箔紙を、裏側に模様を合わせて裏貼り紙を貼った。新調した椽木を取り付け、仕上げた。

(19) 保存

収納袋を新調し、作品を納入した（Fig. 1.13.18）。また、修復前に使用されていた表装材料である屏風下地、椽木、裏打ち紙（3 層分）、補修紙、尾背紙（出尾背：金箔紙）、裏貼り紙、下張り紙（袋紙）は全て別置保存とした。

(20) 記録

修復後の作品の写真撮影を行い、本修復に関する記録を集約した。

特記事項

(3)における洗浄について

本作品は、絵具のバインダーの強度が非常に弱く、水の噴霧による洗浄は不可能と判断した。よってフノリの洗浄効果を利用して溶解した汚れを吸い取り紙に移し取ると同時に、膠水溶液を与えることで接着力を補う洗浄方法を行うことにした。この方法により小面積単位で状態を確認しながら行うことができた。

1 Restoration Report

HANDA Masaki, UWAGAWA Fumihiko, SHIMODA Junpei, ITO Shizuho
Handa Kyuseido Co., Ltd.

1.1 Information of the Artwork

Title	*Cypress Tree, Bridge over Iris Pond*『檜・八橋図』
Artist	SUZUKI Kiitsu (鈴木其一, 1795-1858)
Period	Middle of the 19th century
Owner	The Indianapolis Museum of Art, United States of America
Accession no.	1987.43 (*Bridge over Iris Pond*), 1987.44 (*Hinoki Cypress Tree*)
Media and format (style)	Color on paper with gold leaf, a pair of six-panel folding screens
Paper for artwork	*Kozo* fiber

1.2 Information of the Restoration Project

Duration	25 September 2017 - 30 May 2019
Place	The studio in the Tokyo National Museum, Handa Kyuseido Co., Ltd.
Restorers	Handa Kyuseido Co., Ltd.

1.3 Condition before Restoration

- At the green colored area, there were tears and separation of the artwork from lining paper. There were flaking of green paint and some of the paint was lost (Fig. 1.5(a), Fig. 1.6(a), Fig. 1.7(a)).
- There was blackening of the green colored area of iris leaves in *Bridge over Iris Pond*.
- Infill paper had been applied for the loss area of the artwork on *Cypress Tree*. Color of these papers were adjusted with greenish pigment that seemed to be verdigris to match the surrounding color (Fig. 1.8(a), Fig. 1.9(a)).
- Paper with gold leaf and gold pigment were applied for the missing area of gold ground.
- There were insect damages in the valley fold hinge.
- The artwork were lifted from panel on *Bridge over Iris Pond* (Fig. 1.10(a)).
- Gold leaf was not applied at some areas the part of the folded edge.
- The folding screens were distorted. There were creases on some corners and abrasions (Fig. 1.11(a)).
- Some of the decorative frames were shifted (Fig. 1.12(a)).
- There were damage caused by rubbing in the decorative backing paper.

1.4 Restoration Policy

- Restoration of the artworks to their status quo ante and the maintenance of the present condition would be the fundamental policy to be followed in restoring the artworks.
- Materials, techniques and restoration environment equivalent for the restoration of designated cultural properties would be used.
- The mounting format would be the same style as that before restoration.
- All the previous mounting materials and storage equipment would be returned to the museum.
- All the processes of the restoration would be recorded including photographs.

・Varieties of investigation towards the artworks during restoration would be carried out under the guidance of the person in charge of the Tokyo National Research Institute for Cultural Properties.

1.5 Restoration Process

Regarding restoration materials, see Table 1.3.

(1) Documenting (Fig. 1.13.1)

・The condition of the artworks including the dimensions and damages were recorded. Photos were taken using 4×5 reversal film camera, digital camera and infrared photography (Appendix 1.1).

・To examine the stability of the *sumi* (Chinese ink) and the possibility of stain migration, a patch test, providing water by brush, was done.

(2) Removing dust

A brush was used to remove dirt and dust from the surface of the artworks.

(3) Washing with a liquid extract from seaweed (*funori*) and a glue solution (Fig. 1.13.2, Fig. 1.13.3)

Considering the weakness of the bond strength of pigment layer and safety, solution mixed with a cow skin glue solution (0.5wt-%) and a seaweed (*funori*) extract was applied to the artworks partially through the chemical fiber paper. Dirt and stain were absorbed by blotting paper placed under the artworks. This washing process was done for the whole artworks.

(4) Disassembling (first time)

Decorative frames were detached. The panels were separated by cutting the fold hinges.

(5) Consolidating (first time) (Fig. 1.13.4)

A cow skin glue solution (1.0-1.5wt-%) was used to consolidate the pigments. Depending on the condition of the paint layer, the glue solution was mixed with seaweed (*funori*) extract to adjust the viscosity. After the consolidation, the artworks were sufficiently dried.

(6) Disassembling (second time) (Fig. 1.13.5)

The artworks with their linings were removed from the panels.

(7) Analyzing paper

A very small amount of fiber samples from the back side of the artworks were dyed by C stain and observed with a microscope (Appendix 1.2).

(8) Consolidating (second time)

Pigment areas were consolidated by applying cow glue solution (1.0-1.5wt-%). After drying, a rabbit glue solution (0.5-1.0wt-%) was further applied to the pigment area. Number of times of application and/or concentration of glue was determined depending on the conditions of each area. Afterward, the glue was dried.

(9) Protecting of the pigments (Fig. 1.13.6)

The surface of the painting were protected by chemical fiber paper temporarily pasted with a seaweed (*funori*) extract during the treatment.

(10)Removing the lining paper (Fig. 1.13.7, Fig. 1.13.8)

The lining paper was removed by moisturizing with filtered water from the back side of the artworks. There were three layers of lining and each layer was removed in order.

(11)Modifying of loss areas (Fig. 1.13.9)

Previous infill paper was left and the margin was made as thin as possible. The loss at the painted area were infilled by dyed *kozo* paper. Those in the gold leaf area infilled by similar gold leaf paper. Paper strips of thin

mino paper were applied to rifts of the artworks for reinforcement.

(12) Applying first lining (Fig. 1.13.10)

Thin *mino* papers was applied with wheat starch paste.

(13) Applying second lining (Fig. 1.13.11)

Kozo paper was pasted to the artworks with wheat starch paste two times, dried and conditioned. After drying, synthetic paper applied to protect the pigments areas were removed.

(14) Preparing wooden lattice cores and decorative frames (Fig. 1.13.12)

Wooden lattice cores with a structure that does not easily twist or warp were made. The decorative frames were made thicker than the wooden lattice cores to prevent abrasion.

(15) Making panels (Fig. 1.13.13)

Honeshibari, *minokake*, and *minoosae* made with *hosokawa* paper were applied to the new wooden lattice cores. The pieces were hinged and formed a six-paneled screen. *Shita-fukurogake* and *uwa-fukurogake* made with *kozo* paper were applied twice; thus, a core was structured.

(16) Applying the artworks with lining on the hinged panels (Fig. 1.13.14, Fig. 1.13.15)

The artworks were pasted to hinged-panels with wheat starch paste. The decorative backing paper was made and pasted onto the back side of the panels.

(17) Inpainting (Fig. 1.13.16)

Inpainting was applied to infilled paper in order to match the color of the infilled parts with that of the artworks.

(18) Finishing (Fig. 1.13.17)

Kozo paper with gold leaf was pasted on the front side of hinge and the decorative backing paper was pasted on the back side of hinge so that the pattern would match. New decorative frames were attached, and the folding screens were finished.

(19) Preparing for storage

Storage bags were made (Fig. 1.13.18). The mounting materials and storage equipment which had been used on the object before restoration—wooden lattice cores, decorative frames, lining paper (three layers), infill paper, hinge cover (mountain fold hinge paper: paper with gold leaf), backing paper, underlining paper (pouch pasting paper) were stored separately from the restored artworks.

(20) Documenting

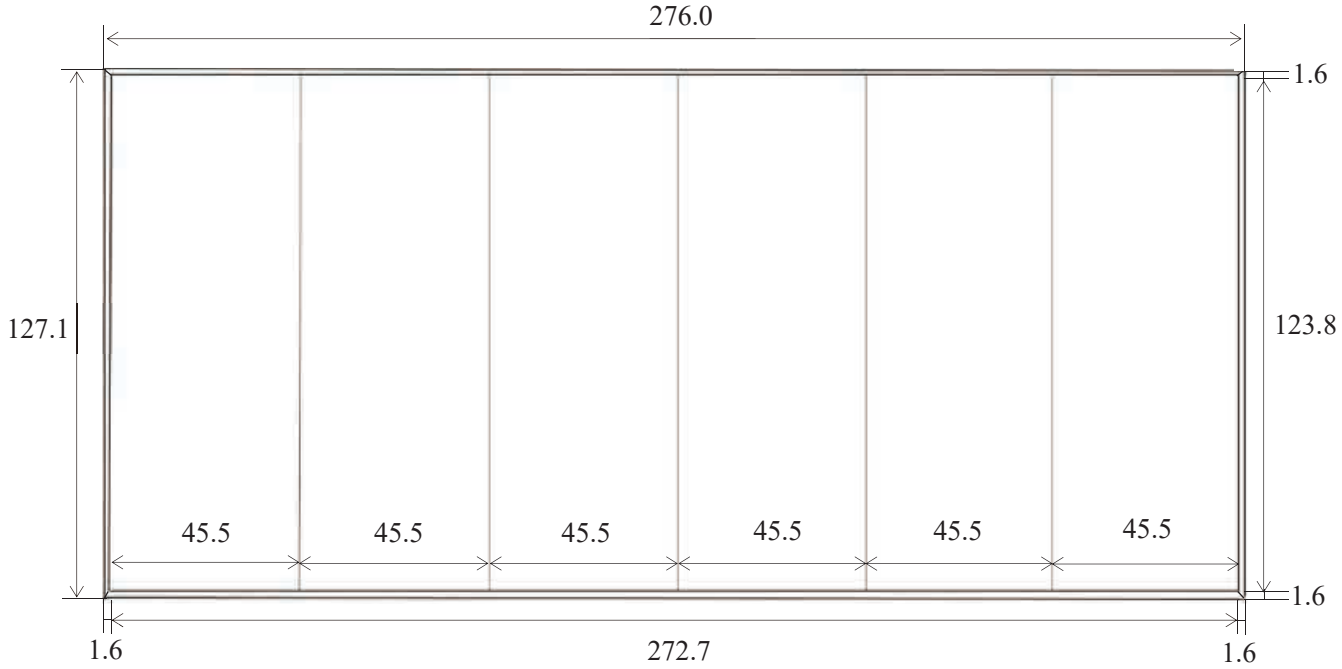
Photographs were taken after restoration and reports were prepared.

Note

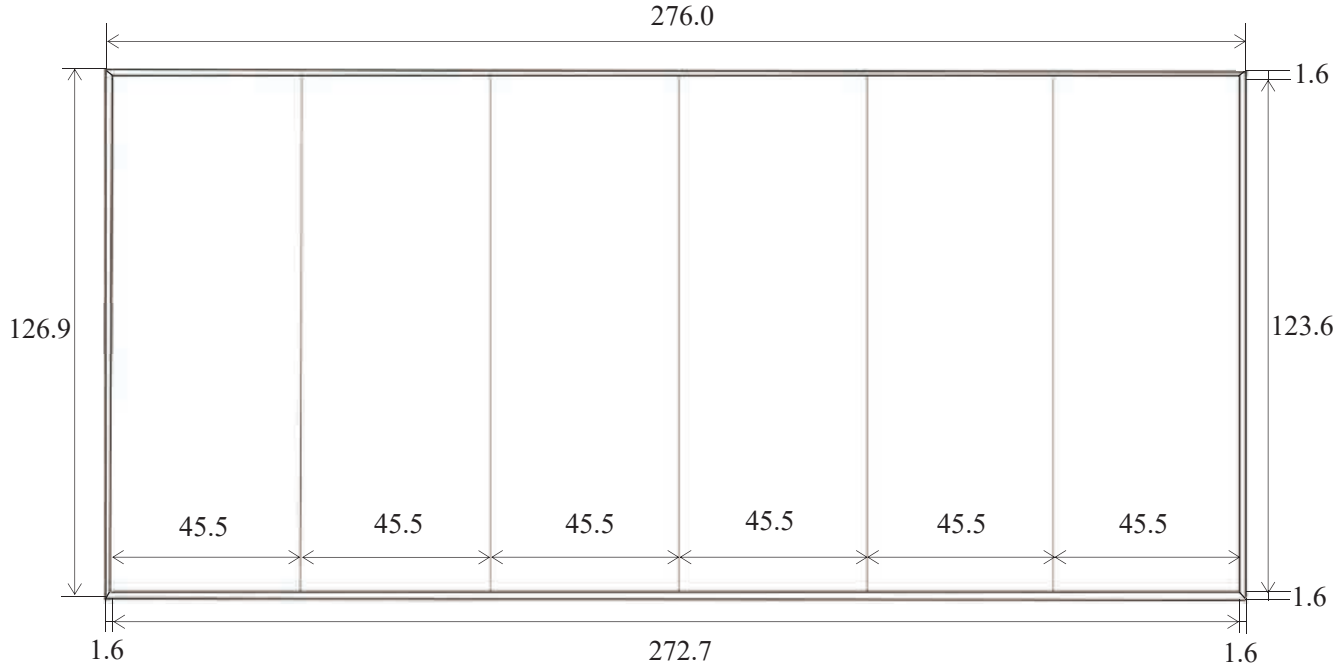
Regarding (3), washing with a seaweed (*funori*) extract and a glue solution

In these artworks, washing with water was quite difficult because the adhesion between the pigments were very weak. Thus, using a glue solution with the seaweed (*funori*) extract to reinforce and the cleaning was achieved at the same time. By this method, it was possible to check the condition of the artworks and wash safely.

Translated by KATAFUCHI Namika, KATO Masato



(a)

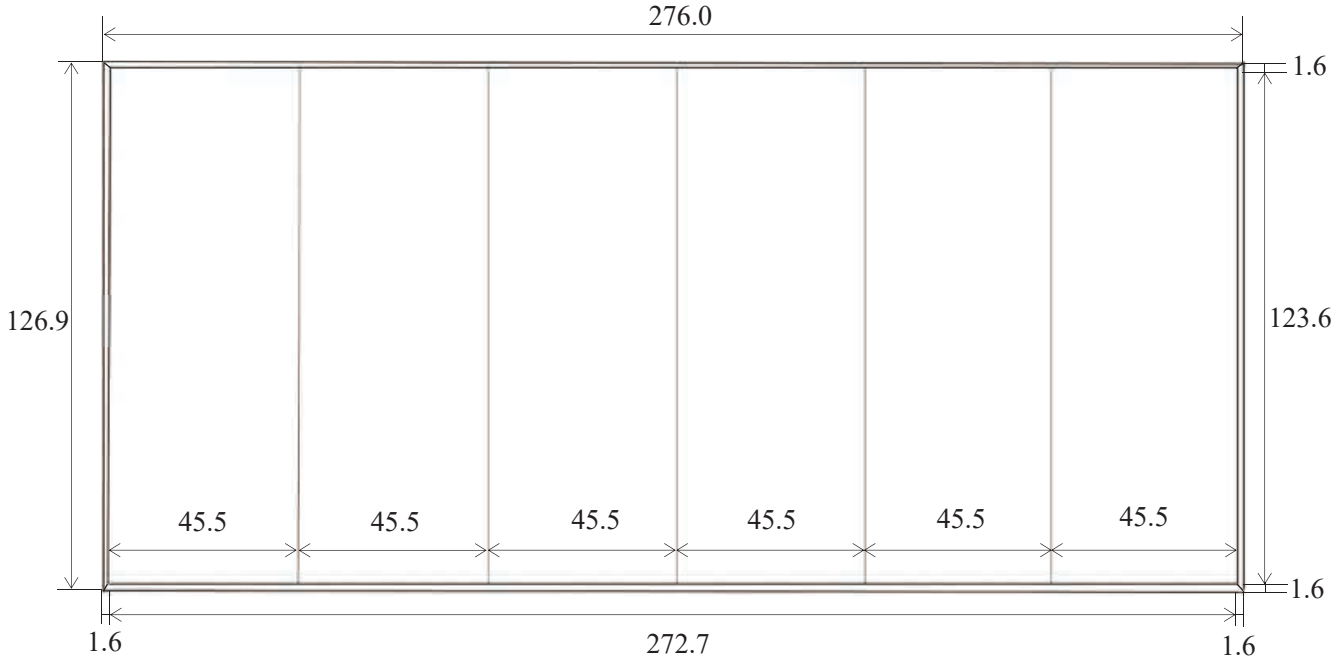


(b)

Fig. 1.1　寸法見取図（cm）『八橋図』(a) 修復前　(b) 修復後

Dimensions (cm), *Bridge over Iris Pond* (a) before restoration (b) after restoration

(a)



(b)

Fig. 1.2　寸法見取図（cm）『檜図』(a) 修復前　(b) 修復後

Dimensions (cm), *Cypress Tree* (a) before restoration (b) after restoration

Table 1.1 形式・仕様等　修復前
Format and mounting materials, before restoration

形式 Form	屏風装 Folding screen
椽木 Decorative frame	黒漆塗り椽 Frame coated with black urushi (Japanese lacquer)
下地 Wooden lattice core	杉材 Japanese cedar
裏貼り紙 Backing paper	薄茶地丸花菱繋ぎ型摺り紙 Paper with a diamond-shaped flower roundel pattern printed on a pale brown background

Table 1.2 形式・仕様等　修復後
Format and mounting materials, after restoration

形式 Form	屏風装 Folding screen
椽木 Decorative frame	桧材（山岸美術木工） Japanese cypress wood (made by Yamagishi Bijutsu Mokko) 黒漆塗り椽（中沢義孝） Coated with black urushi (Japanese lacquer) (made by NAKAZAWA Yoshitaka)
下地骨 Wooden lattice core	杉白太留枘組子（山岸美術木工） Sapwood of Japanese cedar with mitered corners and mortise and tenon joints (made by Yamagishi Bijutsu Mokko)
裏貼り紙 Backing paper	鼠色地雀型摺り紙（株式会社半田九清堂） Paper with a sparrow roundel pattern printed on a gray background (made by Handa Kyuseido Co., Ltd.)
包裂 Wrapping cloth	木綿製平織裂（坂田株式会社） Plain woven cotton cloth (provided Sakata Co., Ltd.)

Table 1.3		修復材料 Restoration materials
水 Water		ろ過水［糸巻きタイプフィルター、粒状活性炭カートリッジフィルターを使用（3M Purification 社）］ Filtered water [using a 0.5μ diameter pore filter and granular activated carbon cartridge filter] (product of 3M Purification Inc.)
糊 Paste		小麦デンプン（籠島澱粉株式会社） Wheat starch (manufactured by Kagoshima Denpun Co.,Ltd.)
膠 Animal glue		牛膠（株式会社かみ屋）、兎膠（クレマーピグメント社） Cow glue (provided Kami Ya Co.,Ltd.), Rabbit glue (provided Kremer Pigments Inc)
フノリ Seaweed paste (*funori*)		マフノリ、フクロフノリ、ハナフノリ（有限会社金開堂） *Mafunori* (*Gloiopeltis tenax*), *Fukurofunori* (*Gloiopeltis furcata*), *Hanafunori* (*Gloiopeltis complanata*) (provided Kinkaido Co.)
肌裏紙 First lining paper		楮紙［薄美濃紙］（長谷川聡） *Kozo* paper [thin *mino* paper] (made by HASEGAWA Satoshi)
増裏紙(1、2 回目) Second lining paper (2 times)		楮紙［八女紙］（溝田義秋） *Kozo* paper [*yame* paper] (made by MIZOTA Yoshiaki)
亀裂部補強紙 Infill paper for rifted parts		楮紙［薄美濃紙］（長谷川聡） *Kozo* paper [thin *mino* paper] (made by HASEGAWA Satoshi)
欠損部補修紙 Infill paper for missing parts		楮紙［薄美濃紙］（長谷川聡） *Kozo* paper [thin *mino* paper] (made by HASEGAWA Satoshi)
下張り紙 Underlining paper	骨縛り *Honeshibari*	楮紙［細川紙］（鷹野禎三） *Kozo* paper [*hosokawa* paper] (made by TAKANO Teizo)
	蓑掛け *Minokake*	楮紙（米粉入り）（鷹野禎三） *Kozo* paper with rice filler (made by TAKANO Teizo)
	蓑押さえ *Minoosae*	楮紙［細川紙］（鷹野禎三） *Kozo* paper [*hosokawa* paper] (made by TAKANO Teizo)
	下袋 *Shitabukuro*	楮紙［八女紙］（溝田義秋） *Kozo* paper [*yame* paper] (made by MIZOTA Yoshiaki)
	上袋 *Uwabukuro*	楮紙［八女紙］（溝田義秋） *Kozo* paper [*yame* paper] (made by MIZOTA Yoshiaki)
染料 Dye		ヤシャ（藍熊染料株式会社） Yasha (*Alnus firma*) (provided AIKUMA SENRYO Co.,Ltd.)
媒染剤 Mordant		木灰（藍熊染料株式会社） Lye extracted from ash of a tree (provided AIKUMA SENRYO Co.,Ltd.)
蝶番 Hinges		楮紙［細川紙］（鷹野禎三） *Kozo* paper [*hosokawa* paper] (made by TAKANO Teizo)
尾背紙 Hinge cover paper	出尾背 *Deoze*	金箔紙（株式会社半田九清堂） *Kozo* paper with gold leaf (made by Handa Kyuseido Co., Ltd.)
	入尾背 *Irioze*	金砂子蒔き鳥の子紙（株式会社半田九清堂） *Torinoko* paper with gold dust (made by Handa Kyuseido Co., Ltd.)
	背尾背 *Seoze*	鼠色地雀型摺り紙（株式会社半田九清堂） Paper with a sparrow roundel pattern printed on a gray background (made by Handa Kyuseido Co., Ltd.)
補彩絵具 Paints for adjusting color of infills		専門家顔料（ホルベイン画材株式会社） ・ピオニーレッド［C.I.No.PR185］／ベンズイミダゾロンカーミン HF4C ・オリエンタルブルー［C.I.No.PB15］／フタロシアニンブルー ・パーマネントイエローライト［C.I.No.PY55］／ベンジジンイエロー ARTISTS' PIGMENT (provided Holbein Art Materials Inc.) ・PEONY RED [C.I.No.PR185] / Benzimidazolone Carmine HF4C ・ORIENTAL BLUE [C.I.No.PB15] / Phthalocyanine Blue ・PERMANENT YELLOW [C.I.No.PY55] / Benzidine Yellow

(a)

(b)

Fig. 1.3 全体 『八橋図』 (a) 修復前 (b) 修復後

Artwork, *Bridge over Iris Pond* (a) before restoration (b) after restoration

(a)

(b)

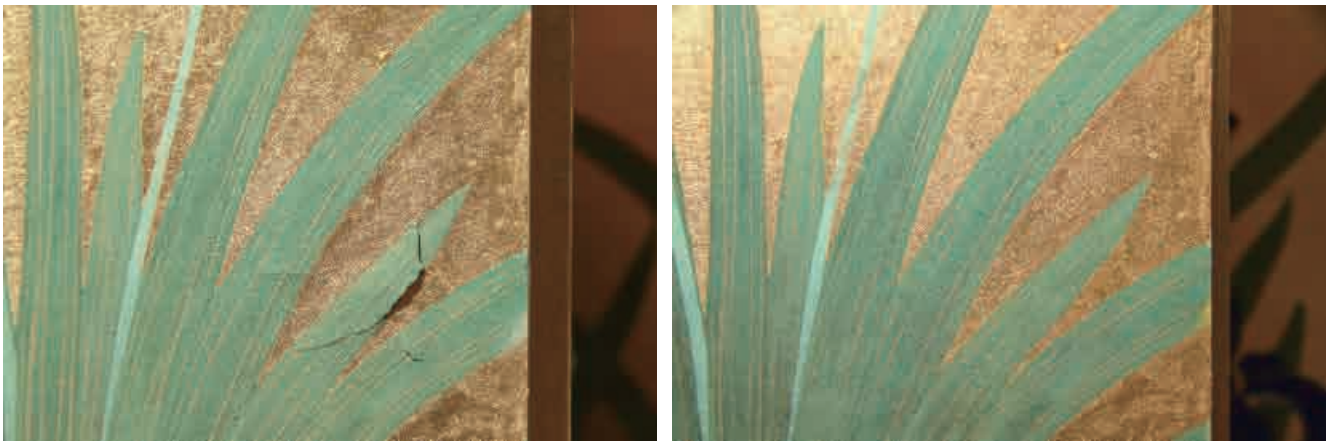
Fig. 1.4 全体 『檜図』 (a) 修復前 (b) 修復後

Artwork, *Cypress Tree* (a) before restoration (b) after restoration

(a) (b)

Fig. 1.5 本紙の裂け（1）『檜図』 (a) 修復前 (b) 修復後

Tears (1), *Cypress Tree* (a) before restoration (b) after restoration



(a) (b)

Fig. 1.6 本紙の裂け（2）『八橋図』 (a) 修復前 (b) 修復後

Tears (2), *Bridge over Iris Pond* (a) before restoration (b) after restoration

(a) (b)

Fig. 1.7 本紙の欠失『八橋図』 (a) 修復前 (b) 修復後

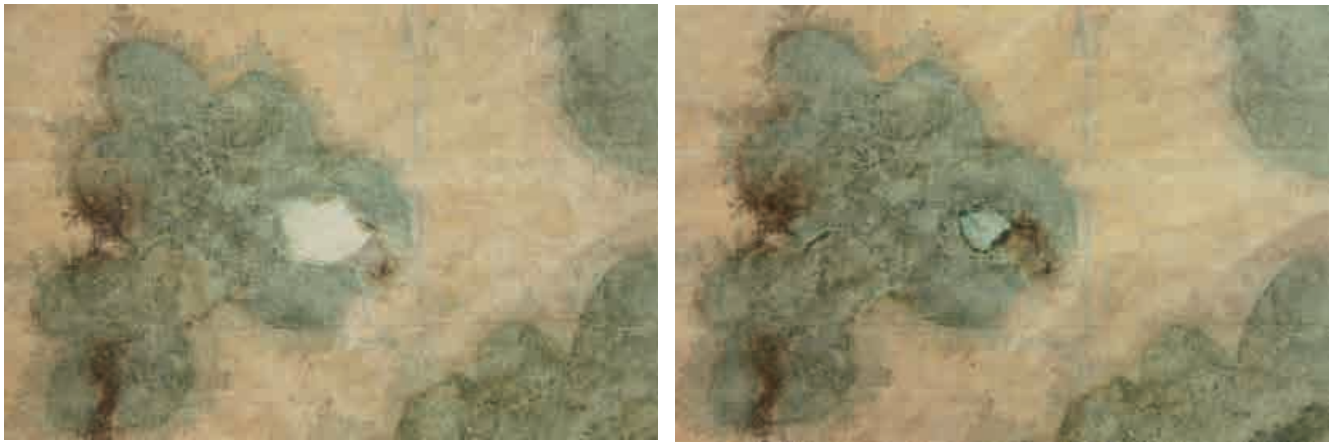
Losses, *Bridge over Iris Pond* (a) before restoration (b) after restoration

(a) (b)

Fig. 1.8 緑色の補彩（本紙表面）『檜図』 (a) 修復前 (b) 修復後

Inpainting with green material (front side of the artwork), *Cypress Tree*

(a) before restoration (b) after restoration

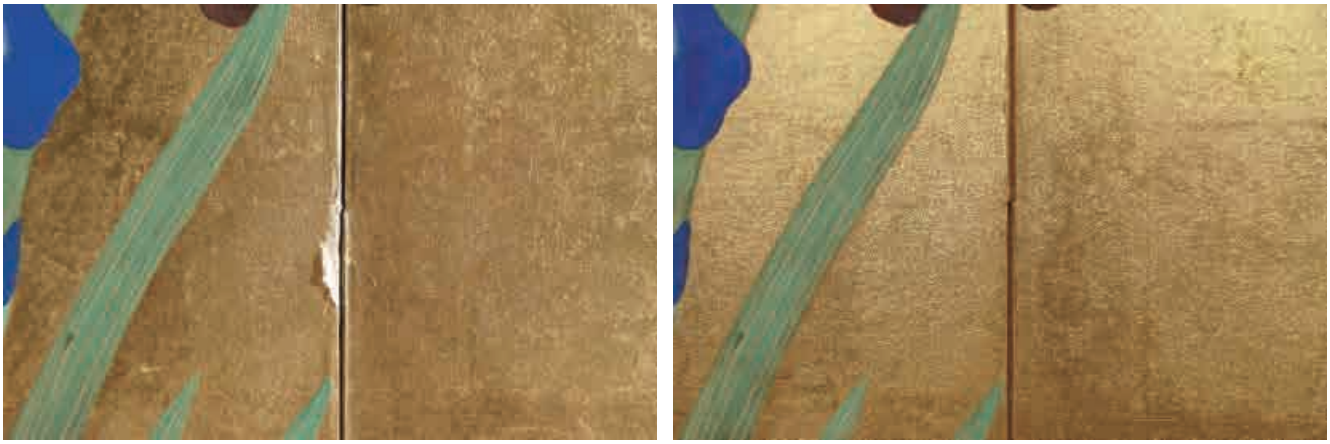


(a) (b)

Fig. 1.9 緑色の補彩（本紙裏面）『檜図』 (a) 修復前 (b) 修復後

Inpainting with green material (back side of the artwork), *Cypress Tree*

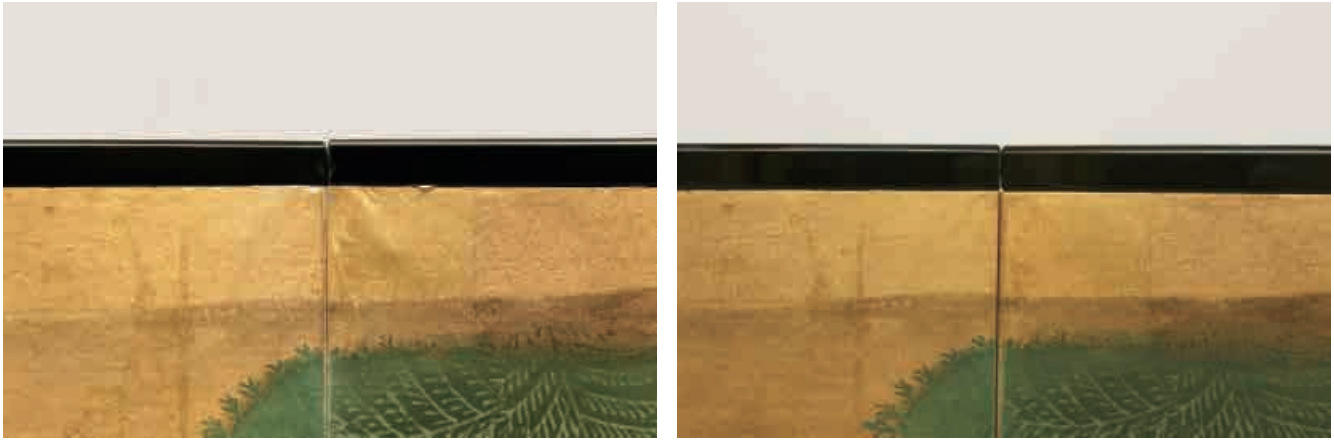
(a) before restoration (b) after restoration



(a) (b)

Fig. 1.10 本紙の捲れ『八橋図』 (a) 修復前 (b) 修復前

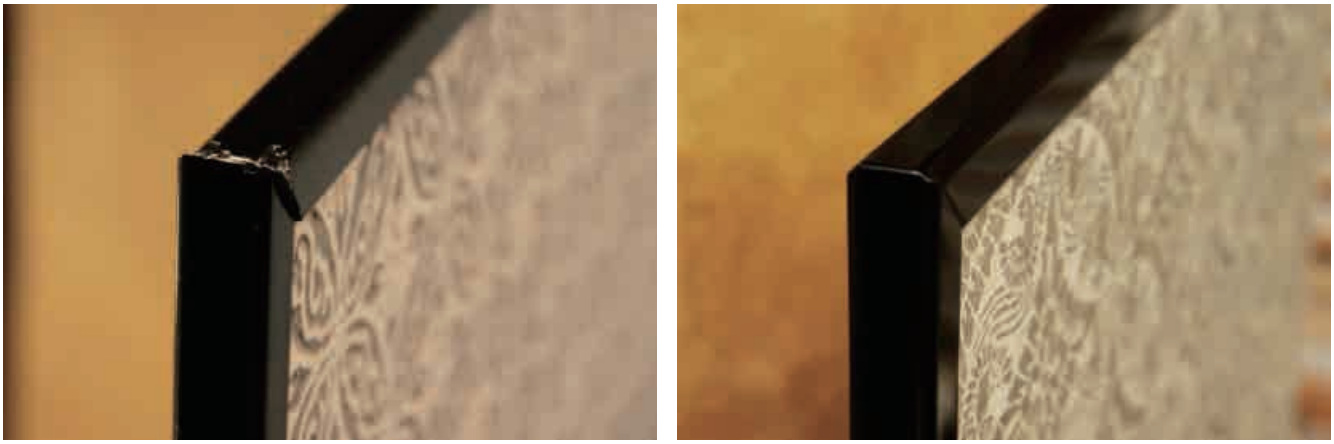
Delamination of the artwork, *Bridge over Iris Pond* (a) before restoration (b) after restoration



(a) (b)

Fig. 1.11　角皺　(a)修復前　(b)修復後

Crease of corner (a) before restoration (b) after restoration



(a) (b)

Fig. 1.12　椽木のずれ　(a) 修復前 (b) 修復後

Loose decorative frame (a) before restoration (b) after restoration

Fig. 1.13.1　記録（作品撮影）
Documenting (Photographing)

Fig. 1.13.2　フノリと膠による洗浄（1）
Washing with a liquid extract from seaweed (*funori*) and a glue solution (1)

Fig. 1.13.3　フノリと膠による洗浄（2）
Washing with a liquid extract from seaweed (*funori*) and a glue solution (2)

Fig. 1.13.4　剥落止め
Consolidating

Fig. 1.13.5 解体
Disassembling

Fig. 1.13.6 絵具養生
Protection of the pigments

Fig. 1.13.7　裏打ち紙の除去
Removing the lining paper

Fig. 1.13.8 肌裏紙の除去
Removing the first lining paper

Fig. 1.13.9 欠損部の調整
Modifying of loss areas

Fig. 1.13.10 肌裏打ち
Applying first lining

Fig. 1.13.11 増裏打ち
Applying second lining

Fig. 1.13.12 骨木地と椽木の新調
Preparing wooden lattice cores and decorative frames

Fig. 1.13.13 下張り
Making panels

Fig. 1.13.14 本紙貼り込み
Applying the artworks with lining on the hinged panel

Fig. 1.13.15 裏貼り紙貼り込み
Applying the backing paper with lining on the hinged panel

Fig. 1.13.16 補彩
Inpainting

Fig. 1.13.17 仕上げ
Finishing

Fig. 1.13.18 収納袋（新調）
Storage bag (newly made)

2 作品解説

東京文化財研究所
江村　知子

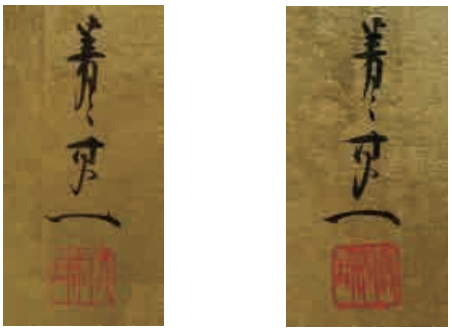
六曲一双の右隻に檜図、左隻に八橋図を配した金地の中屏風。両隻の画面両端に「菁々其一」の落款と「祝琳」朱文方印が捺されており、鈴木其一（1796-1858）の晩年の作品と考えられる（Fig. 2.1）。

右隻の「檜図」では中央やや右寄り、第３扇を貫通するように檜の樹幹を描き、周囲に細い若木を点在させる。本作品は、酒井抱一が編纂した『光琳百図』後編上に掲載されている「（檜図）屏風一双極彩色金地無名印」（Fig. 2.2）の左隻とほぼ同じ構図であることが注目される。『光琳百図』の「檜図屏風」の現所在は不明で、光琳の作品であったかどうかも不明であるが、其一は本作品を光琳風の檜図として制作した可能性が高い。檜の幹は茶色の絵具に樹皮の質感と陰影を表すように墨を引き重ね、虚（うろ）の輪郭部分には金泥が用いられている。樹皮の所々に白い絵具の点描と緑色の絵具によって点苔が表され、白緑色のたらしこみ（絵具や墨を塗り、それが完全に乾く前に、別の色の絵具を重ねて、自然にできるにじみやぼかしを表現効果とすること。俵屋宗達や尾形光琳が用いて、琳派の特徴的な表現技法の 1 つとされる）で樹皮にうっすらと苔が生えている状態を表している。檜の太い幹の上方には霞がたなびく様子が墨で表され、どっしりとした檜が金地の無背景の空間に溶け込むような表現となっている。

左隻の「八橋図」では屈曲しながら画面を横断する八橋と青と白の燕子花が咲き誇る様子を表す。尾形光琳の「八橋図屏風」（紙本金地着色・六曲一双・メトロポリタン美術館）は上述の『光琳百図』に掲載されており、それに倣い酒井抱一の「八橋図屏風」（絹本金地着色・六曲一双・出光美術館）が制作されたことが知られ、八橋図は琳派の代表的な画題の 1 つと言える。またこの 2 点の八橋図に描かれるのは全て青色の燕子花であるが、酒井抱一筆「燕子花図屏風」（紙本着色・二曲一隻・出光美術館）では群生する青い燕子花の中に 3 輪の白い燕子花の花が叢や青い花に見え隠れするように描かれている。其一はこうした先行作例に倣いつつ、本作品を制作したと推測されるが、花の数を少なくして構図を整理することにより、金地と青と白の花、緑色の葉による色彩の対照が明るく際立った表現となっている。橋の部分には、薄茶色の上に淡墨と白緑色のたらしこみで、板橋の古びた様子、あるいは、朝露に濡れた板に燕子花の葉の緑色が映り込んでいる様子が表されていると見られる。

この檜と八橋を対の画題とすることが、其一の独創かどうかは定かではないが、右隻が垂直方向に、左隻が水平方向に画面を分断する構図で表され、革新的なデザイン感覚で表現されている。檜図を一双屏風の一方とすることは、天保 6 年（1835）其一 40 歳の制作とされる「三十六歌仙・檜図屏風」（紙本金地着色・八曲一双・個人蔵）が本作品の先例としてあげられる（注）（Fig. 2.3）。この作品は各縦 60cm・横 242cm の特殊な寸法から、特別な用途のために注文制作された作品と考えられる。「三十六歌仙・檜図屏風」の「檜図」では、『光琳百図』の「檜図」六曲一双を、八曲一隻に改変したような構図で、其一が『光琳百図』を自らの絵画制作に戦略的に活用していたことを裏付ける作品と言える。そしてこの「檜図」が金地墨画であるのに対して、本作品では、濃密な彩色と整理された明確な構図で表されていることから、本作品は其一にとって琳派の伝統的画題表現の到達点を示していると言える。

（注）久保佐知恵解説「三十六歌仙・檜図屏風」（作品番号 41）『鈴木其一　江戸琳派の旗手』展図録、サントリー美術館・姫路市立美術館・細見美術館、p277、2016 年



(a) (b)

Fig. 2.1 落款・印章　(a)左隻『八橋図』(b) 右隻『檜図』
Signature and seal,
(a) left screen *Bridge over Iris Pond* (b) right screen *Cypress Tree*

(a) (b)

Fig. 2.2「（檜図）屏風一双極彩色金地　無名印」酒井抱一編纂『光琳百図』後編上、
文政 9 年（1826）東京文化財研究所所蔵　(a) 左隻　(b) 右隻
Hinoki Cypress Trees (a pair of folding screens, ink and color on gold-leaf, no signature and seal), in SAKAI Hoitsu (ed.), (1826). *Korin Hyakuzu*, the first volume of the two sequel volumes, the library collection of Tokyo National Research Institute for Cultural Properties, (a) left screen (b) right screen

(a)

(b)

Fig. 2.3　鈴木其一「三十六歌仙・檜図屏風」八曲一双、紙本金地着色・紙本金地墨画、
個人蔵　(a) 左隻　(b) 右隻
SUZUKI Kiitsu, *The Thirty-Six Poetic Geniuses and Japanese Cypresses,* a pair of eight-panel folding screens, ink on gold ground paper, private collection, (a) left screen (b) right screen

2 Description about the Artwork

EMURA Tomoko
Tokyo National Research Institute for Cultural Properties

These are a pair of six-panel middle-sized folding screens with gold-leaf backgrounds. The right screen depicts *hinoki* cypress trees, and the left screen presents Yatsuhashi, eight bridges crossing over an iris pond. The signature which reads "Seisei Kiitsu (菁々其一)" and the red square relief seal of "Shukurin (祝琳)" are on both screens, the right end of the right screen and the left end of the left screen (Fig. 2.1). Those indicate that the paintings would be the later works of SUZUKI Kiitsu (1796-1858).

In *Cypress Trees* of the right screen, the trunk of a cypress tree is painted in the middle, slightly to the right, as it is passing through the third panel from the top to the bottom, and some thin younger trees are dotted around it. What should draw attention is that this painting has almost the same composition as the left screen of *Hinoki Cypress Trees* (a pair of folding screens, ink and color on gold-leaf, no signature and seal) (Fig. 2.2) shown in the first volume of the two sequel volumes of *Korin Hyakuzu* (one-hundred paintings by Korin) edited by SAKAI Hoitsu. Since the presence of the pair of folding screens with *Hinoki Cypress Trees* illustrated in the *Korin Hyakuzu* is unknown, it is unclear whether it was the works of Korin or not. However, it is highly possible that Kiitsu produced this painting of *hinoki* trees in the Korin-style. The tree trunk is executed using brown color as a base, and multiple lines drawn on it with Chinese ink (*sumi*) convey the texture and shadows of the bark. The tree hollows are outlined with gold paint. The moss growths on the bark in places are painted in white and green dots, while pale green color applied with *tarashikomi* technique presents the mosses thinly spreading on the bark. *Tarashikomi* is used by TAWARAYA Sotatsu and OGATA Korin and is known as one of the distinctive expression techniques of Rinpa (may also be spelled "Rimpa"). The technique involves applying paint or Chinese ink followed by the dripping of another color of paint before the first one is fully dried; as a result, the naturally created blur and subtle gradation provide visual effects. Layers of mist hanging over the thick trunk are drawn in Chinese ink. That allows the massive *hinoki* tree to fit into the plain gold background.

Bridge over Iris Pond in the left screen represents the bridges zigzagging across the screen and the blooming of blue and white irises. *Irises at Yatsuhashi (Eight Bridges)* by OGATA Korin (a pair of six-panel folding screens, ink and color on gold leaf on paper, The Metropolitan Museum of Art, New York) appears in the *Korin Hyakuzu* mentioned above, and it is known that SAKAI Hoitsu modeled it to render his *Yatsuhashi (Irises and the Bridge)* (a pair of six-panel folding screens, ink and color on gold leaf on silk, Idemitsu Museum of Arts, Tokyo). Hence, *Yatsuhashi* would be one of the representative subject matters for Rinpa. Furthermore, whereas all flowers of irises depicted in these two paintings are blue, another work of Hoitsu titled *Irises* (a two-panel folding screen, ink and color on silk, Idemitsu Museum of Arts, Tokyo) includes three white irises in the clumps of blue irises and presents the phenomena in which white flowers occasionally appear among the grass and blue flowers. It is assumed that Kiitsu created this painting by following these earlier works. However, the clear composition by reducing the number of flowers makes contrast between the gold background and colors—blue and white of the flowers and green of the leaves—highly conspicuous.

The bridges are painted in *tarashikomi* technique. Washes of thin Chinese ink and pale green dripped in pale brown convey the age of planked bridges or the green iris leaves reflected on morning dew on the bridge planks.

Although it is uncertain whether taking the *hinoki* trees and the bridges and irises as a paired subject matter was the original idea of Kiitsu, his sense of innovative design appears in their compositions: *Cypress Trees* on the right is arranged to divide the space vertically while *Bridge over Iris Pond* on the left is done horizontally. An earlier example of a paired folding screens which has *Hinoki Cypress Trees* on one side would be *The Thirty-Six Poetic Geniuses and Japanese Cypresses* (a pair of eight-panel folding screens, ink and color on gold leaf on paper, private collection) (Fig. 2.3). These were produced by Kiitsu probably in 1835 at his age of 40 (KUBO, 2016). As they are unique in size, each painting measuring 60 cm in height and 242 cm in width, it is supposed to have been order-made for a special purpose. The composition of *Hinoki Cypress Trees* of this pair appears to be a modification of the design of *Hinoki Cypress Trees* in the *Korin Hyakuzu* from for one paired six-panel screens to for one eight-panel screen. Thus, this piece might corroborate that Kiitsu strategically employed *Korin Hyakuzu* into his painting. Moreover, *Hinoki Cypress Trees* paired to *The Thirty-Six Poetic Geniuses and Japanese Cypresses* was executed in Chinese ink on gold-leaf, but this *Hinoki Cypress Trees* was painted in rich colors and well-organized clear composition. Therefore, for Kiitsu, this pair of folding screens would be an accomplishment of the Rinpa's expression given to traditional subject matters.

Translated by GOTO Rika

Reference:

KUBO Sachie, (2016). Explanation of the Artwork (Exhibit No. 41), *SUZUKI Kiitsu; The Thirty-Six Poetic Geniuses and Japanese Cypresses, Standard-bearer of the Edo Rimpa School* [Exhibition catalog], Suntory Museum of Art, Himeji City Museum of Art and Hosomi Museum. p.277

付録 1　Appendix 1

株式会社 半田九清堂　　半田 昌規、宇和川 史彦、下田 純平、伊東 静穂
HANDA Masaki, UWAGAWA Fumihiko, SHIMODA Junpei, ITO Shizuho,
Handa Kyuseido Co., Ltd.

付録 1.1　記録
Appendix 1.1 Documentation

■	裂け	Tear
■	補紙・補彩	Infilling and inpainting
■	変色	Discoloration
■	擦れ	Abrasion
■	本紙欠失	Loss of the artwork
■	本紙のめくれ	Delamination of the artwork
■	付着物	Accretion
■	絵具の剥離・剥落	Lift and loss of painting
■	皺	Crease
□	襲木のゆるみ	Loose decorative frame
□	本紙余白	Margin space

Fig. A.1.1 修復前損傷図面『八橋図』
Mapping of damages before restoration, *Bridge over Iris Pond*

■	裂け	Tear
■	補紙・補彩	Infilling and inpainting
■	変色	Discoloration
■	金箔剥落	Missing gold leaf
■	皺	Crease
□	襲木のゆるみ	Loose decorative frame
□	本紙余白	Margin space

Fig. A.1.2 修復前損傷図面『檜図』

Mapping of damages before restoration, *Cypress Tree*

Fig. A.1.3　肌裏紙除去後　本紙裏面『八橋図』
Back side of the artwork, after removal of the previous first lining paper, *Bridge over Iris Pond*

Fig. A.1.4　肌裏紙除去後　本紙裏面『檜図』
Back side of the artwork, after removal of the previous first lining paper, *Cypress Tree*

Fig. A.1.5　旧補修紙　本紙裏面『檜図』
Back side of the artwork, previous infill paper, *Cypress Tree*

(a)

(b)

Fig. A.1.6 近赤外線写真（反射光）修復前 (a) 八橋図　(b) 檜図

Near infrared photographs by reflected light, before restoration

(a) *Bridge over Iris Pond* (b) *Cypress Tree*

イメージセンサー	CCD センサー　フルフレーム　感度領域：800～1100 ㎚
画素数	4000×2315（ピクセル）
画像フォーマット	Tiff
Image sensor	CCD Sensor, Full-Frame, Sensitivity:800–1100 ㎚
Image size	4000 × 2315 (pixel)
Image format	Tiff

付録 1.2　繊維組成分析

Appendix 1.2 Analyzing Paper

試験方法；JIS P8120（ISO9184-4）を参考に、本紙から採取した微量の繊維を C 染色液を用いて染色し、顕微鏡による観察を行った。その結果、本紙繊維は楮が用いられていることが分かった。

Analysis method; According as Japanese Industrial Standard P8120 (cf. ISO9184-4), a very small amount of fibers sampling from the artworks were dyed by C stain and observed with a microscope. As a result, the paper was made of *kozo*.

(a)　　(b)

Fig. A.1.7 本紙繊維の顕微写真

(a)『八橋図』　(b)『檜図』

Micrographs of fiber from the artworks

(a) *Bridge over Iris Pond* (b) *Cypress Tree*

使用機材	顕微鏡スギトウ（×100）、デジタルカメラリコーGRII
画素数	1936×2912（ピクセル）
画像フォーマット	JPEG
Apparatus	Microscope (SUGITOH (×100) equipped with a digital camera GRII RICOH)
Image size	1936 × 2912 (pixel)
Image format	JPEG

付録 2　Appendix 2

東京文化財研究所　早川　泰弘
HAYAKAWA Yasuhiro
Tokyo National Research Institute for Cultural Properties

付録 2　彩色材料調査
Appendix 2 Analyzing Colorant Materials

2.1 調査日時・場所：2018 年 1 月 29 日　東京文化財研究所　写場

Date and Place of Analysis: January 29, 2018
Photo Studio, Tokyo National Research Institute for Cultural Properties

2.2 分析装置・条件
Apparatus and Conditions for Analysis

(1)　蛍光 X 線分析
装置：BRUKER ハンドヘルド XRF
S1 TURBO-SD
X 線管球：Pd（パラジウム）
管電圧・管電流：40kV・17μA
X 線照射径：φ7mm
測定時間：60 秒
装置ヘッド～試料間距離：約 10mm
測定位置：Fig. A.2.1、Fig. A.2.2 参照

(1)　X-ray fluorescence analysis
Apparatus: BRUKER Handheld XRF
S1 TURBO-SD
Target: Pd (*palladium*)
Tube voltage, current: 40kV, 17μA
X-ray radiation diameter: φ7mm
Measuring time: 60 seconds
Distance between the apparatus and the sample:
approximately 10 mm
Measuring points: See Fig. A.2.1, Fig. A. 2.2

(2)　可視反射分光分析
装置：ポータブル分光光度計
（日本分光製 MV-2020VIS）
光源：ハロゲンランプ 20W
分光器：ローランド円外配置
検出器：MOS リニアイメージセンサ
波長範囲：360-800nm
照射径：φ4mm
測定位置：Fig. A.2.1 参照

(2) Visible reflectance spectrometry
Apparatus: Portable spectrophotometer
(JASCO Corporation MV-2020VIS)
Light source: Halogen lamp 20W
Spectrometer：Rowland circle geometry
Detector: MOS linear image sensor
Wavelength range: 360-800nm
Measurement area: φ4mm
Measuring points: See Fig. A.2.1

2.3 分析結果

以下に分析結果の概要を示す。

(1) 得られた蛍光 X 線強度およびスペクトルを Fig. A.2.3-13 および Table A.2.1 に示す。なお Cu が大きく検出されている箇所で Fe が大きく検出されているが、これは Cu-Kα のエスケープピークによるものである。実際に Fe が検出されているわけではない。

・白色顔料は Ca 系顔料（胡粉）である。

・黄色材料は染料と考えられるが、物質特定はできなかった。

・茶色材料には Fe 系材料（代赭）が使われている。

・金地には金箔、『檜図』の幹の洞には金泥が使われていると判断できる。金箔、金泥のいずれも 2-3% 程度の銀を含む材料である。

・緑色材料は銅系緑色顔料 2 種類が使い分けられている。いずれの材料にも少量の亜鉛とヒ素が含まれるが、その含有率が異なる。2 種類の緑色顔料は鉛系顔料との併用の有無が認められる。

(2) 得られた可視反射分光スペクトルを Fig. A.2.15 に示す。

・燕子花の花弁の濃青色材料は、ウルトラマリンブルーであると考えられる。

2.3 Analytical Results

The summary of analytical results are shown below.

(1) X-ray fluorescence intensity and spectra obtained are shown in Figs. A.2.3-13 and Table A.2.1. Furthermore, large amounts of Fe were detected from the measuring points where large amounts of Cu were detected. This was caused by the escape peak of Cu-Kα. Thus detection values of Fe are not actual values.

・The white color material was found to be a Ca-based pigment (calcium carbonate [*gofun*]).

・The yellow color material was thought to be from dye; however, it was not possible to identify.

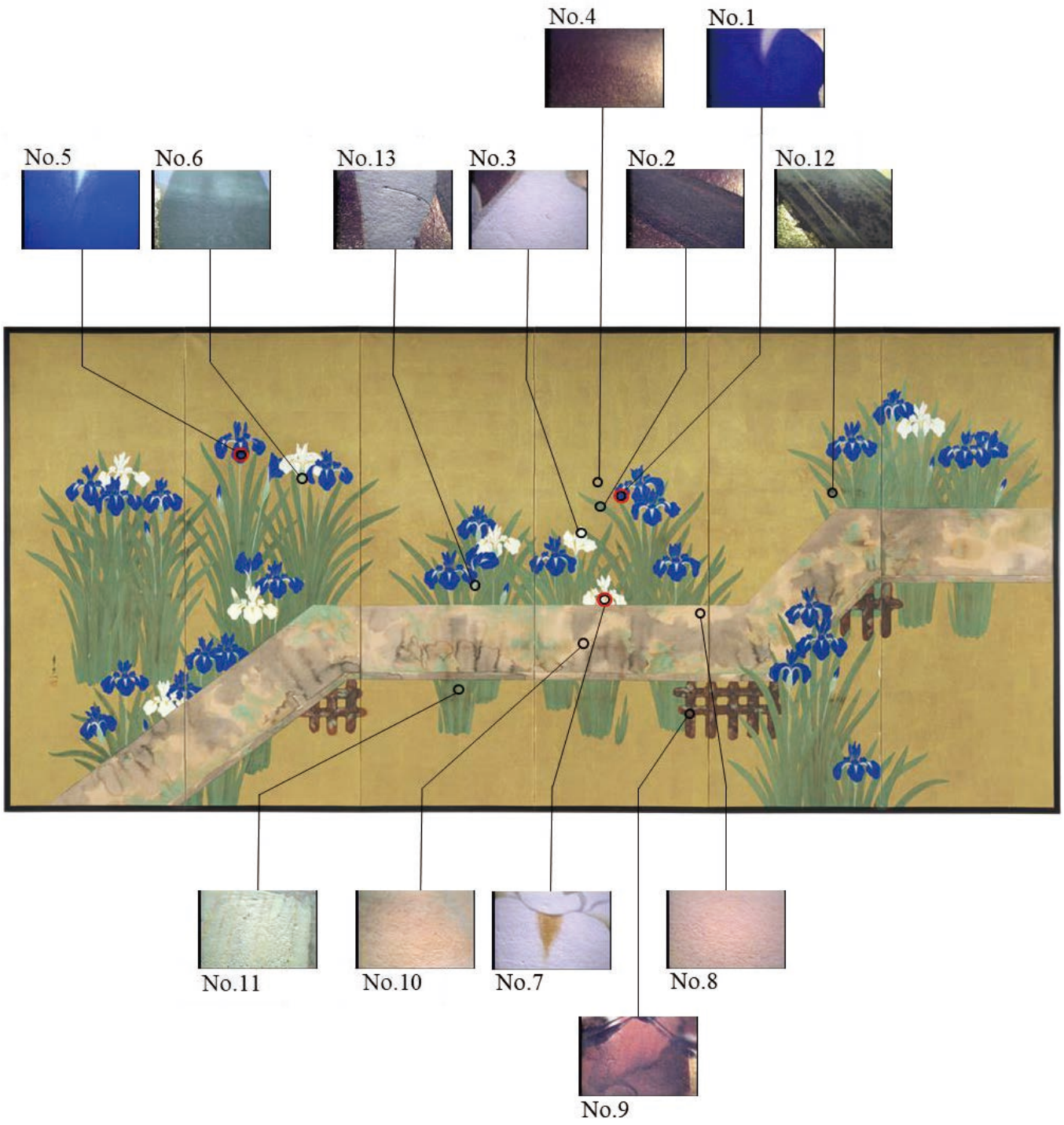
・The brown color materials were made of a Fe-based material (red ocher [*taisha*]).

・It can be determined that gold leaf was used for the gold ground on the folding screen and gold pigment was used for the tree cave in *Cypress Tree.* Both the gold leaf and the gold pigment contained about 2-3% silver.

・Two kinds of Cu-based green pigments were used in the green-colored area in the artworks. Small amounts of Zinc and Arsenic were contained in all the green color materials; however, their concentrations were different. It was recognized that two kinds of green pigments were used in combination with Pb-based pigment.

(2) Visible reflection spectra obtained is shown in Fig. A.2.15.

・It was revealed that the deep blue color material of iris petals was ultramarine blue.

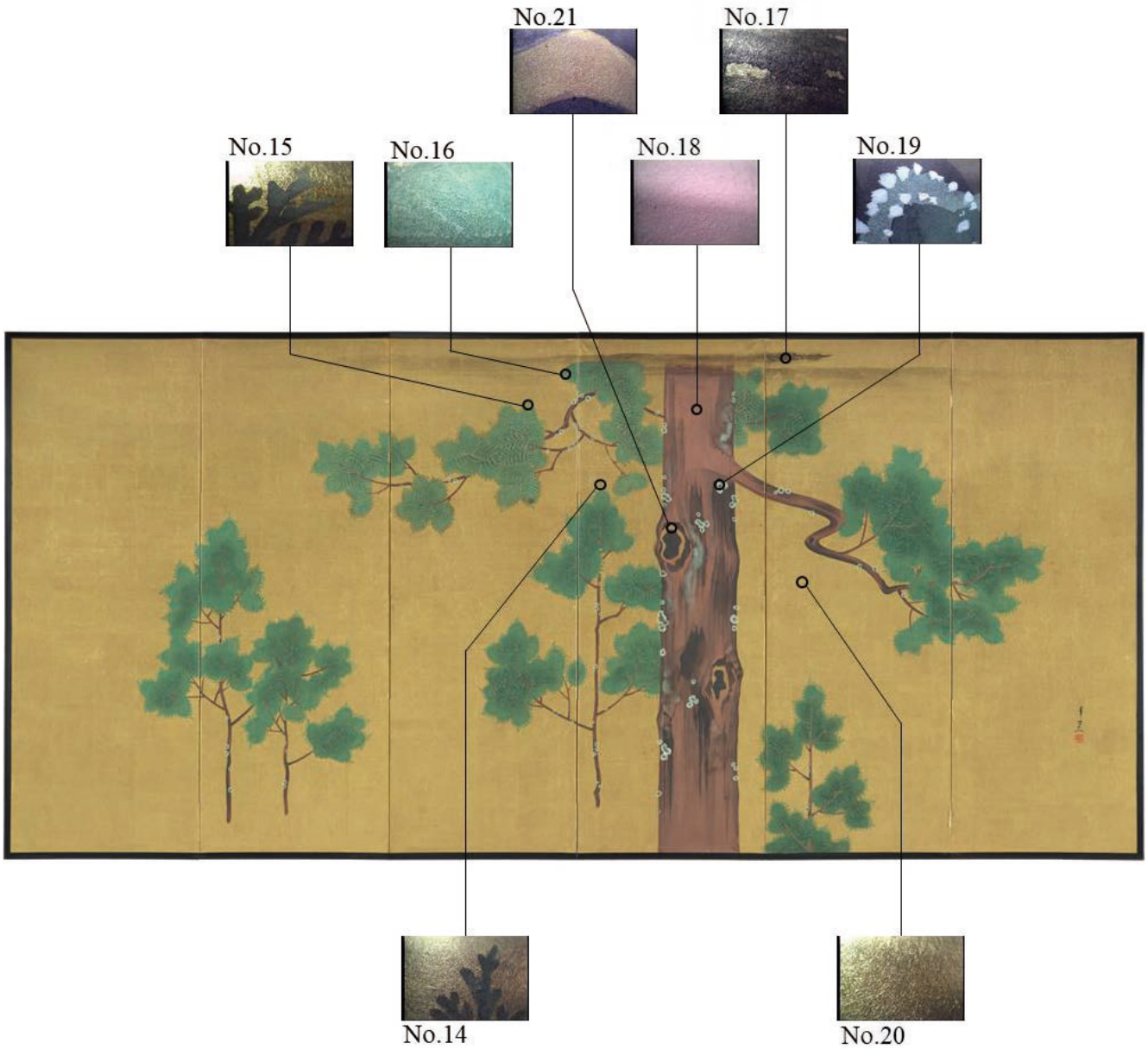


○ 蛍光 X 線分析位置／Measuring points for X-ray fluorescence analysis

○ 可視反射分光分析位置／Measuring points for visible reflectance spectrometry

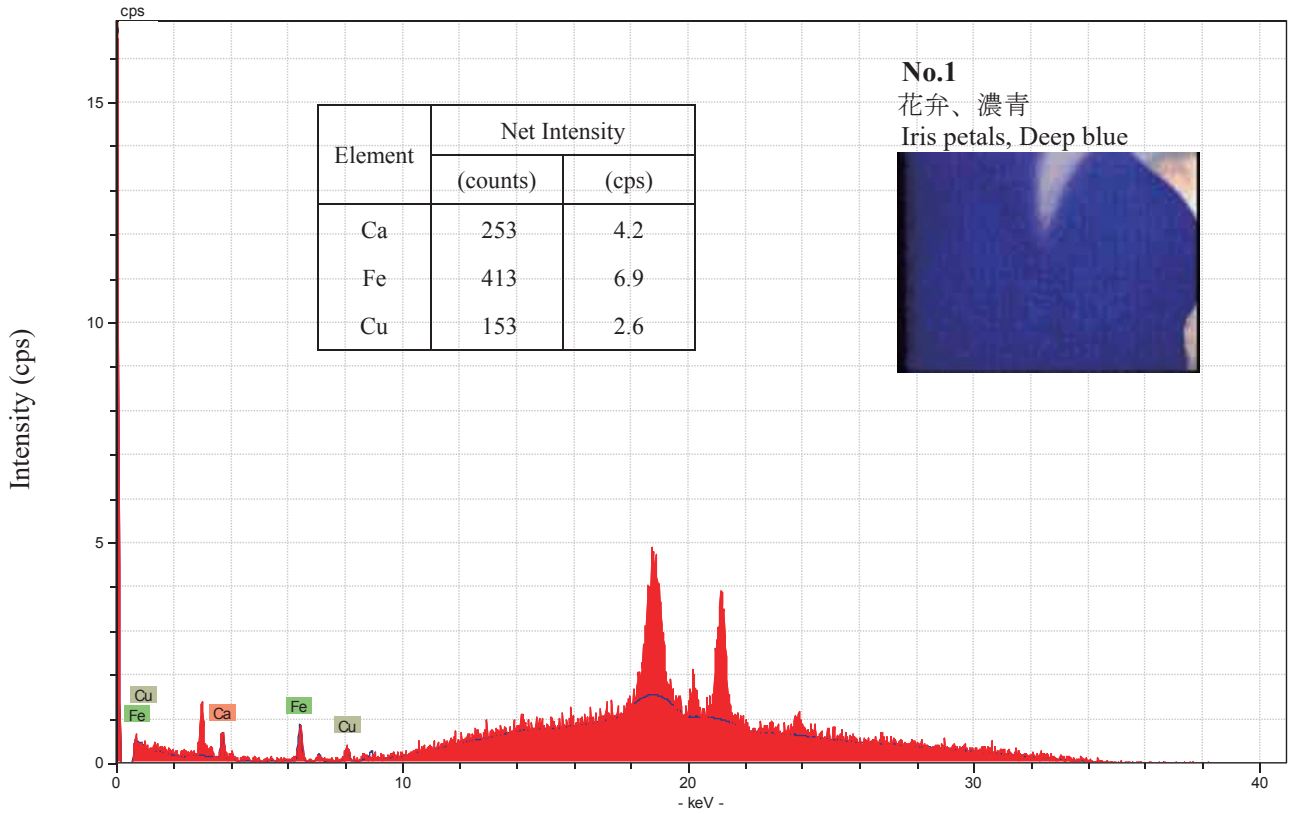
Fig. A.2.1 測定位置『八橋図』

Measuring points, *Bridge Over Iris Pond*



○ 蛍光 X 線分析位置／Measuring points for X-ray Fluorescence analysis

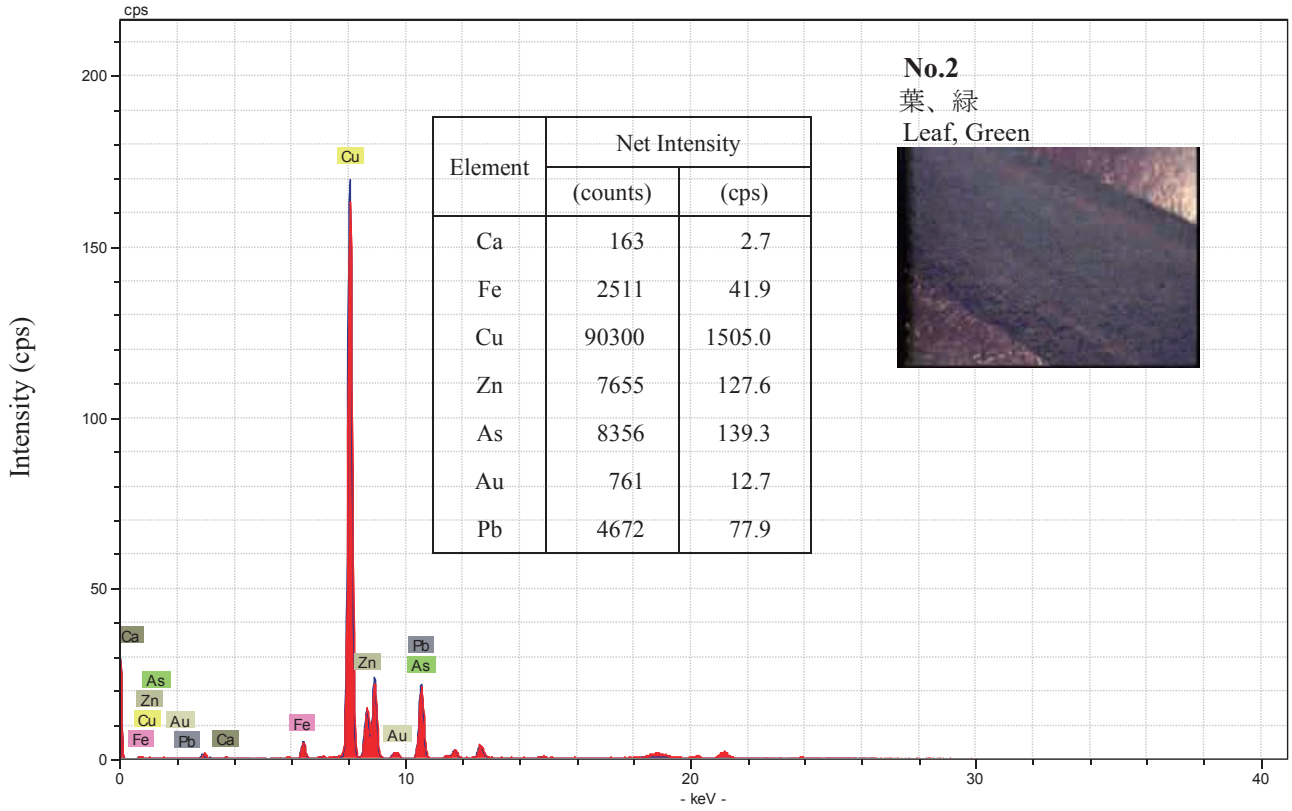
Fig. A.2.2 測定位置『檜図』
Measuring points, *Cypress Tree*



Element	Net Intensity	
	(counts)	(cps)
Ca	253	4.2
Fe	413	6.9
Cu	153	2.6

No.1
花弁、濃青
Iris petals, Deep blue

Energy (keV)



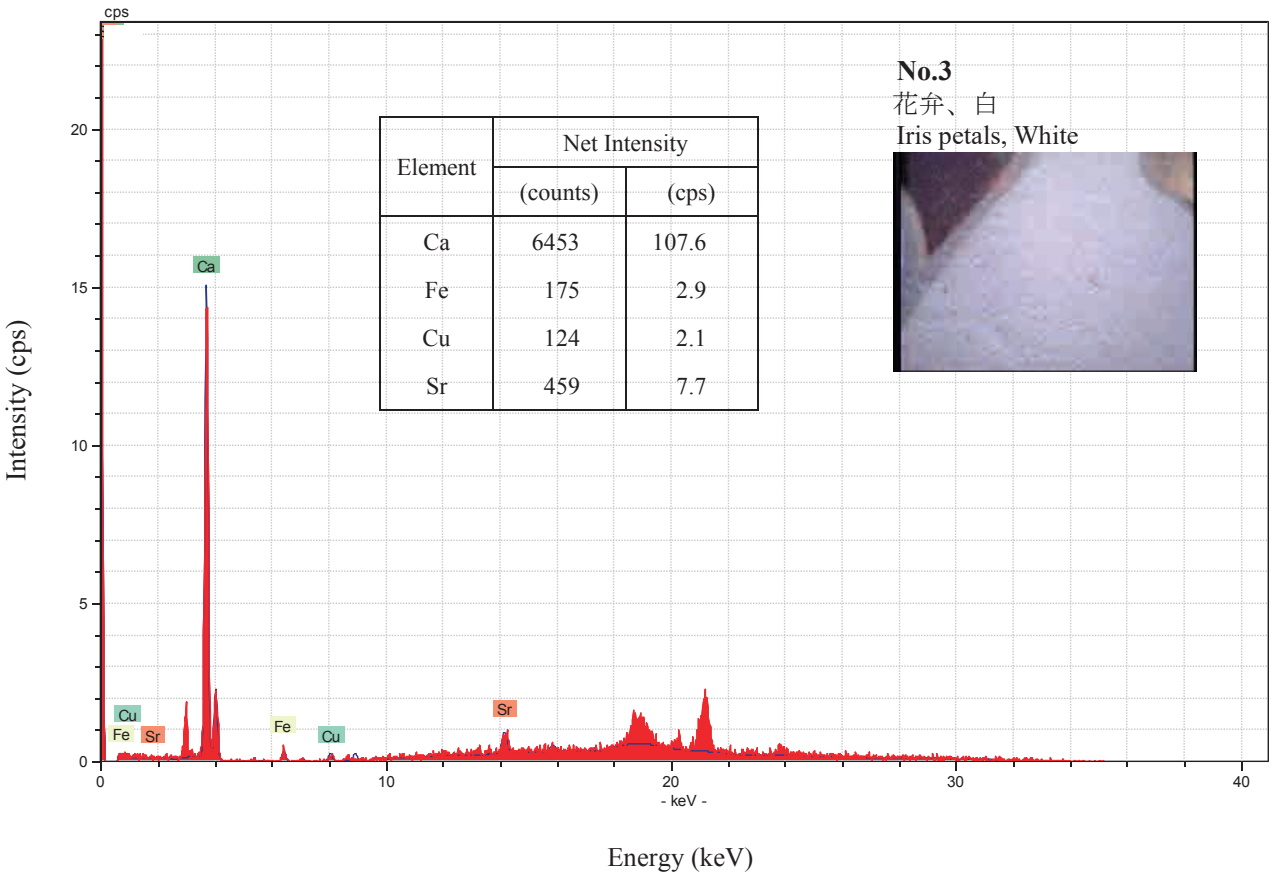
Element	Net Intensity	
	(counts)	(cps)
Ca	163	2.7
Fe	2511	41.9
Cu	90300	1505.0
Zn	7655	127.6
As	8356	139.3
Au	761	12.7
Pb	4672	77.9

No.2
葉、緑
Leaf, Green

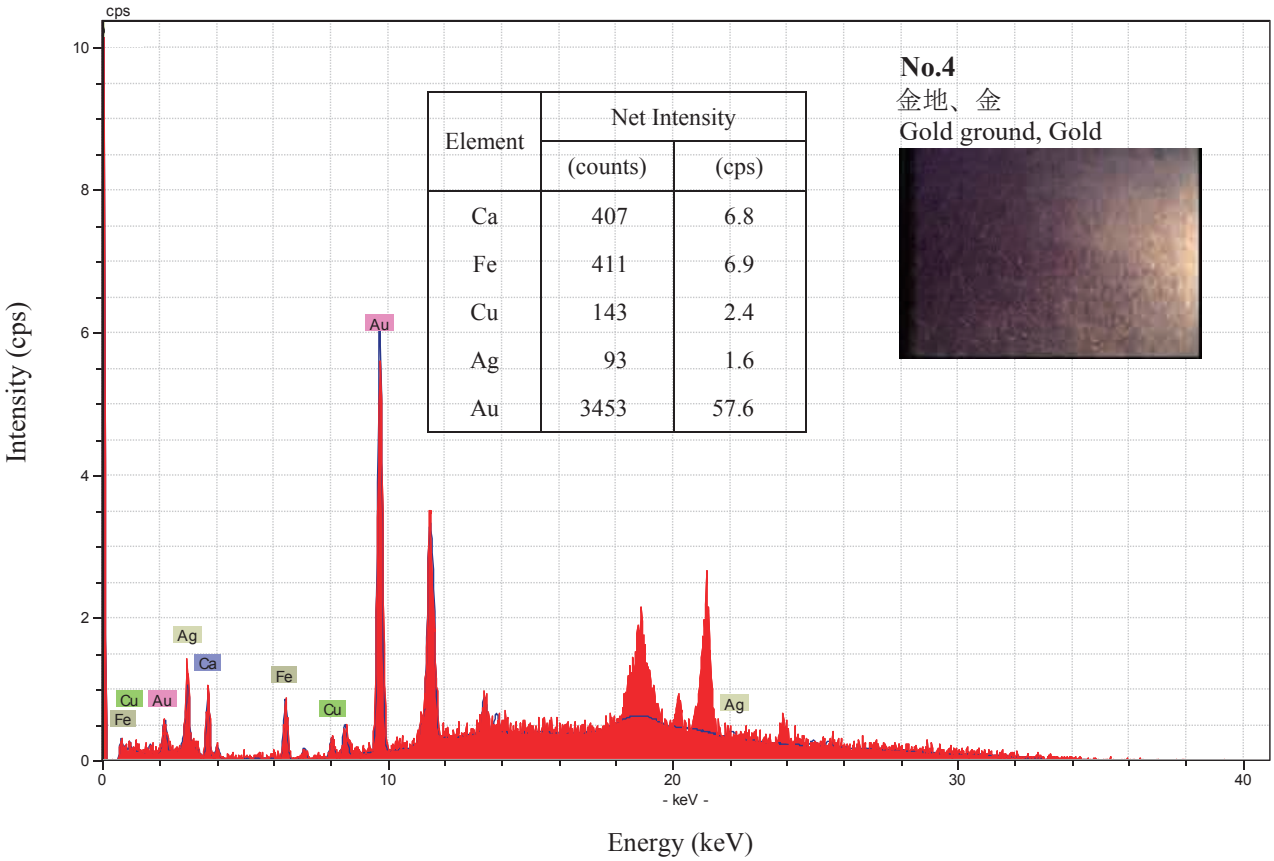
Energy (keV)

Fig. A.2.3 蛍光 X 線強度とスペクトル（No.1、2）『八橋図』

X-ray fluorescence intensity and spectra (No.1, 2), *Bridge Over Iris Pond*



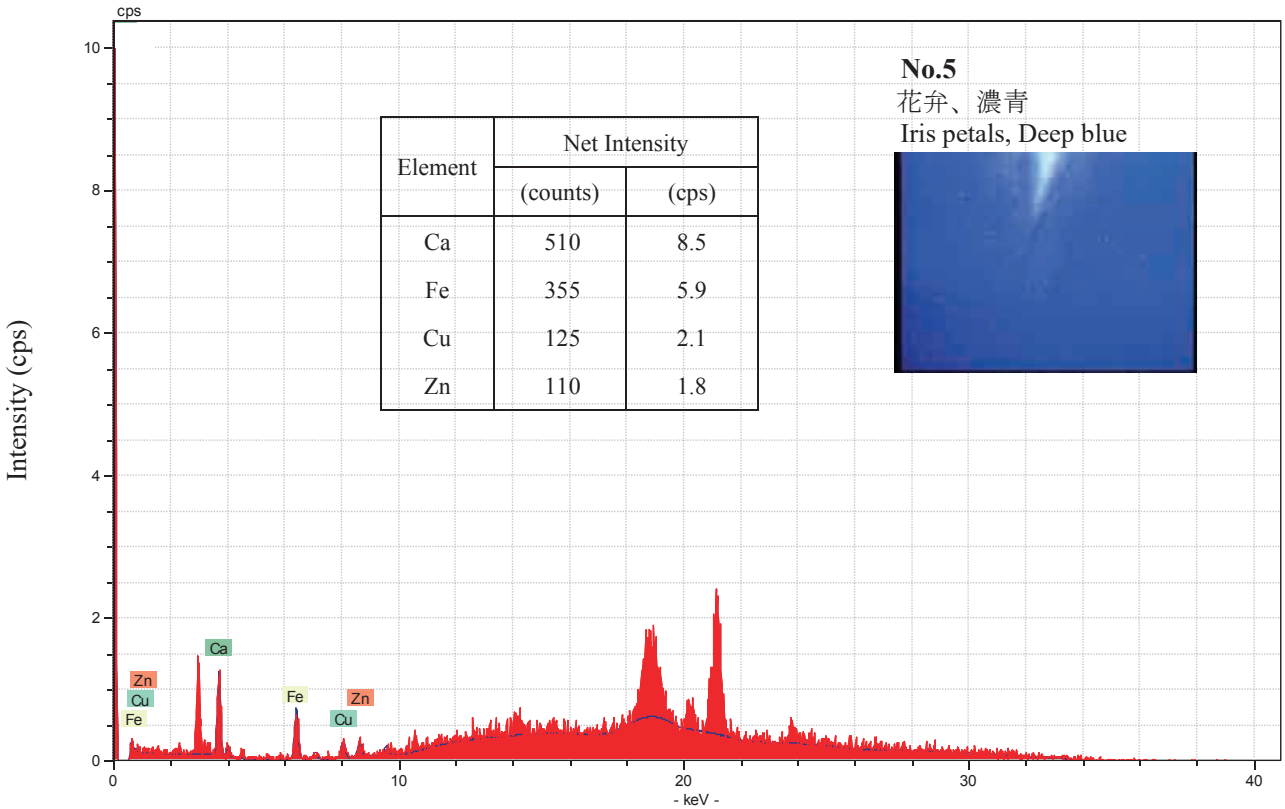
Element	Net Intensity	
	(counts)	(cps)
Ca	6453	107.6
Fe	175	2.9
Cu	124	2.1
Sr	459	7.7



Element	Net Intensity	
	(counts)	(cps)
Ca	407	6.8
Fe	411	6.9
Cu	143	2.4
Ag	93	1.6
Au	3453	57.6

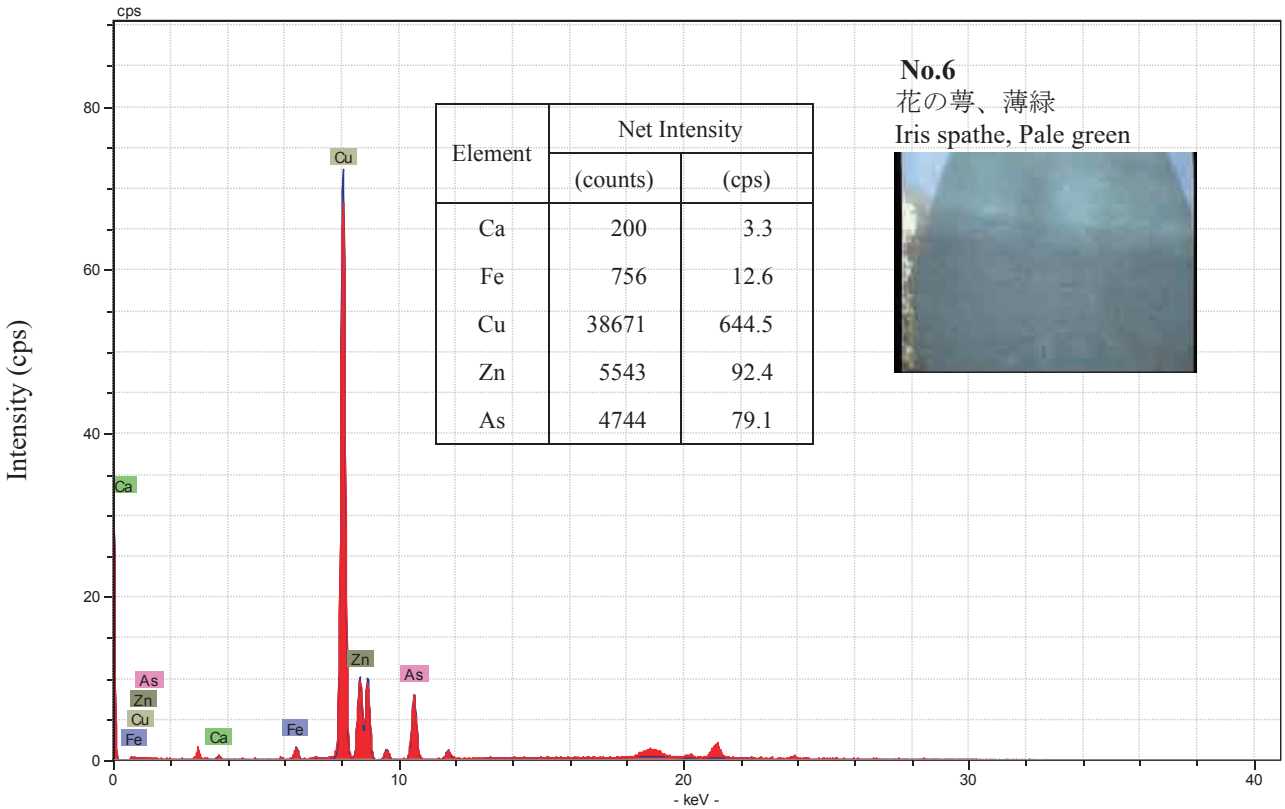
Fig. A.2.4 蛍光 X 線強度とスペクトル（No.3、4）『八橋図』

X-ray fluorescence intensity and spectra (No.3, 4), *Bridge Over Iris Pond*



Element	Net Intensity	
	(counts)	(cps)
Ca	510	8.5
Fe	355	5.9
Cu	125	2.1
Zn	110	1.8

No.5
花弁、濃青
Iris petals, Deep blue

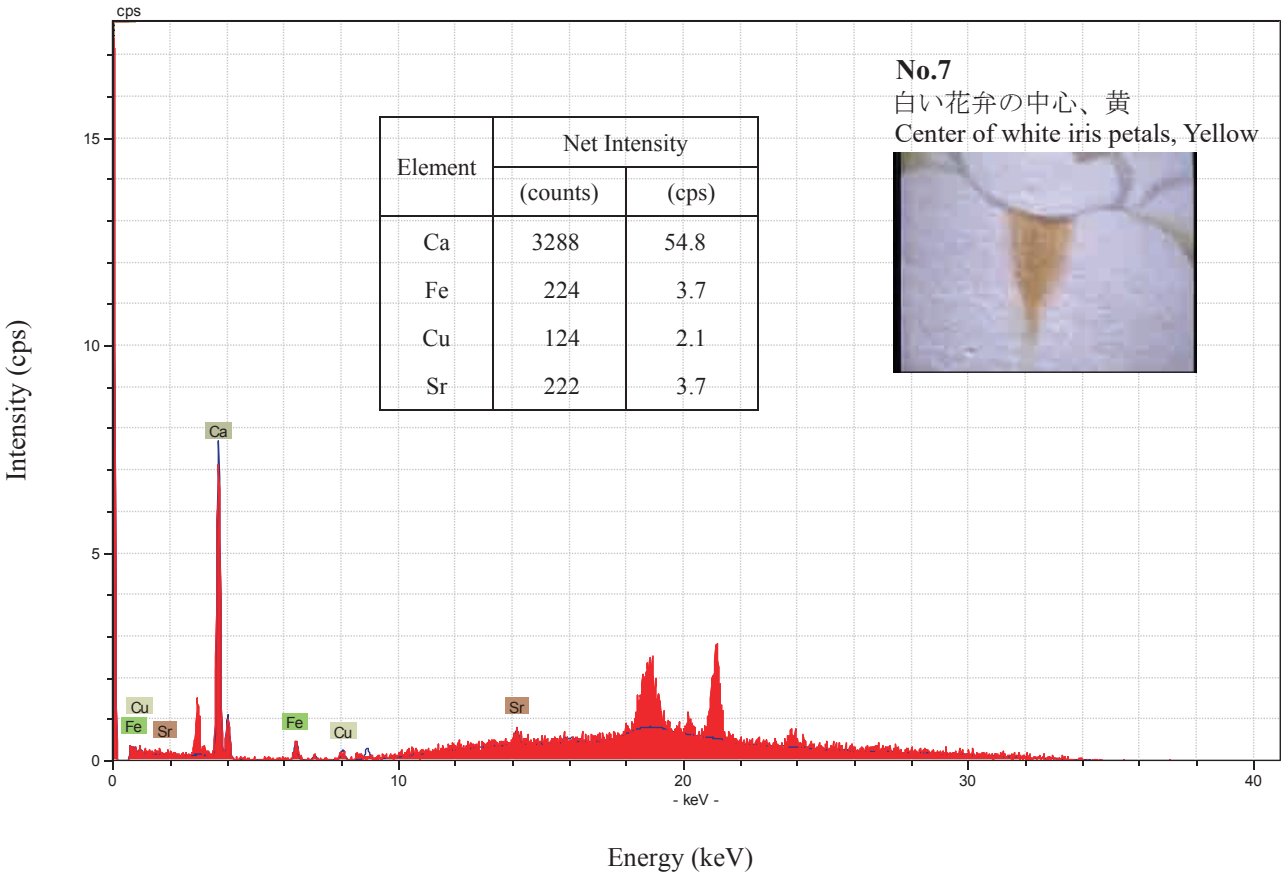


Element	Net Intensity	
	(counts)	(cps)
Ca	200	3.3
Fe	756	12.6
Cu	38671	644.5
Zn	5543	92.4
As	4744	79.1

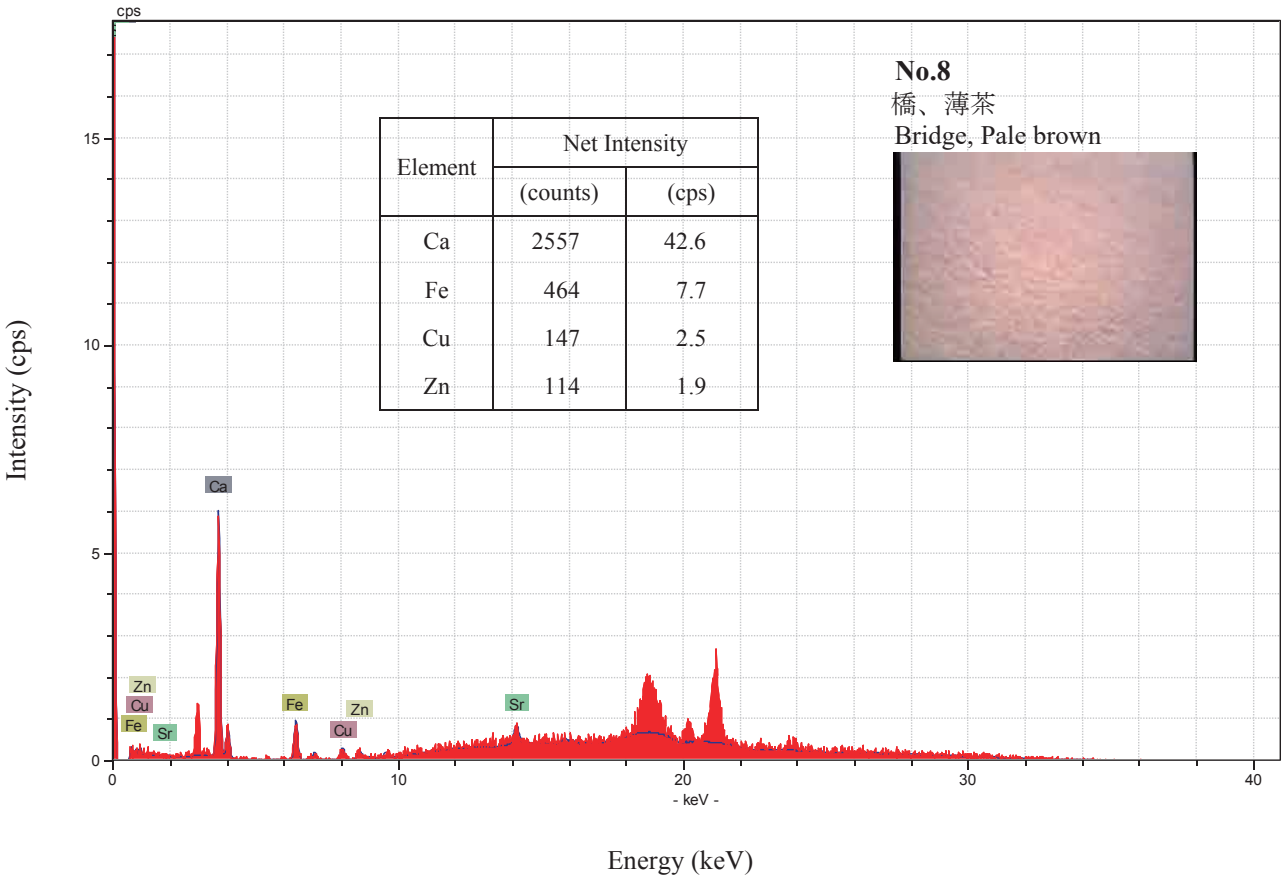
No.6
花の萼、薄緑
Iris spathe, Pale green

Fig. A.2.5 蛍光 X 線強度とスペクトル（No.5、6）『八橋図』

X-ray fluorescence intensity and spectra (No.5, 6), *Bridge Over Iris Pond*



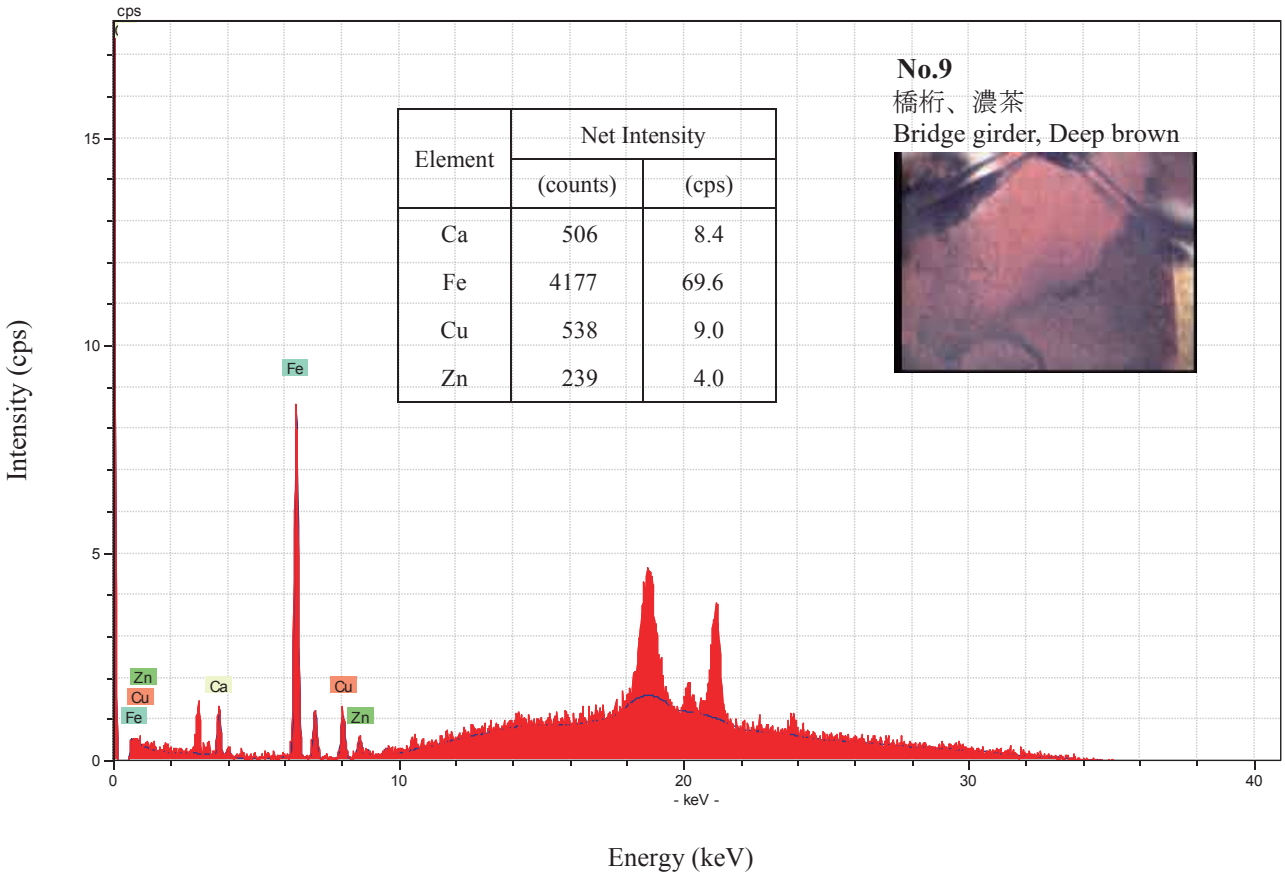
Element	Net Intensity	
	(counts)	(cps)
Ca	3288	54.8
Fe	224	3.7
Cu	124	2.1
Sr	222	3.7



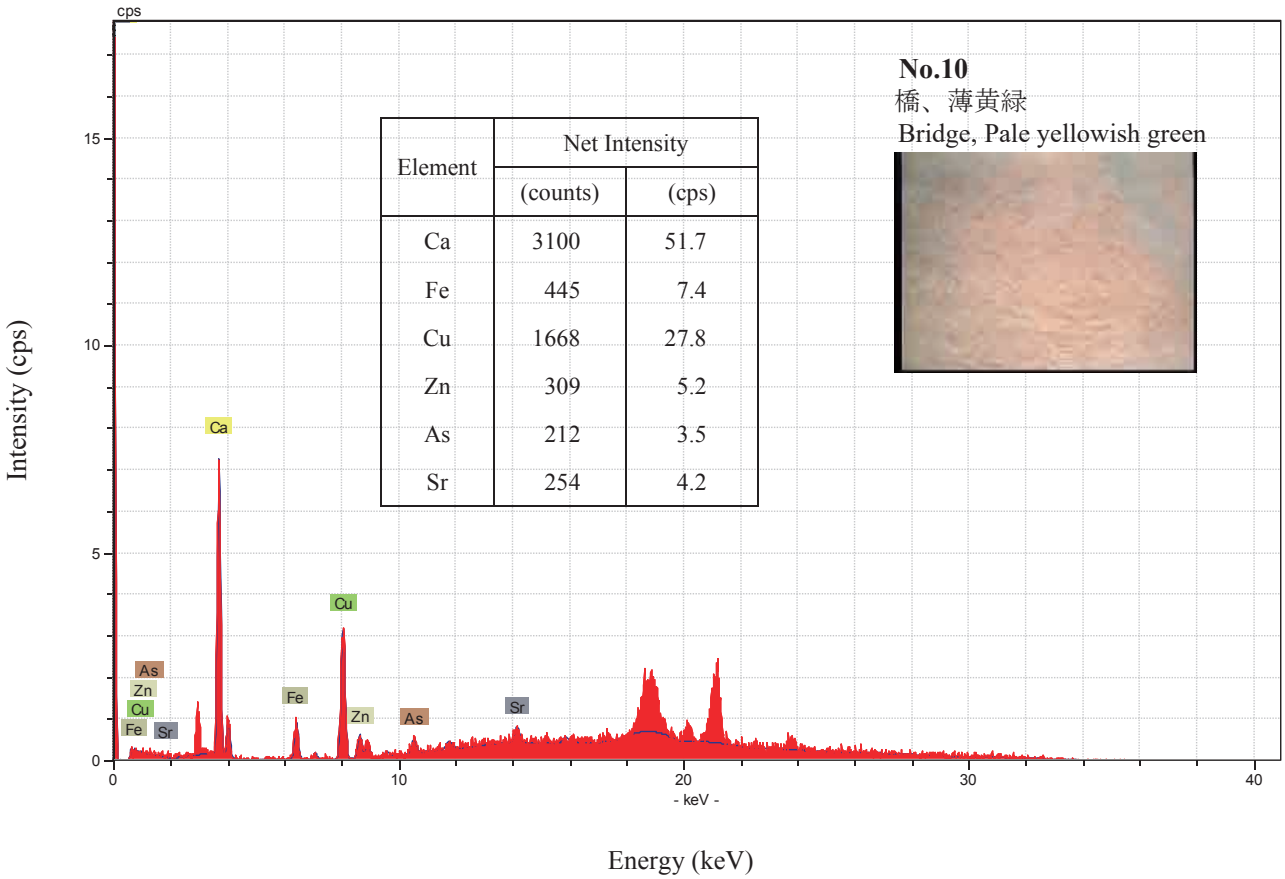
Element	Net Intensity	
	(counts)	(cps)
Ca	2557	42.6
Fe	464	7.7
Cu	147	2.5
Zn	114	1.9

Fig. A.2.6 蛍光 X 線強度とスペクトル（No.7、8）『八橋図』

X-ray fluorescence intensity and spectra (No.7, 8), *Bridge Over Iris Pond*



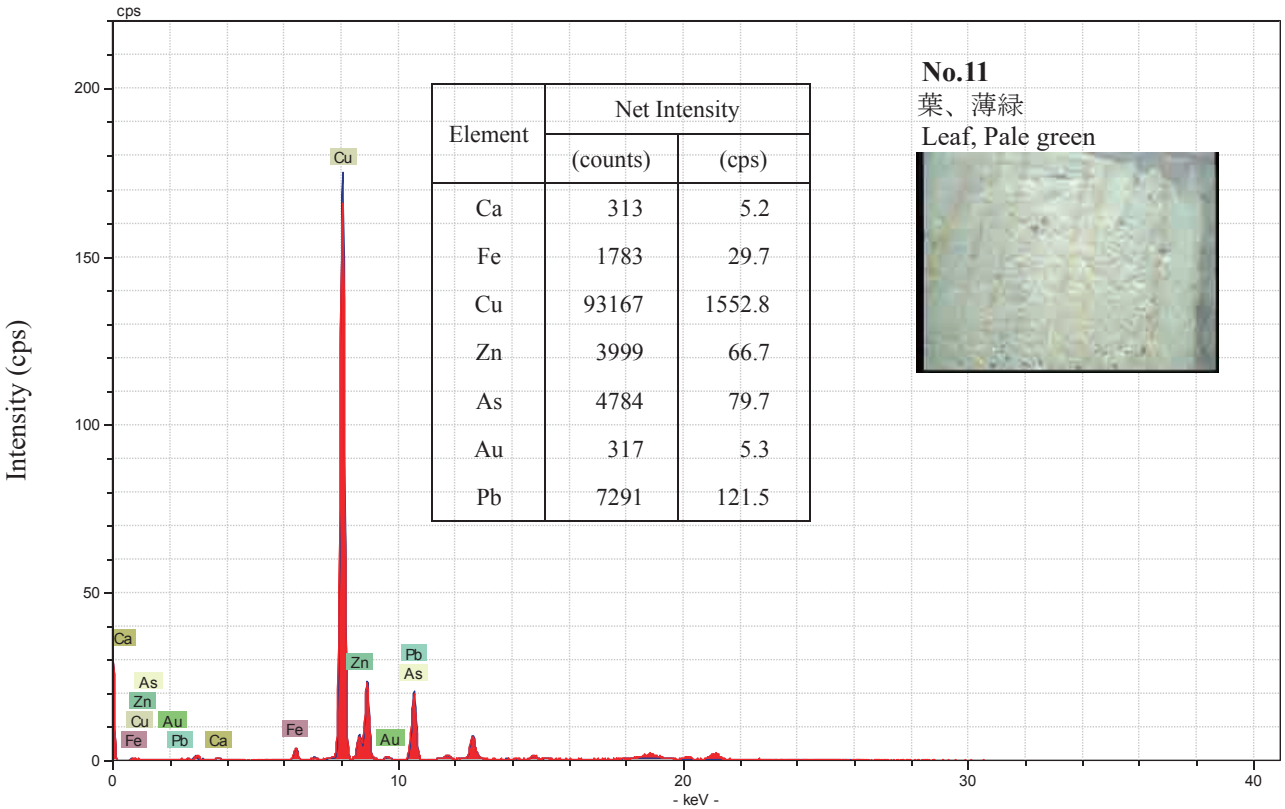
Element	Net Intensity	
	(counts)	(cps)
Ca	506	8.4
Fe	4177	69.6
Cu	538	9.0
Zn	239	4.0



Element	Net Intensity	
	(counts)	(cps)
Ca	3100	51.7
Fe	445	7.4
Cu	1668	27.8
Zn	309	5.2
As	212	3.5
Sr	254	4.2

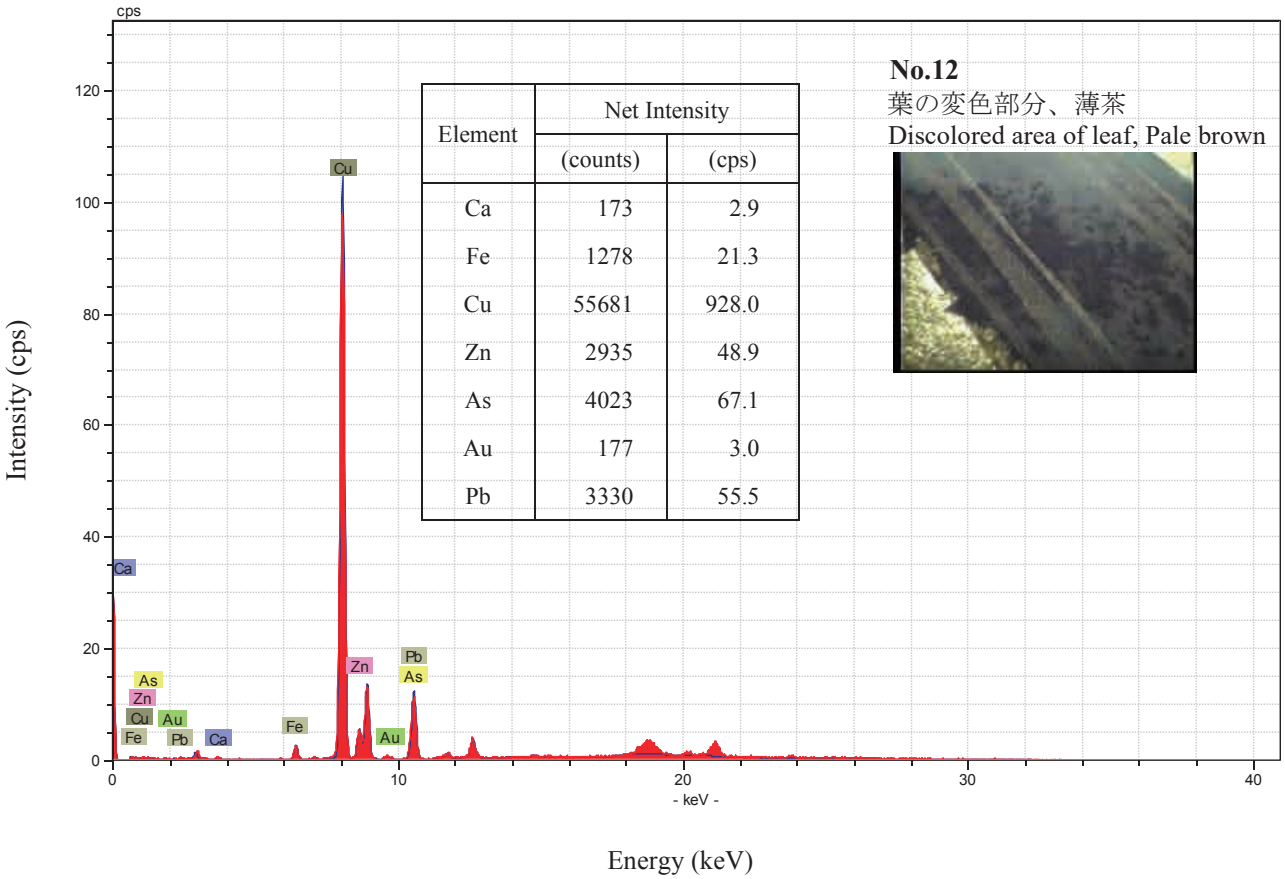
Fig. A.2.7 蛍光 X 線強度とスペクトル（No.9、10）『八橋図』

X-ray fluorescence intensity and spectra (No.9, 10), *Bridge Over Iris Pond*



No.11
葉、薄緑
Leaf, Pale green

Element	Net Intensity	
	(counts)	(cps)
Ca	313	5.2
Fe	1783	29.7
Cu	93167	1552.8
Zn	3999	66.7
As	4784	79.7
Au	317	5.3
Pb	7291	121.5

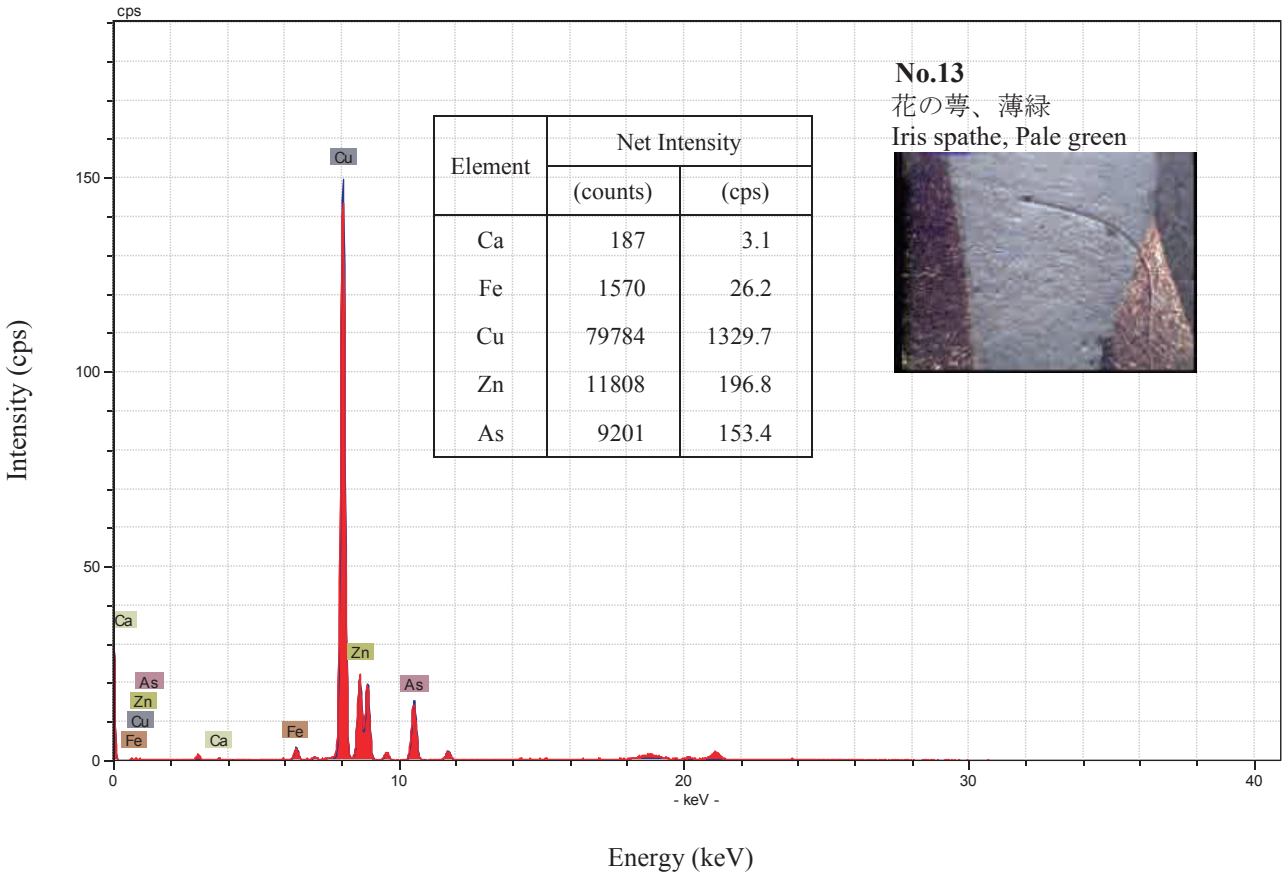


No.12
葉の変色部分、薄茶
Discolored area of leaf, Pale brown

Element	Net Intensity	
	(counts)	(cps)
Ca	173	2.9
Fe	1278	21.3
Cu	55681	928.0
Zn	2935	48.9
As	4023	67.1
Au	177	3.0
Pb	3330	55.5

Fig. A.2.8 蛍光 X 線強度とスペクトル（No.11、12）『八橋図』

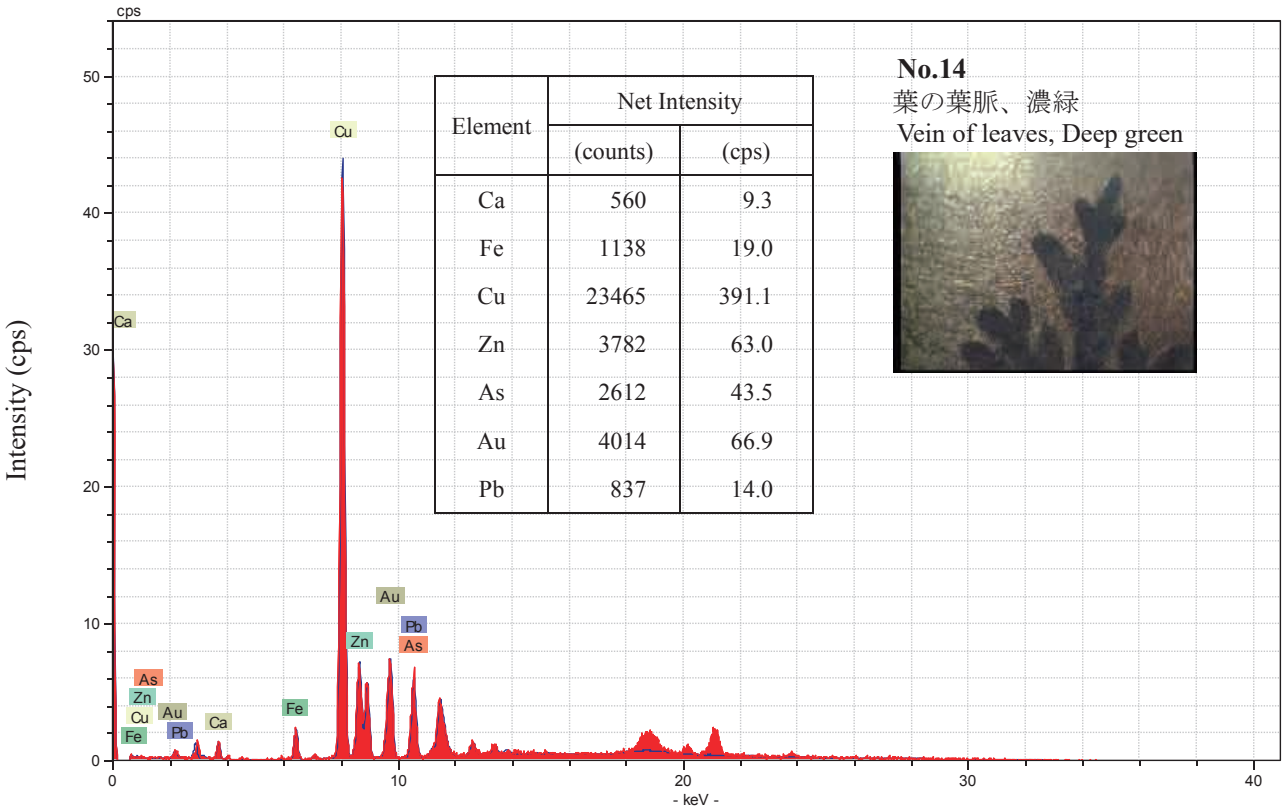
X-ray fluorescence intensity and spectra (No.11, 12), *Bridge Over Iris Pond*



Element	Net Intensity	
	(counts)	(cps)
Ca	187	3.1
Fe	1570	26.2
Cu	79784	1329.7
Zn	11808	196.8
As	9201	153.4

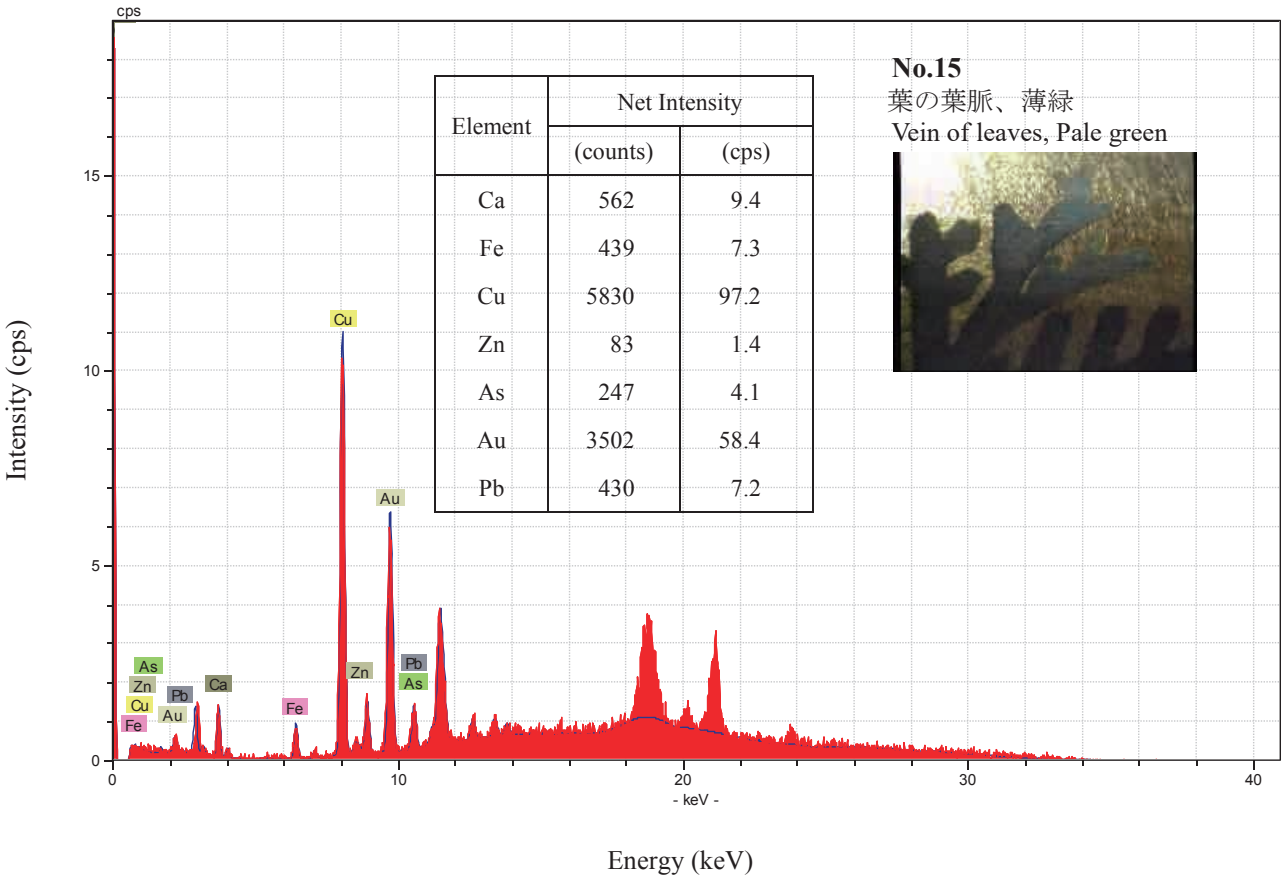
Fig. A.2.9 蛍光 X 線強度とスペクトル（No.13）『八橋図』

X-ray fluorescence intensity and spectra (No.13), *Bridge Over Iris Pond*



Element	Net Intensity	
	(counts)	(cps)
Ca	560	9.3
Fe	1138	19.0
Cu	23465	391.1
Zn	3782	63.0
As	2612	43.5
Au	4014	66.9
Pb	837	14.0

No.14
葉の葉脈、濃緑
Vein of leaves, Deep green

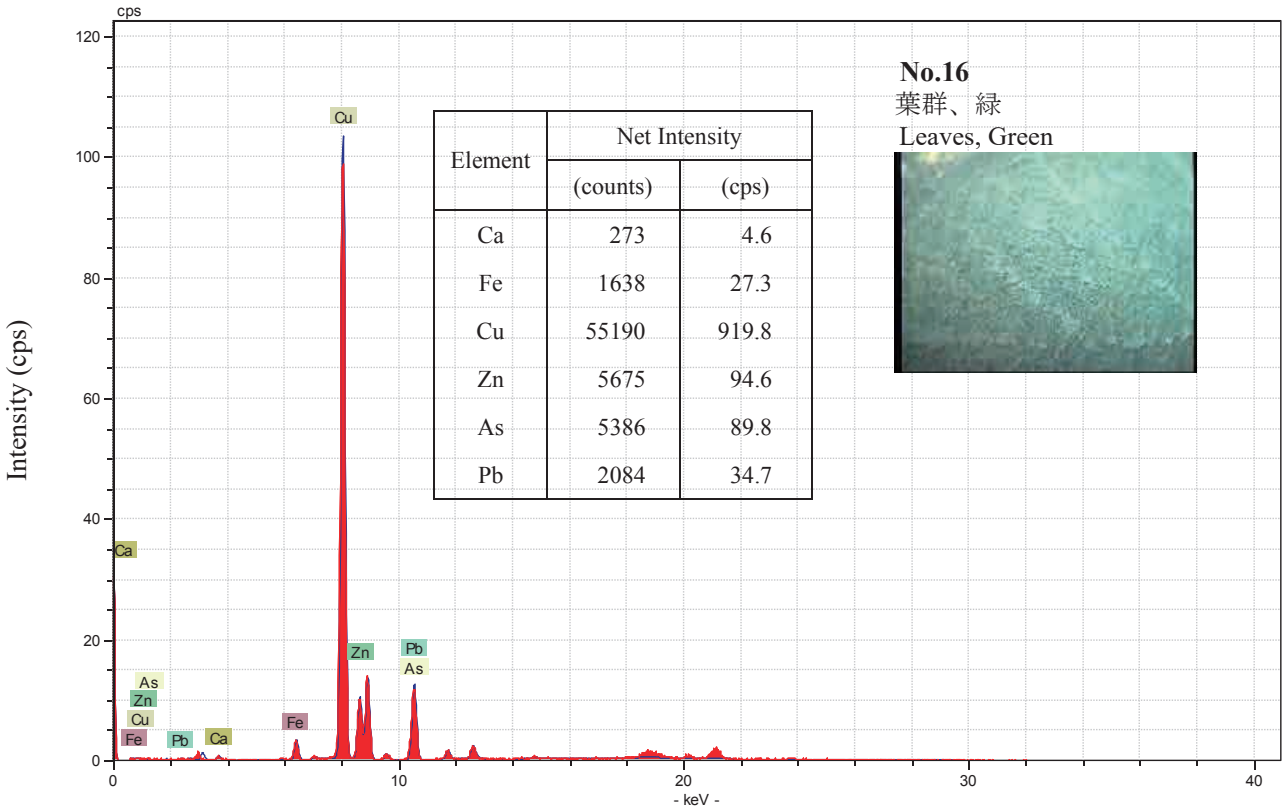


Element	Net Intensity	
	(counts)	(cps)
Ca	562	9.4
Fe	439	7.3
Cu	5830	97.2
Zn	83	1.4
As	247	4.1
Au	3502	58.4
Pb	430	7.2

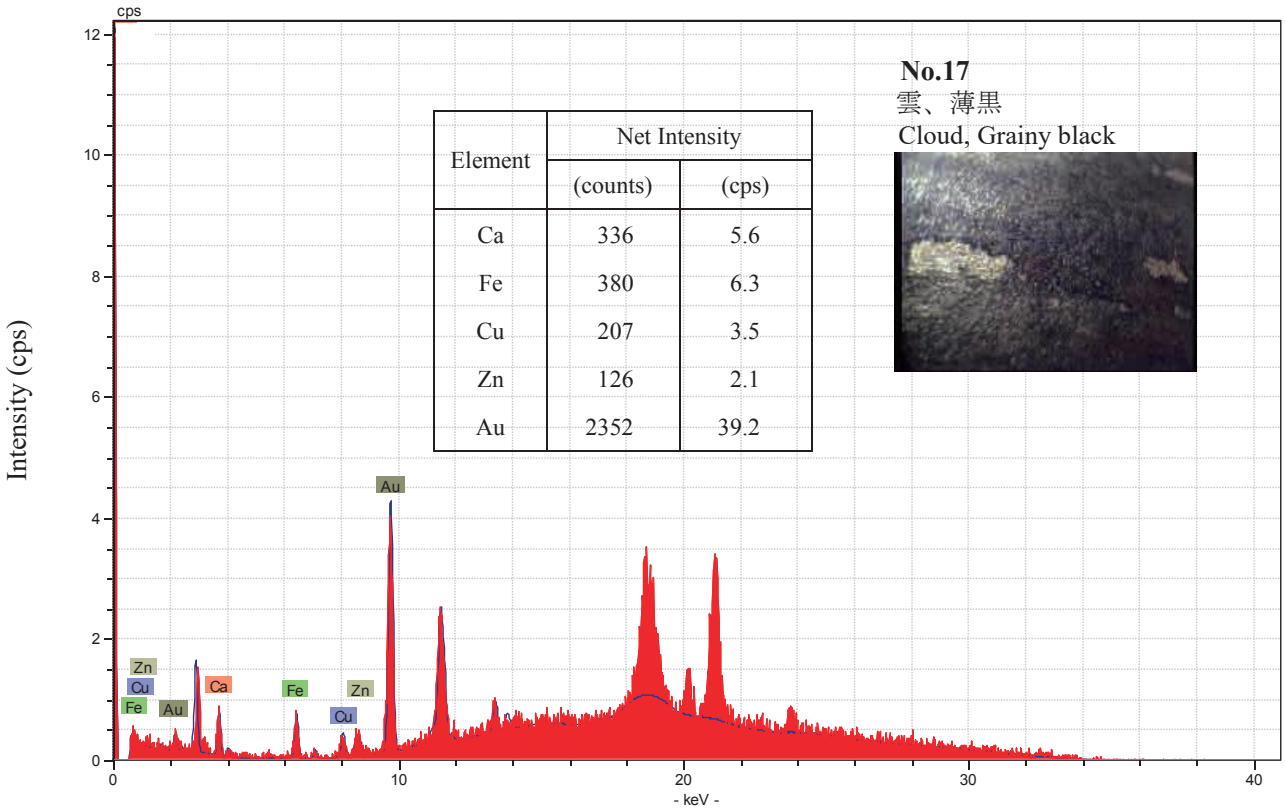
No.15
葉の葉脈、薄緑
Vein of leaves, Pale green

Fig. A.2.10 蛍光 X 線強度とスペクトル（No.14、15）『檜図』

X-ray fluorescence intensity and spectra (No.14, 15), *Cypress Tree*



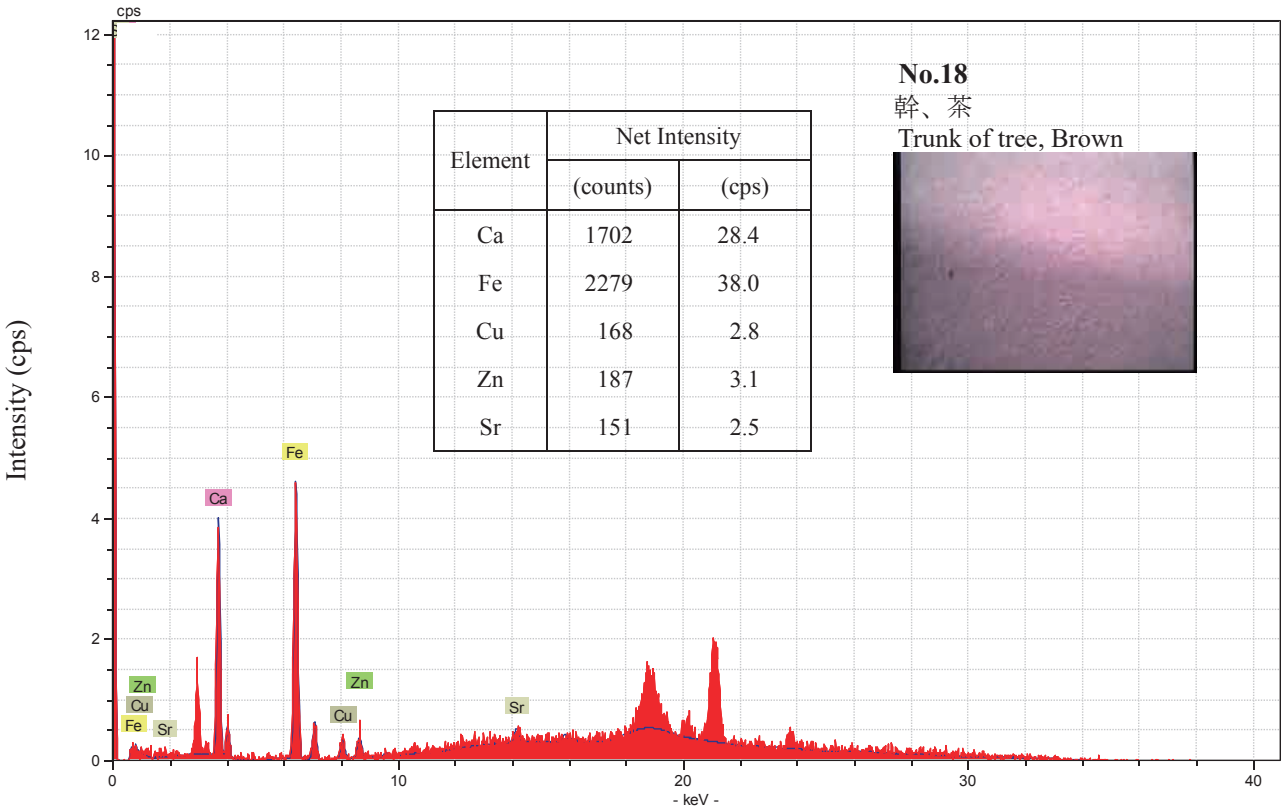
Element	Net Intensity	
	(counts)	(cps)
Ca	273	4.6
Fe	1638	27.3
Cu	55190	919.8
Zn	5675	94.6
As	5386	89.8
Pb	2084	34.7



Element	Net Intensity	
	(counts)	(cps)
Ca	336	5.6
Fe	380	6.3
Cu	207	3.5
Zn	126	2.1
Au	2352	39.2

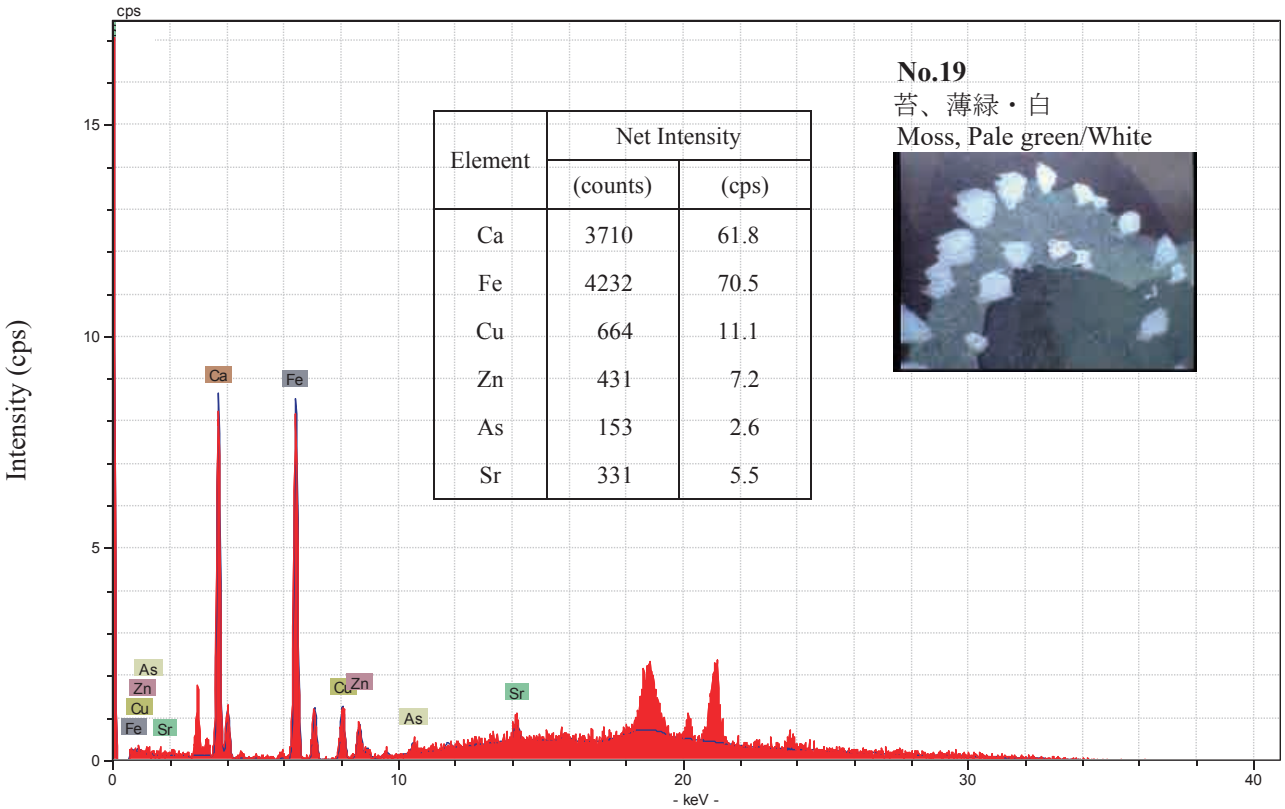
Fig. A.2.11 蛍光 X 線強度とスペクトル（No.16、17）『檜図』

X-ray fluorescence intensity and spectra (No.16, 17), *Cypress Tree*



No.18
幹、茶
Trunk of tree, Brown

Element	Net Intensity	
	(counts)	(cps)
Ca	1702	28.4
Fe	2279	38.0
Cu	168	2.8
Zn	187	3.1
Sr	151	2.5

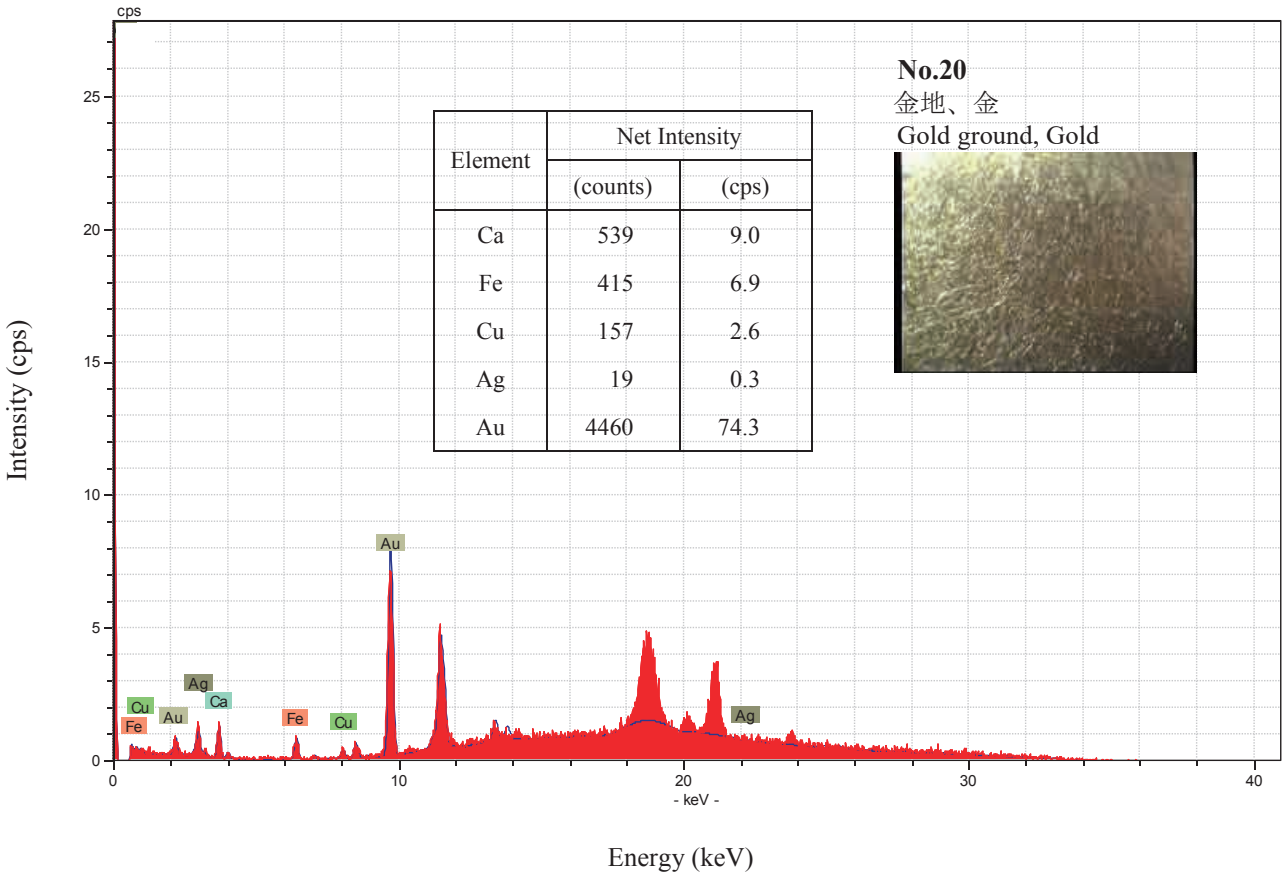


No.19
苔、薄緑・白
Moss, Pale green/White

Element	Net Intensity	
	(counts)	(cps)
Ca	3710	61.8
Fe	4232	70.5
Cu	664	11.1
Zn	431	7.2
As	153	2.6
Sr	331	5.5

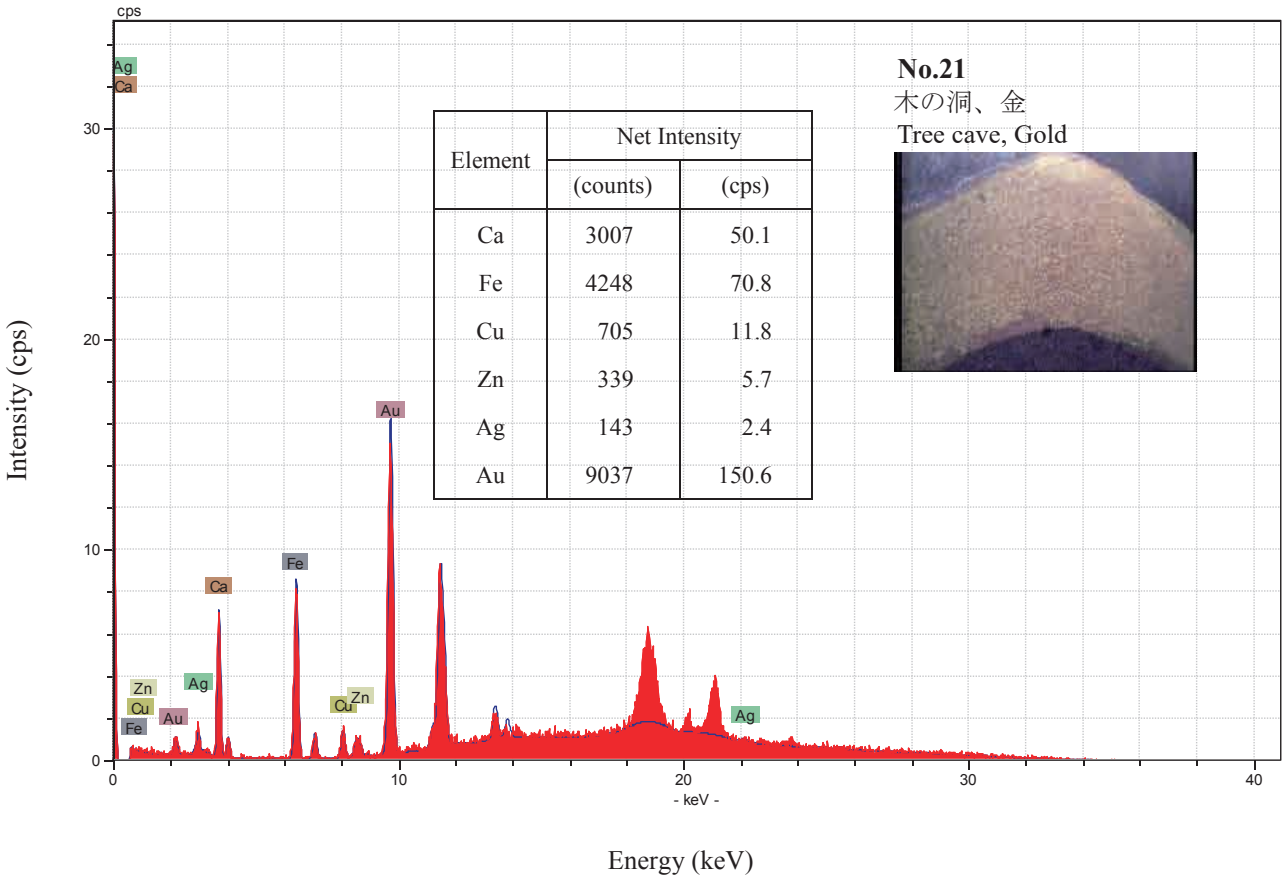
Fig. A.2.12 蛍光 X 線強度とスペクトル（No.18、19）『檜図』

X-ray fluorescence intensity and spectra (No.18, 19), *Cypress Tree*



No.20
金地、金
Gold ground, Gold

Element	Net Intensity	
	(counts)	(cps)
Ca	539	9.0
Fe	415	6.9
Cu	157	2.6
Ag	19	0.3
Au	4460	74.3



No.21
木の洞、金
Tree cave, Gold

Element	Net Intensity	
	(counts)	(cps)
Ca	3007	50.1
Fe	4248	70.8
Cu	705	11.8
Zn	339	5.7
Ag	143	2.4
Au	9037	150.6

Fig. A.2.13 蛍光 X 線強度とスペクトル（No.20、21）『檜図』
X-ray fluorescence intensity and spectra (No.20, 21), *Cypress Tree*

Table A.2.1　蛍光 X 線分析結果（緑色部分）

Results of X-ray fluorecence analysis (the green-colored area)

測定箇所/ Measuring point No.	蛍光 X 線強度/X-ray fluorecence intensity (cps)									Zn/Cu	Pb/Cu
	Ca カルシウム Calcium	Fe 鉄 Iron	Cu 銅 Copper	Zn 亜鉛 Zinc	As ヒ素 Arsenic	Sr ストロンチウム Strontium	Ag 銀 Silver	Au 金 Gold	Pb 鉛 Lead		
No. 2	2.7	41.9	1505.0	127.6	139.3			12.7	77.9	0.085	0.052
No. 6	3.3	12.6	644.5	92.4	79.1					0.143	
No. 10	51.7	7.4	27.8	5.2	3.5	4.2				0.185	
No. 11	5.2	29.7	1552.8	66.7	79.7			5.3	121.5	0.043	0.078
No. 12	2.9	21.3	928.0	48.9	67.1			3.0	55.5	0.053	0.060
No. 13	3.1	26.2	1329.7	196.8	153.4					0.148	
No. 14	9.3	19.0	391.1	63.0	43.5			66.9	14.0	0.161	0.036
No. 15	9.4	7.3	97.2	1.4	4.1			58.4	7.2	0.014	0.074
No. 16	4.6	27.3	919.8	94.6	89.8				34.7	0.103	0.038
No. 19	61.8	70.5	11.1	7.2	2.6	5.5				0.649	

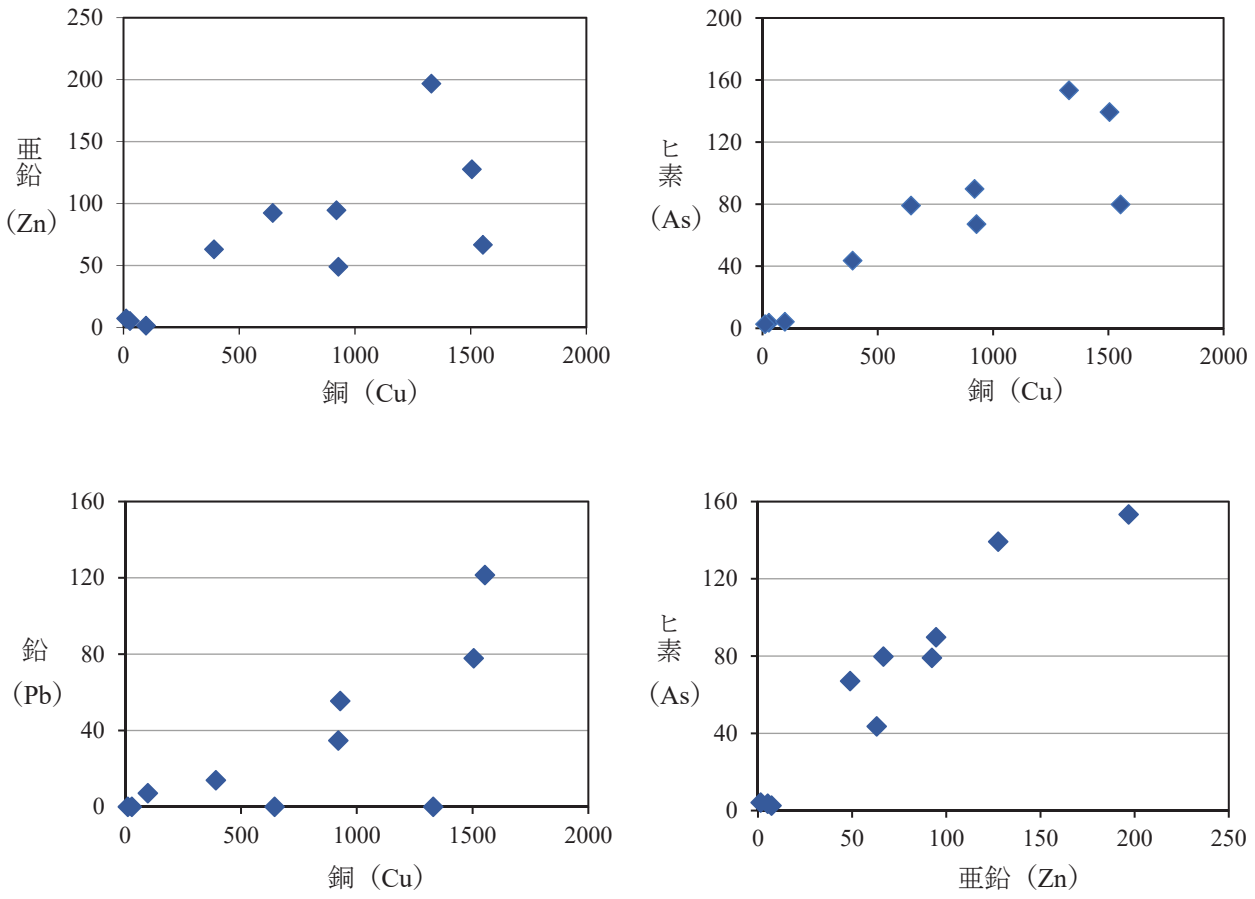


Fig. A.2.14　元素（銅、亜鉛、ヒ素、鉛）の蛍光 X 線強度（cps）の相関

X-ray fluorecence intensity (cps) correlation for each element (Copper, Zinc, Arsenic and Lead)

【分析結果に関するコメント】

『八橋図』

No. 1、5　花弁の濃青色部分からは微量の Ca、Fe、Cu が検出されるだけ。特徴的な元素は何も検出されない。青色材料は軽元素だけで構成されていることがわかる。

No. 2、11　葉の緑色部分からは Cu が多く検出され、同時に少量の Zn、As が検出される（Zn/Cu＝0.04-0.08）。さらに少量の Pb が検出される特徴がある。Pb/Cu＝0.05-0.08

No.12　葉の変色部分から検出される元素は、他の緑色部分から検出される元素とほぼ変わらない。この結果から変色の原因を探るのは難しい。

No. 6、13　花の萼の薄緑色部分からは Cu、Zn、As が検出されるが、No.2、11 とは Zn/Cu 比が大きく異なる（Zn/Cu=0.14-0.15）。Pb はまったく検出されない。No.2、11 とは材料が異なる緑色材料と考えられる。

No. 10　Zn/Cu 比および Pb が検出されないことから考えると、この部分に用いられているのは No. 6、13 と同じ材料である。

No. 3　花弁の白色からは Ca が多く検出される。Ca 系白色顔料（胡粉）が用いられていることがわかる。

No. 7　白色の花弁の中心の黄色部分は、白色部分と同じ検出結果である。黄色材料は染料であると考えられる。

No. 9　橋桁の濃茶色部分からは Fe が多く検出される。代赭などの Fe 系材料が用いられていると考えられる。

No. 4　金地からは Au とともに微量の Ag が検出される。Ag 含有率は 2-3%程度であると考えられる。

『檜図』

No. 14、16　いずれの緑色部分からも Cu、Zu、As が検出される。八橋図の No. 6、13 と Zn/Cu 比は近いが、Pb が検出される点が異なる。

No. 15　Cu、Zn、As が検出され、Pb も検出されるが、Zn/Cu 比、Pb/Cu 比は No.14、16 とは大きく異なる。八橋図の No.2、11 に近い。

No. 17　特徴的な元素は検出されない。Ag は検出されない。

No. 19　周囲の白色、茶色の影響が大きく、緑色材料の評価は難しい。

No. 20　金地からは Au と共に、微量の Ag が検出される。八橋図の No.4 の金地に近い Au 強度である。Ag 含有率は 2-3%程度である。

No. 21　Au 検出量は No.20 の金地の約 2 倍の量が得られる。厚く金が存在しており、金泥の可能性が高い。Ag 含有率は No. 20 と同様、2-3%程度と計算される。

【Comments about the Analytical Results】

Bridge Over Iris Pond

No. 1, 5 Small amounts of Ca, Fe and Cu were detected from the deep blue-colored area of iris petals. Distinctive elements were not detected. The blue color material consisted of some light elements only.

No. 2, 11 From the green-colored area of the leaves, large amounts of Cu were detected along with small amounts of Zn and As (Zn/Cu＝0.04-0.08). In addition, small amounts of Pb were detected. Pb/Cu=0.05-0.08

No. 12 Elements detected from the discolored area of leaves were almost identical to those detected from the green-colored areas. From this result, the cause of discoloration could not be revealed.

No. 6, 13 From the pale green-colored area of the iris spathe, Cu, Zu and As were detected. However, the ratio of Zn to Cu was different at the measuring points No.2 and 11 (Zn/Cu=0.14-0.15). Pb was not detected at all. Materials used at these points are thought to be different from the green-colored material at measuring points No.2 and 11.

No. 10 Considering from the ratio of Zn to Cu and non-detection of Pb, it can be speculated that the same material as No.6 and 13 were used in this area.

No. 3 A large amount of Ca was detected from the white-colored area of petals. It was determined that a Ca-based pigment (calcium carbonate [*gofun*]) was used.

No. 7 The yellow-colored area at the center of the white iris petals provided the same analysis result as the white-colored area. The yellow color material seems to be from a dye.

No. 9 A large amount of Fe was detected from the dark brown area of the bridge girder. This is thought to be from a Fe-based material such as red ocher [*taisha*].

No. 4 From the gold ground, Au was detected along with a small amount of Ag. The content rate of Ag was approximately 2-3%.

Cypress Tree

No. 14, 16 Cu, Zu and As were detected from all of the green-colored areas. These results are similar to the ratio of Zn to Cu at No.6 and 13 in *Bridge Over Iris Pond*; however, Pb was detected as well.

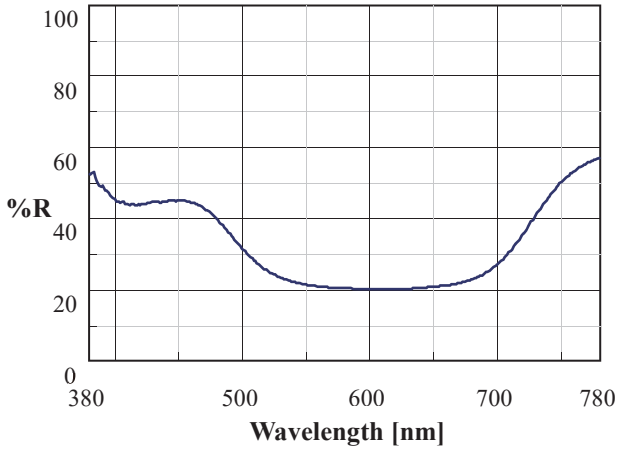
No. 15 Cu, Zn, As and Pb were detected; however, the ratios of Zn to Cu and Pb to Cu were quite different from No.14 and 16. The result from this area resembles that of No.2 and 11 in *Bridge Over Iris Pond*.

No. 17 Distinctive elements were not detected. Ag was not detected at this measuring point.

No. 19 It was difficult to identify the green color material because of the influence of white and brown color materials around this measuring point.

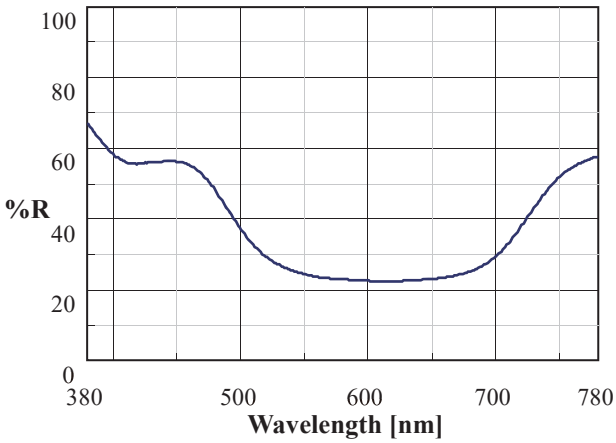
No. 20 From the gold ground, a small amount of Ag was detected along with Au. The intensity of Au in this area resembles that of the gold ground at No.4 in *Bridge Over Iris Pond*. The content rate of Ag was approximately 2-3%.

No. 21 Amount of Au detected at this point was twice as large as the amount at No.20. This result indicates a high possibility that there is a thick gold layer and a gold pigment is used here. The content rate of Ag was calculated to be approximately 2-3% as with at No.20.



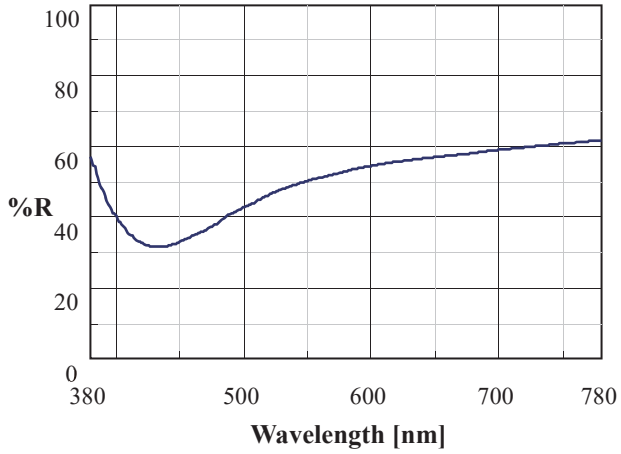
No.1　花弁、濃青

Iris petals, deep blue



No.5　花弁、濃青

Iris petals, deep blue

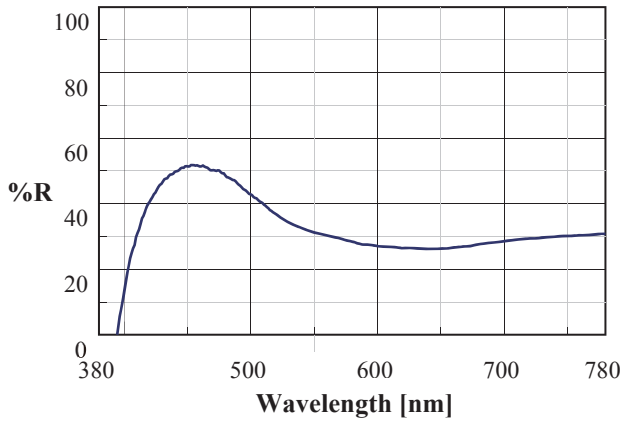


No.7　白い花弁の中心、黄

Center of white iris petals, yellow

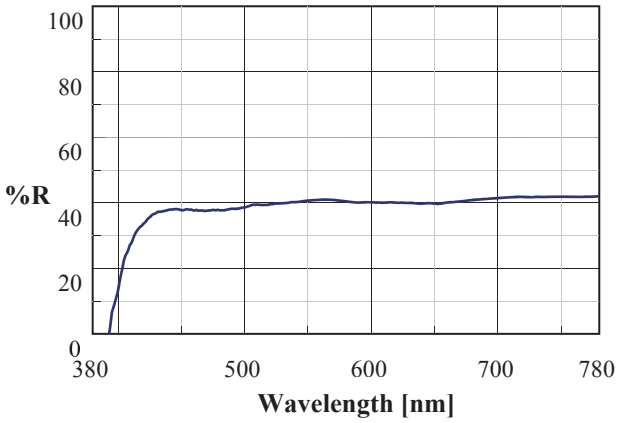
Fig. A.2.15　可視反射分光スペクトル（No.1、5、7）

Visible reflection spectra (No.1, 5, 7)



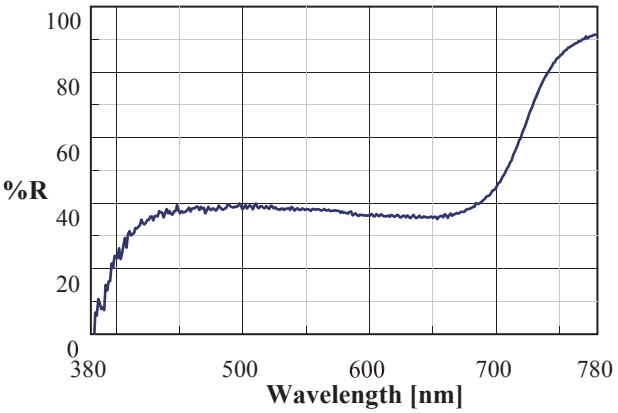
群青

Azurite



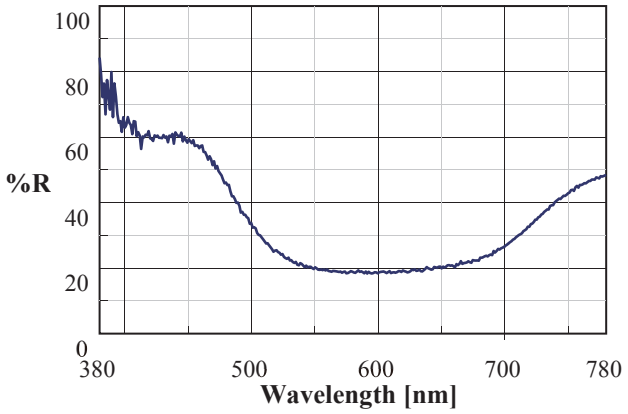
プルシアンブルー

Prussian blue



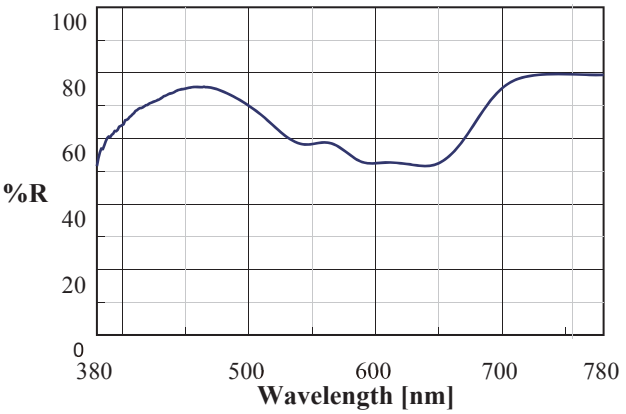
藍

Indigo



ウルトラマリンブルー

Ultramarine blue



スマルト

Smalt

Fig. A.2.16　標準試料（主な青色材料）の可視反射分光スペクトル

Visible reflection spectra of reference samples (the main blue color materials)

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