



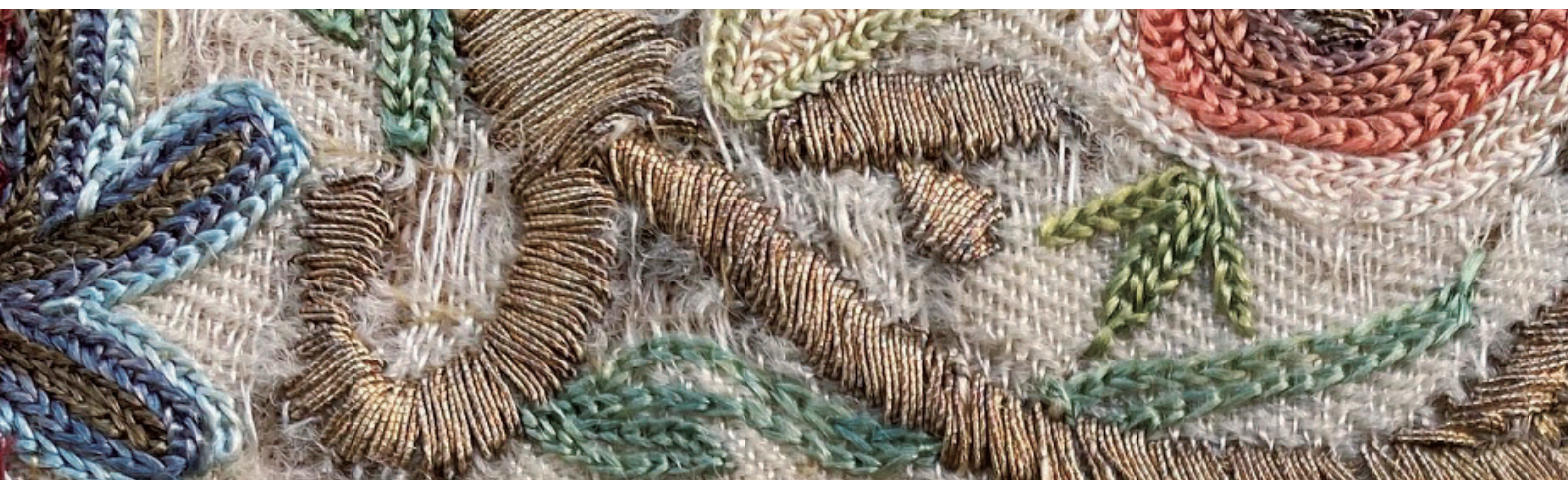
ARMENIA / JAPAN

Agency for Cultural Affairs Commissioned Project 2021

International Cooperation in
Cultural Heritage Institutional Exchange Project

Institutional Exchange Project in
Human Resource Development for the Preservation of
Cultural Heritage in the Republic of Armenia

National University Corporation Saga University Faculty of Art and Regional Design





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Agency for Cultural Affairs Commissioned Project 2021
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Institutional Exchange Project

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Project in Human Resource Development
for the Preservation of Cultural Heritage
in the Republic of Armenia

2021 - 2022

Project Report

Agency for Cultural Affairs Commissioned Project 2021

International Cooperation in Cultural Heritage Institutional Exchange Project

"Institutional Exchange Project in Human Resource Development for the Preservation of Cultural Heritage in the Republic of Armenia"

January 31, 2022

Editor ISHII Mie, OGATA Kazuko

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Forward

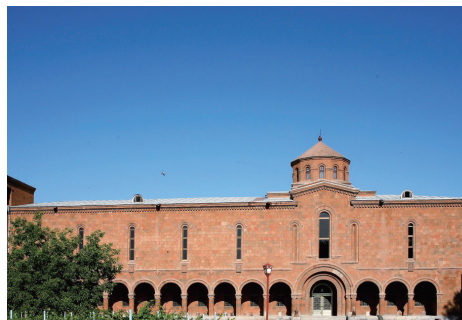
First of all, I would like to express my sincere gratitude to the people of Armenia, especially to Catholicos Karekin II, Catholicos of All Armenians, for the friendship between Armenian and Japan. Saga University has been entrusted by the Agency for Cultural Affairs in the institutional exchange project to cooperate in the preservation of cultural heritage. We are fortunate to have the Armenian Apostolic Church Museums of the Mother See of Holy Etchmiadzin as our institutional exchange partner. During a period in which the world faces difficulties with the COVID-19 infections, using online digital technology, we have endeavoured to cooperate beyond borders to assist professionals working in cultural heritage preservation. It has not been an easy task but we have been able to work together with hope under a united purpose. I would like to express my deepest gratitude to His Excellency Archbishop Nathan of the Armenian Apostolic Church, Director Asoghik Karapechan of Museums of the Mother See of Holy Etchmiadzin. Ministry of Culture, Republic of Armenia, Scientific Research Center for Historical and Cultural Heritage, National History Museum of Armenia, Japanese Embassy to Armenia, and Tokyo National Institute for Cultural Properties and everyone who generously supported this project.

Saga University
Faculty of Art and Regional Design
Dean Dr. YOSHIZUMI Mako



About the Museums of the Mother See of Holy Etchmiadzin

Etchmiadzin Cathedral is the headquarter of the Armenian Orthodox Apostolic Church and is located about 30 minutes by car from the capital Yerevan. "Cathedral and Churches of Etchmiadzin and Archeological Sites of Zvartnots" was registered as a UNESCO World Heritage Site in 2000. Armenia became independent of gained independence from the Soviet Union in 1991, but many of its treasures remain in warehouses due to long-term restrictions on religious activity. The museum was opened in 2014, and its treasures have been opened to the public, but there are many treasures that need to be restored. In addition, there are treasures awaiting restoration in the Armenian Apostolic Churches scattered throughout the country. Therefore, the basement of the museum is being renovated to house a storage room and a restoration room are being developed, which is scheduled to be completed in 2021. It is being developed as a base facility to restore all the treasures of the Armenian Apostolic Church.



Armenian Apostolic Church, Museums of the Mother See of Holy Etchmiadzin

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Aim of the Project

Saga University and with the Armenian Orthodox Apostolic Church Museums of the Mother See of Holy Etchmiadzin as a partner institute, and in collaboration with the Armenian National Center for Historical and Cultural Heritage Science, will cooperate in the exchange in knowledge of and skills in heritage conservation, and research focusing especially on historic textiles and archaeological materials. Training will be conducted in four fields: (1) history and philosophy of cultural heritage preservation, (2) inorganic substance analysis, (3) documentation and photography, and (4) Textile conservation science (storage and display) with the aim of contributing to the development of young and mid-career heritage professionals.

Conducted Project

As a result of the continuing COVID-19 situation, this year's training programme was carried out online from the initial stage.

Duration

April 1, 2021 ~ March 31, 2022

Base Institution

Saga University Faculty of Art and Regional Design
Dean : Dr. YOSHIZUMI Mako
Honjyomachi, 1, Saga City, Saga, Japan, 840-8502
Tel. (+81) 052-28-8349



Armenia Base Institution

Armenian Apostolic Church,
Museums of the Mother See of Holy Etchmiadzin
Director: Father Asoghik Karapetyan
110 Vagharshapat, Republic of Armenia
Tel. (+374) 10 51 71 10





Etchimiadzin Cathedral

The Results of the Cooperation between Japan and Armenia in Human Resource Development for the Preservation of Cultural Heritage and Textile Conservation

- 1 Agency for Cultural Affairs Commissioned Project 2020 International Cooperation in Cultural Heritage Institutional Exchange Project "Institutional Exchange Project in Human Resource Development for the Preservation of Cultural Heritage in the Republic of Armenia."
- 2 2017-2019 Tokyo National Institute for Cultural Properties Properties "Workshop on the Conservation of Textile Heritage in Armenia, 2017-2019."
- 3 2014 Arts and Crafts Promotion Sato Foundation Granted Research "Investigation and Preservation of Historic Textiles Cultural at the Museums of the Mother See of Holy Echimiadzin, Armenia"
- 4 2010-2014 Japan Foundation Cultural Cooperation Sponsored Project "Workshop on Conservation and Restoration of Historic Textiles at the Armenian History Museum."
- 5 2010 Ikuo Hirayama Silk Road Museum Research Grant "Armenian Textile Conservation and Restoration Survey."

Lecturer

ISHII Mie, Saga University
TSUCHIYA Takayoshi, Saga University
KONDO Keisuke, Saga University
YAMAUCHI Kazuya Yamauchi, Teikyo University
KANSHA Hiroo, Tokyo National Institute for Cultural Properties
YOKOYAMA Midori, NHK Bunka Center
MATSUSHIMA Tomohide, Kochi University

Project Office

Kazuko Ogata, Saga University

Coordination

Shuichi Minamie
Ruzan Khojikyán
IROHA Center: Armenian –
Japanese Center of Educational and Cultural Exchange
<https://irohacenter.com/ja/>

Participants

Armenian Apostolic Church Etchmiadzin Cathedral Museum

Marine Petrosyan (Textile conservator)
Maro Harutyunyan (Textile conservator)

Armenian National Center for Historical and Cultural Heritage Science

Meri Safaryan (Archaeologist)
Nanar Kalantarian (Architect-Restorer)
Arina Grigoryan (Conservator/Ceramic)
Yelena Atoyants (Conservator/Metal)
Nona Manaseryan (Archeological and anthropological finds
department. Curator)
Siranush Khalikyan (Conservator/Ceramic)
Taguhi Hmayakyan (Painter restorer)
Liana Zhamagortsyan (Conservator/Ceramic)

Service for the Protection of Historical Environment and Cultural Museum-Reservations

Astghik Simonyan (Conservator/Ceramic)

Interpreter / translator (Armenian)

Ruzan Khojikyán
Lilit Khansulyan
Zarine Hovakimyan
Shushan Hakobyan

Translator (English)

Yuko Furuya

Armenian Apostolic Church, Museums of the Mother See of Holy Etchmiadzin

Director Asoghik Karapechan of Museums of the Mother
See of Holy Etchmiadzin

History Museum of Armenia

Hasmik Khachatryan (Conservator/textile)
Gevorg Vardanyan (Conservator/Metal)
Astghik Melkonyan (Conservator/Ceramic)
Anna Shcherbakova (Conservator/Metal)

Institute of Archaeology and Ethnography NAS RA

Mariam Amiryan (Archaeologist)

National Gallery of Armenia

Lilit Ghazaryan (Conservator/Ceramic)
Lilit Aghabekyan (Art critic)

Restorer at Research Center for Restoration of Mural Paintings

Geghetsik Gyurjyan (Restorer)
Ani Kananyan (Restorer)
Anna Gabrielyan (Restorer)

Produced Audiovisual Programms

Four videos were made with an accompanying text.

1. The Storage and Display of Textiles in Museum Collections

< Cast >

SAKATA Kumi
NETSU Aoi
TAKAHAMA Ikuha
OKUSHIMA Kiko

< Cooperation >

Saga University Art Museum

2. Examinaton and Investigation of Cultural Properties

< Cooperation >

Yoka Shrine (Saga city)
Analytical Research Center for
Experimental Sciences, Saga University
MASEDA Mikio

3. The Observation and Measurement of Artifacts

< Cooperation >

SHIGEHUJI Teruyuki
(Saga University)

4. The Characteristics of a Digital Single-Lens Reflex Camera and Lenses

<Cast >

TAZUNOKI Akiho
EUCHIDA Toru
ENDO Rika
YOSHINAKA Mio

< Cooperation >

Public Relations Office, Saga University
TOKUYASU Kazuhiro (Saga University)
OGATA Koharu

Audiovisual Production

Toppen Co. Ltd. (Audiovisual Production 2-4)

MUTO Ami

JINNAI Tomotaka

AMADERA Kosuke



Fish Eye LLC. (Audiovisual Production 1)

MORISHITA Yuji

SATO Sou

KOROGI Yuya

KUBOTA Kaede



Schedule

Opening ceremony May 27, 2021

Textile Remote Programme 01 May 27, 2021

The *Wabi-sabi* of *Boro* Ragss and the Art of Textile Conservation

Time : 15:00-17:00 (Japan time)

Lecturer : ISHII Mie (Saga University)

Content : Training session on the conservation of textile materials in museum collections. Based on this session, participants were instructed to present conservation case studies in Armenia for the next training session



Textile Remote Programme 02 July 1, 2021

Armenian Embroidery: Textile Conservation Stitching in Museums and Conservation

Time : 15:00-17:00 (Japan time)

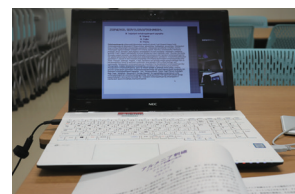
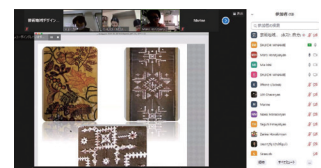
Lecturer : ISHII Mie (Saga University)

Presenters: Armenian Apostolic Church Etchmiadzin Cathedral Museum

Marine Petrosyan (Textile conservator)

Maro Harutyunyan (Textile conservator)

Content: Based on the training session held in May, two participants carried out presentations on textile conservation in Armenia.



Textile Remote Programme 01 December 13, 2021

The Storage and Display of Textiles in Museum Collections

Time : 15:00-17:00 (Japan time)

Lecturer: YOKOYAMA Midori (NHK Culture Center)

ISHII Mie (Saga University)

Content: Based on the audiovisual material,

"The Display and Storage of Textiles in Museums", which was produced this year. Knowledge was exchanged on the differences in the folding methods of Japanese kimonos and Armenian costumes and their storage techniques.



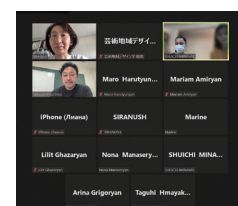
Camera Remote Programme November 4, 2021

The Characteristics of the Digital Single-Lens Camera and Lenses

Time : 15:00-17:00 (Japan time)

Lecturer : ISHII Mie (Saga University)

Content : Based on the audiovisual material, "The Characteristics of the Digital Single-lens Camera and Lenses", which was produced this year. After viewing the video, a question and answer session was held. As many of the participants had never used a single-lens camera before, they were assigned the task of taking photographs using a single-lens camera.



The Examination and Investigation of Cultural Properties

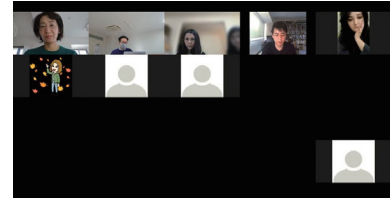
Time : 15:00-17:00 (Japan time)

Lecturer : MATSUSHIMA Tomohide (Kochi University)

KONDO Keisuke (Saga University)

ISHII Mie (Saga University)

Content : The lecture was based on the audiovisual material, "The Examination and Research of Cultural Properties", which was produced this year. The video was streamed before hand and the actual session focused on questions and answers. Lecturers explained about the pigments used in Japanese style paintings and discussed specific topics on analysis techniques. Participants were given the task of making a presentation on Armenian paintings for the December 27 session.



Documentation of Excavated Archaeological Artifacts

Time : 15:00-17:00 (Japan time)

Lecturer: KANSHA Hiroo

(Tokyo National Research Institute for Cultural Properties)

Presenters:

Armenia National Scientific Research Center for Historical and Cultural Heritage

Taguhi Hmayakyan (in charge of measured drawings of archaeological artifacts)

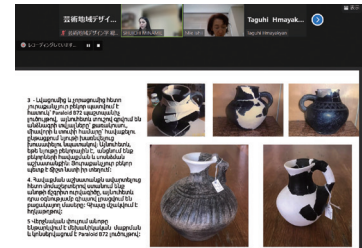
"The Storage, Conservation, and Drawing of Archaeological and Anthropological Excavated Artifacts"

Institute of Archaeology and Ethnography NASRA

Mariam Amiryany (Archaeologist)

"The Documentation of Archaeological Artifacts"

Content: Two participants gave presentations on the documentation of archaeological artifacts excavated in Armenia. Based on their presentations, a discussion was held regarding the detailed contents of the audiovisual materials.

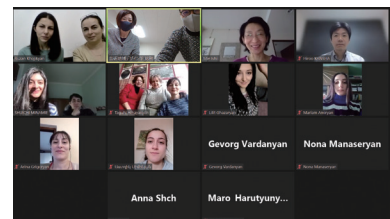


The Observation and Measurement of Artifacts

Time : 15:00-17:00 (Japan time)

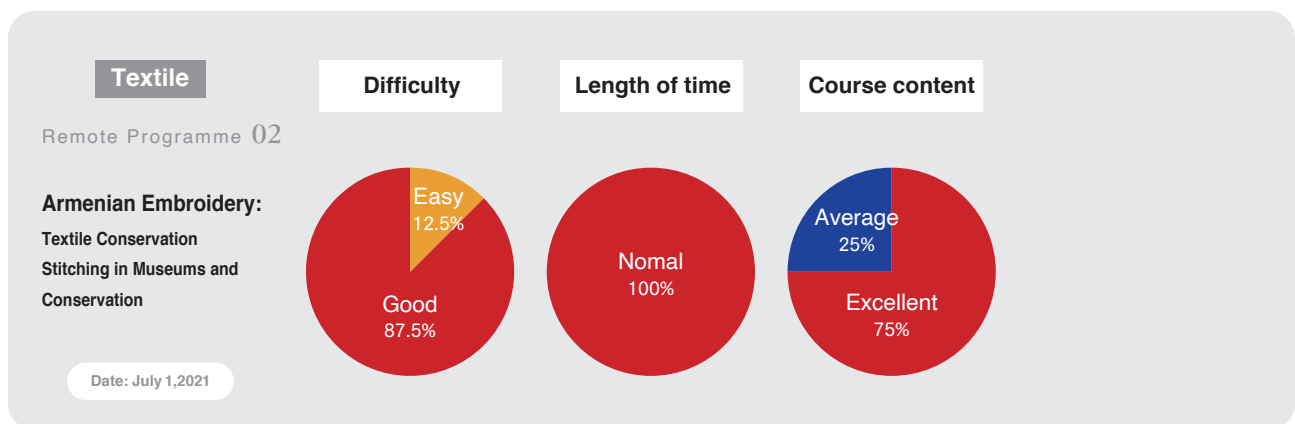
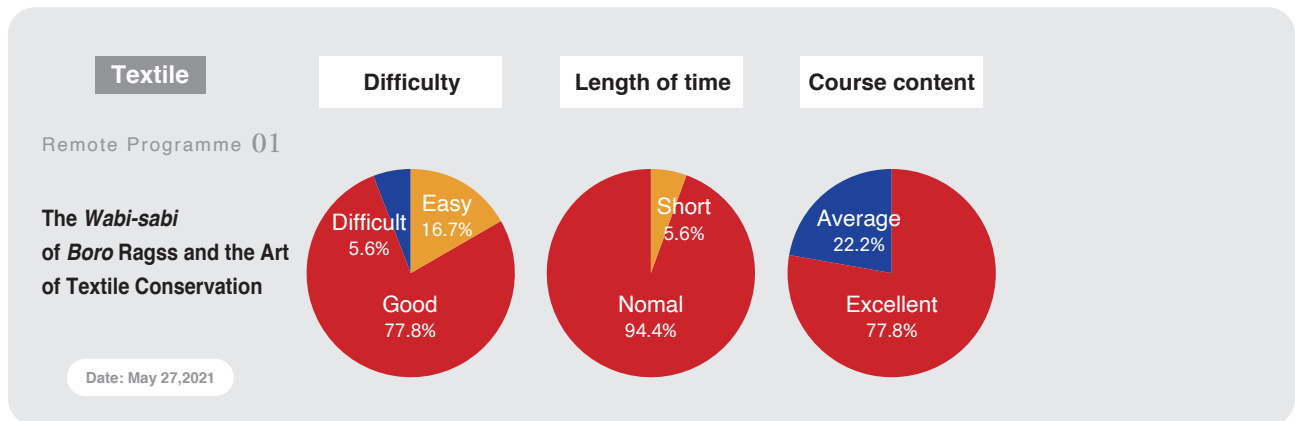
Lecturer: KANSHA Hiroo (Tokyo National Research Institute for Cultural Properties)

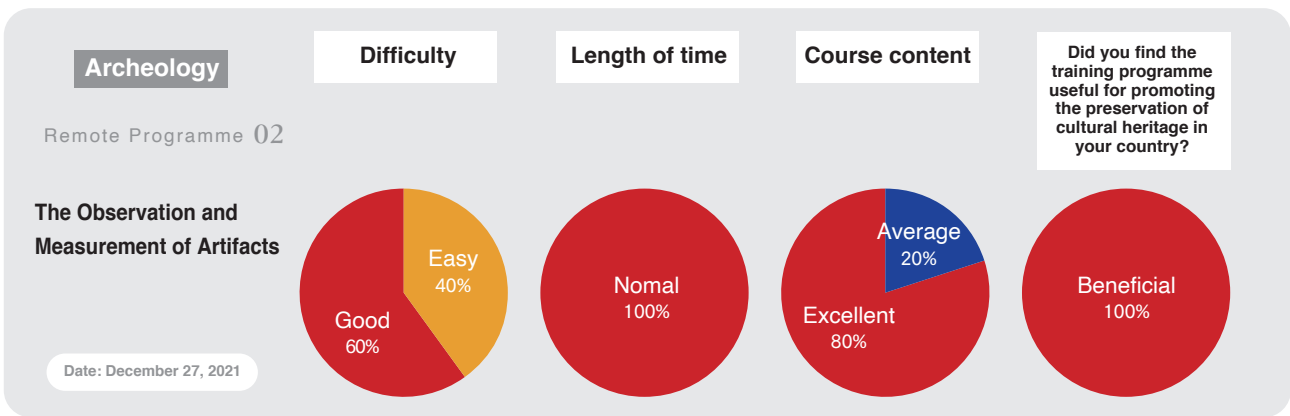
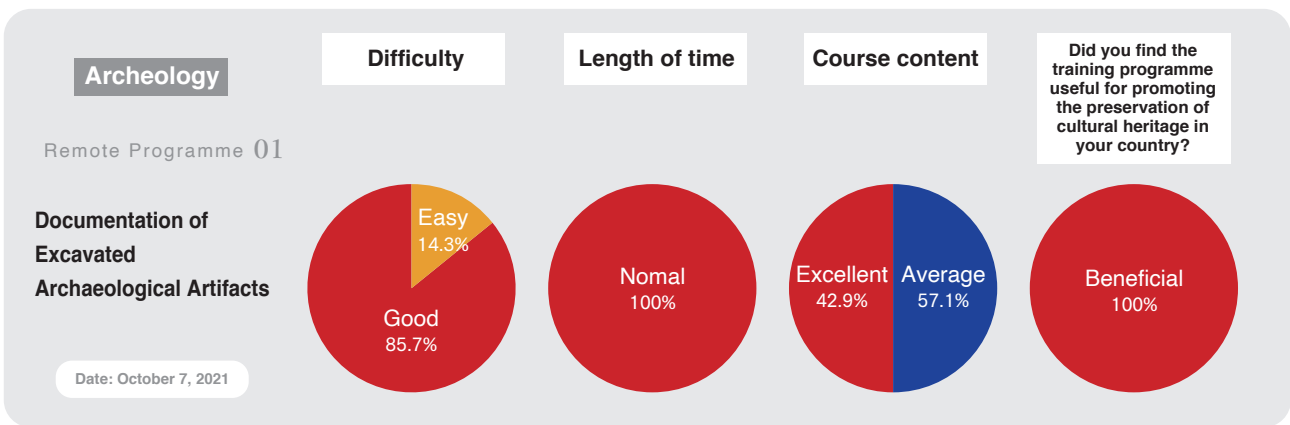
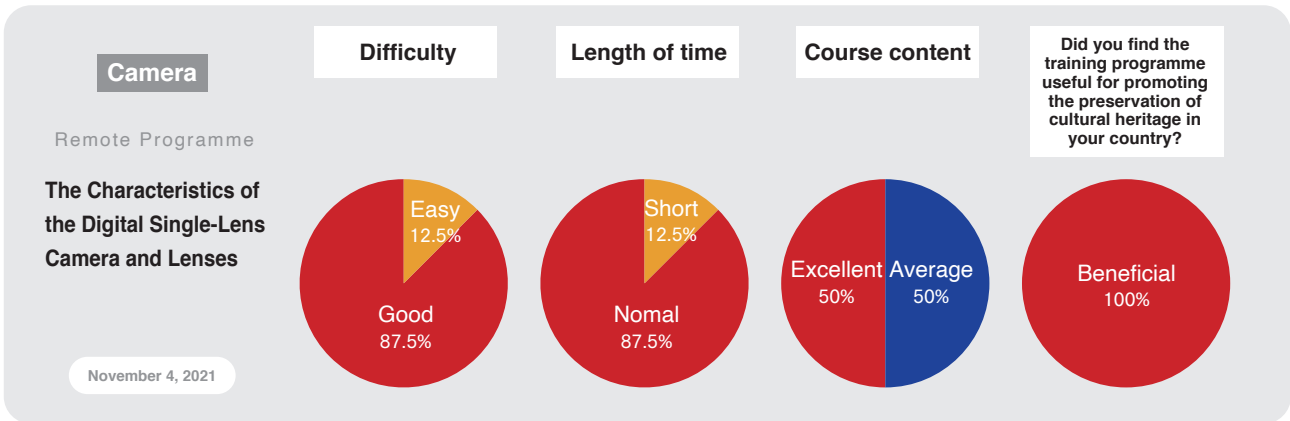
Content: Based on the audiovisual material, "Measuring Artifacts", which was produced this year. The session confirmed that the same techniques for basic measuring methods were used in Armenia. We hope that Armenia will subsequently take full advantage in utilizing the more devised techniques.



Questionnaire

Result of the Questionnaire on the Programme





Participant's comment:

- We carried out discussions on complicated ethical and philosophical issues regarding the conservation and support treatments of textiles. I am very grateful to you all for organizing this training programme.
- Thank you for the interesting and informative videos. It was a pleasure for me to have the chance to be part of this course. Through viewing the videos on the "Examination and Investigation of Cultural Properties" and the "Storage and Display of Textiles in Museum Collections", I was able to easily understand the points to be careful of as well as the possibilities. I intend to re-examine what I am aiming to achieve, which methods to apply, the points which should be prioritized in my investigations, including the order in which they should be dealt with. Furthermore, the method for constructing and displaying mounts used for storing items is something that can be incorporated immediately and can be executed by any individual who has gained the knowledge. I plan to implement my newly gained knowledge as much as possible. The strong impact of videos, which are not still images, was also reinforced on me and I realized the importance of using videos for my investigations.
- Videos are a wonderful material where the thoughts regarding the cultural properties are communicated through every movement. I feel that videos are not limited to providing an easily understood image, but through repeated viewing, they can bring new aspects to the forefront from different angles.
- The course has taught me the importance of understanding and communicating one's own culture and how the way a costume is stored daily, even how the costume is folded, reveals the cultural background of the costume. The work carried out by the lecturers has taught me the profundity of human resource development. Although we come from different countries and our experiences may differ, I hope to continue furthering the understanding of my country's culture through a multilateral approach.

1

The Storage and Display of Textiles in Museum Collections



ISHII Mie

Saga University,

Faculty of Art and Regional Design

YOKOYAMA Midori

NHK Culture Center

The Storage and Display of Textiles in Museum Collections



Textiles from various regions, cultures, and periods are stored in museums.

We will use actual examples to demonstrate the storage and display of textiles based on preventive conservation.

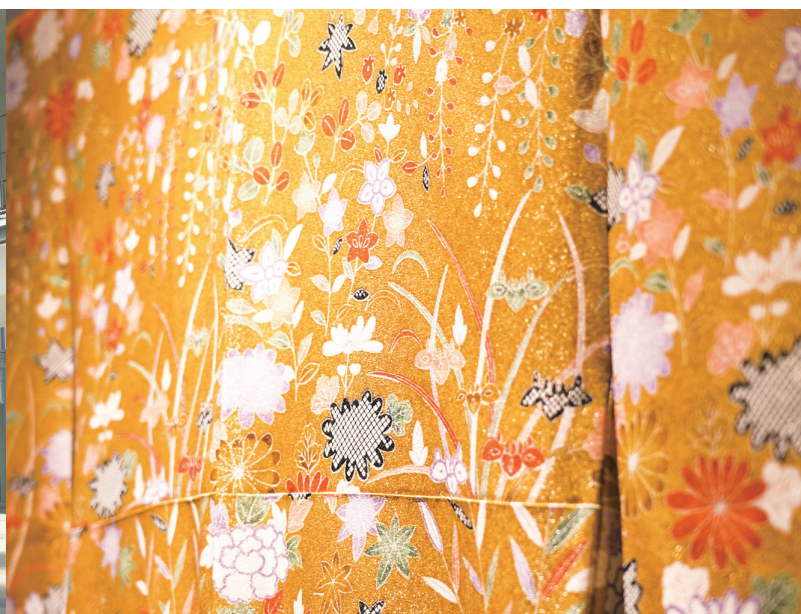
1

ISHII Mie

*Saga University,
Faculty of Art and Regional Design*

YOKOYAMA Midori

NHK Culture Center



MOUNTING SYSTEM

01

MOUNTING SYSTEM



Textiles are made from fibers and are characterized by their pliability. It is important for textiles to have a support structure in order to maintain their shape and to ensure their safe handling. Preventive conservation is an approach to forestall the future deterioration of cultural properties.

02

MOUNTING SYSTEM



A pliable textile will gain stability when placed on a paperboard. The apparatus used to support a material is collectively referred to as a mount. Mounting a textile ensures that it can be handled more easily when it is displayed or stored. The textile is framed using materials which have been selected through an approach based on preventive conservation.

03

MOUNTING SYSTEM



Mounts can be largely divided into four types: flat, recessed, sculpted and tube. We will examine the characteristics and method of constructing each type of mount.

Bingata (stencil dyeing)
FUJIMURA Reiko
Okinawa late 1990's

FLAT MOUNT

04

FLAT MOUNT



The mount basically consists of a flat paperboard. The textile is placed on an acid-free paperboard in order to handle the textile without touching it. The paperboard is covered with a cotton fabric to enhance the visual effect of the displayed textile.

05

FLAT MOUNT



The friction between the cotton fabric and textile prevents the textile from sliding down and allows the textile to be displayed in a gently slanting position.

06

FLAT MOUNT



When holding the paperboard, make sure that your thumbs do not touch the textile and reduce handling.

The paperboard is cut according to the textile's size with the addition of a handling edge around its perimeter.

Following these measures when constructing a mount reinforce an approach to preventive conservation.

METHOD FOR MAKING A FLAT MOUNT

07

METHOD FOR MAKING A FLAT MOUNT



Align the warp and weft direction of the textile with the warp and weft direction of the cotton fabric used for the mount.

Acid-free cotton mat board

Polyester felt (needle punch)

Cotton fabric

Adhesive tested for conservation use

08

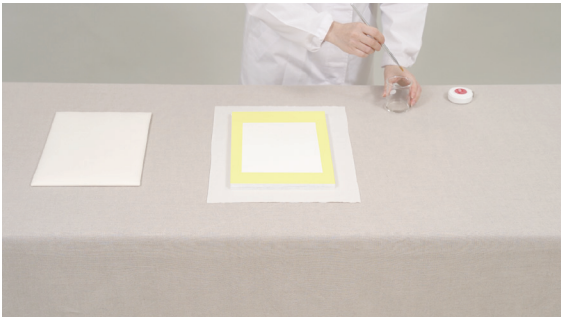
METHOD FOR MAKING A FLAT MOUNT



The cotton fabric is cut according to the paperboard's size with the addition of a 5cm perimeter.

09

METHOD FOR MAKING A FLAT MOUNT



Place the felt onto the reverse side of the cotton fabric.
Next place the paperboard on top of it.

Apply archival adhesive on to the edges of the paperboard
5-10% Klucel G® (hydroxypropyl cellulose) in water

10

METHOD FOR MAKING A FLAT MOUNT



First attach the edges of the cotton fabric's warp direction and next attach the edges of the weft direction onto the paperboard (use a weight).

Cover the edges with archival tape to ensure that the cotton fabric does not peel off the paperboard.

Make sure that the grain of the fabric is straight.

STITCHED MOUNT

11

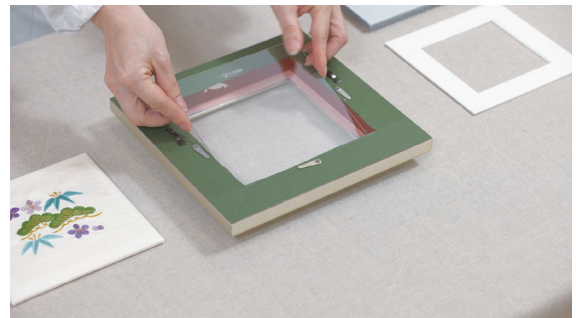
STITCHED MOUNT



Textiles, which need to be displayed on a wall or framed, should be placed on a mount and secured using a long and short stitch around the perimeter.

12

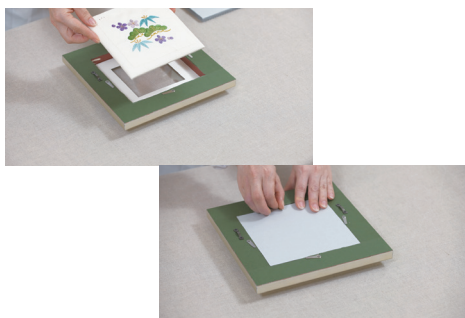
FRAMING



We will now frame a mounted textile
With a store bought frame, apply two coatings of water based acrylic paint to seal the wood with resin.
Select an acrylic or glass glazing which blocks ultraviolet light and prevents static electricity from occurring.

13

FRAMING



Insert a mat board with a window cut out to prevent the glass and textile from directly touching.

14

FRAMING



Insert an archival board as a backing board and close the frame using metal fittings. Instead of an archival board, using a cardboard covered in aluminum foil as a backing board will also result in the reduction of acidic substances.

METHOD FOR MAKING A RECESSED MOUNT

15

METHOD FOR MAKING A RECESSED MOUNT

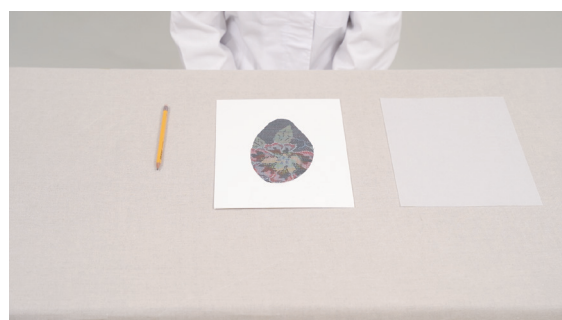


Using a recessed flat board as a mount will prevent the textile from moving.

Polyester thread / Pin / Needle /
Archival tape / Ruler / Scissors / Cutter /
Roll cutter / Awl / Scalpel / Design cutter /
Pencil / Clips / Felt

16

METHOD FOR MAKING A RECESSED MOUNT



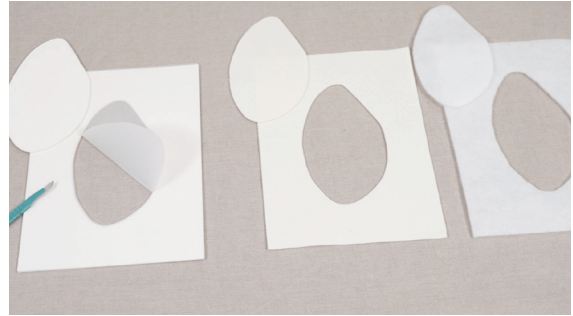
Two acid-free cotton mat boards
Two polyester felt (thick and soft)
One polyester felt (thin and hard)
Tracing paper
Cotton fabric

17 — METHOD FOR MAKING A RECESSED MOUNT



Create a pattern by tracing the textile
Use a pencil to draw an outline of the textile over the tracing paper.
The traced outline should be 2-3 mm larger all around than the actual textile .

18 — METHOD FOR MAKING A RECESSED MOUNT



Use the pattern to cut out a hollow in each of the single mat board, thin polyester felt, and thick polyester felt.

19 — METHOD FOR MAKING A RECESSED MOUNT



Following the pattern, use an awl to pierce holes in the mat board which constitutes the base board.

20 — METHOD FOR MAKING A RECESSED MOUNT



Stack in the order of the base board, polyester felt, thick polyester felt with shape cut out, hard polyester felt with shape cut out, and mat board with shape cut out.

21 — METHOD FOR MAKING A RECESSED MOUNT



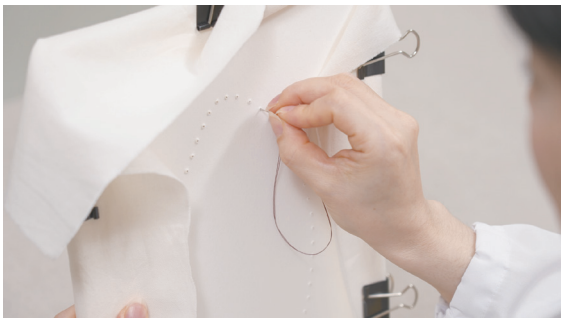
Place a fabric over it and make sure that the grain of the fabric is straight.

22 — METHOD FOR MAKING A RECESSED MOUNT



Secure the fabric using clips with felts to prevent leaving any markings on the fabric.

23 — METHOD FOR MAKING A RECESSED MOUNT



Insert the needle from under the hole in the base board and secure the fabric and felt using small back stitches.

24 — METHOD FOR MAKING A RECESSED MOUNT



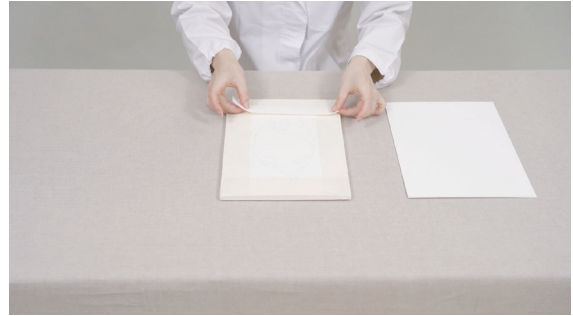
Tie the thread ends of the start and end stitch firmly together.

25 — METHOD FOR MAKING A RECESSED MOUNT



Stretch the fabric and secure it with pins.

26 — METHOD FOR MAKING A RECESSED MOUNT



After all four sides of the fabric have been secured with adhesive (use a weight), cover the edges with archival tape to prevent the fabric from peeling off.

27 — METHOD FOR MAKING A RECESSED MOUNT



Use an neutral mat board as a lid so that the textile can be stored directly.

28 — METHOD FOR MAKING A RECESSED MOUNT



If a textile is placed in a recessed mount with a low reflectance, UV cut and anti-static acrylic or glass cover, the mounting system will prevent the textile from moving and fragile archaeological textiles can be stored and displayed and this method can be use for storing and displaying fragile archeological textiles.

29

STORAGE



Due to the dissemination of preventive conservation, the storage system is changing from wood to metal shelves. The aim is to limit the deterioration of stored works of art by reducing as much as possible the amount of acid emitted from wood. The movable shelves make effective use of limited spaces.

30

STORAGE



Fixed shelves

The shelves are installed with earthquake preventive measures to prevent artifacts from falling down or boxes toppling over.

31

STORAGE



The shallow drawers contain textiles which can be stored flat.

32

STORAGE



This is a window mat folder made from an acid-free mat board.

33

STORAGE



Two sheets of transparent and antistatic polyester film are machine sewn together.

The textile can be seen from both sides
Anti-static polyester sheet (Lumirror® X53 100µ)

34

STORAGE



Paperboard and film folder

A sheet of acid-free mat board and a sheet of transparent film are machine sewn together.

35

STORAGE



Paperboard and film folder

A sheet of acid-free mat board and a sheet of transparent film are machine sewn together. Since artifacts are kept in storage for a long period of time, it is important to consider how they are preserved while in storage.

36

STORAGE



A storage system with preventive conservation in mind facilitates handling and protects a textile from dust, light and changes of temperature and humidity.

TUBE MOUNT · ROLLED STORAGE

37

TUBE MOUNT · ROLLED STORAGE



If a textile is kept in a folded condition for a long period of time, the folded area can become easily torn.

As a result, we recommend rolled storage for flat and long textiles.

- Neutral paper tube
- Cotton tapes
- Neutral tissue paper
- Neutral paper cover

38

TUBE MOUNT · ROLLED STORAGE



Textiles with embroidery, pile fabric or lining are rolled around the tube so that the front side is facing outwards.

This means that when the textile is rolled, any creases that occur will appear on the reverse side while the front side remains flat.

- Kosode fragment
- Mid Edo period (late 17th century)
- Silk and embroidery

39

TUBE MOUNT · ROLLED STORAGE



This is a storage box for long kimono fragments. A holder is placed inside the box so that both sides of the tube are raised.

40

TUBE MOUNT · ROLLED STORAGE



Let us examine the method for rolling a textile

Roll a thin sheet of paper around the tube

If you cannot obtain an acid-free paper tube, roll aluminum foil around a paper tube to reduce the emission of acids.

Roll a long thin sheet of paper one and a half times around the tube.

Since the textile is decorated with embroidery, make sure to roll it around the tube so that the embroidered areas face outwards.

41

TUBE MOUNT • ROLLED STORAGE



Once you finish rolling the textile, place a cover and tie it using a cotton tape.

42

TUBE MOUNT • ROLLED STORAGE



Place the rolled textile inside a storage box which should be kept in the storage room.

ROLLED STORAGE OF RUGS

43

ROLLED STORAGE OF RUGS



Known as Nabeshima Dantsu, this rug is made from cotton and is a traditional arts and crafts product of Saga Prefecture.

During the Edo period, agricultural land in Saga expanded through land reclamation and raw cotton was cultivated to desalinate the soil.

Rug manufacturing methods were originally introduced from China and subsequently developed into unique cotton rugs.

Nabeshima Dantsu
Saga
Early 20th century
Cotton pile

44

ROLLED STORAGE OF RUGS



Roll the rug around the thick tube so that the pile fabric is facing outwards.

Place a cotton fabric cover over the roll.

When storing the tube, place foams on both ends of the tube in order to raise it.

This will prevent the rug from becoming crushed.

STORING A KIMONO

METHOD FOR FOLDING A KIMONO

45

METHOD FOR FOLDING A KIMONO



In Japan, a kimono is traditionally placed inside a *tatashi* (kimono storage envelope) and stored in a chest of drawers made of paulownia wood. Museums also handle kimono in the same way and the method of handling and storing a kimono is passed down as a "living cultural property." Subsequently, it is very important to know how to fold a kimono.

46

METHOD FOR FOLDING A KIMONO



Before folding a kimono, spread out a cloth underneath it. Spread out the kimono so that the hem is on your right side and the collar is on your left side.

47

METHOD FOR FOLDING A KIMONO



Fold the side seam so that it forms a straight line along the right lower front panel.

48

METHOD FOR FOLDING A KIMONO



Fold the side seam so that it forms a straight line along the right lower front panel.

49

METHOD FOR FOLDING A KIMONO



Hold the collar tip and hem of the left front panel that appears on top when the kimono is worn and place it over the front panel that fits underneath.

50

METHOD FOR FOLDING A KIMONO



Fold the side seam of the left front panel onto the side of the right lower front and make sure that the center back seam is folded properly.

51

METHOD FOR FOLDING A KIMONO



Arrange the collar in a valley fold.

52

METHOD FOR FOLDING A KIMONO



Hold the collar tip and collar end and align them.

STORING A KIMONO

53

METHOD FOR FOLDING A KIMONO



Overlap the left and right sleeve together.

54

METHOD FOR FOLDING A KIMONO

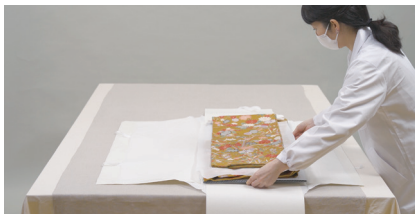


Make sure that there are no creases and insert a tissue paper and pillow in the area that is being folded.

Pillow: A polyester felt core wrapped around in a silk fabric
Tatoshiki (kimono storage envelope- Japanese paper)
Neutral tissue paper
Paulownia wood box
Pillow
Archival paperboard

55

METHOD FOR FOLDING A KIMONO



Fold the kimono in two at the collar tip to hem area.

Fold the right sleeve and place it on top of the kimono.

56

METHOD FOR FOLDING A KIMONO



Place the kimono on a mat board and wrap in kimono storage envelope before storing the kimono inside a chest of drawers made from paulownia.

SCULPTED MOUNT / MANNEQUIN

57

SCULPTED MOUNT / MANNEQUIN



The shape of clothing is finalized once it is actually worn by a person. Mounts also include mannequins and stands which are used to display costumes.

Jacket and dress
ISSEY MIYAKE
Japan
Early 1990s

58

SCULPTED MOUNT / MANNEQUIN



When installing a costume onto a mount, it is important to measure and document all the parts. To adjust the costume's shape on the mannequin, the costume is supported from the interior by adding wadding, padding, and skirt.

59

SCULPTED MOUNT / MANNEQUIN



Sewing on a three-dimensional object is made easier with the use of a curved needle. Sew on the polyester wadding using a herringbone stitch.

60

SCULPTED MOUNT / MANNEQUIN



Loosen and smooth out the edges of the polyester wadding before enclosing it with an elastic fabric.

61

SCULPTED MOUNT / MANNEQUIN



Wrap the polyester felt around a thick wire.
Then cover it with a cotton fabric to create an
arm that can bend freely.

62

SCULPTED MOUNT / MANNEQUIN



Use an elastic fabric to cover the mannequin
and place cushioning material over it to fit the
shape of the costume.

63

SCULPTED MOUNT / MANNEQUIN



Add a nylon tulle skirt onto the mannequin in
order to support and spread out the costume's
skirt.
Add a dressing cloth to cover the neck and
neckline.

64

SCULPTED MOUNT / MANNEQUIN



By supporting the costume from the interior,
the shape of the costume is arranged for
display.

KIMONO DISPLAY STAND

65

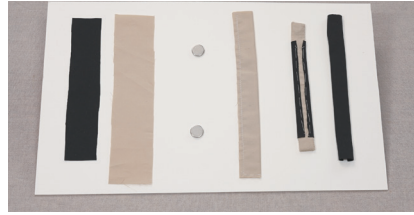
KIMONO DISPLAY STAND



The kimono is traditionally displayed on a kimono display stand. Adjust the sleeves towards the front part of the kimono before inserting the pole of the display stand.

66

KIMONO DISPLAY STAND



When the lower front part of the kimono is spread open for display, use a cloth tape with magnets to secure it unobtrusively.

67

KIMONO DISPLAY STAND



To make the collar stand up, fold it into a triangle and insert it into the collar and adjust the collar's shape.

T-SHAPED STAND

68

T-SHAPED STAND

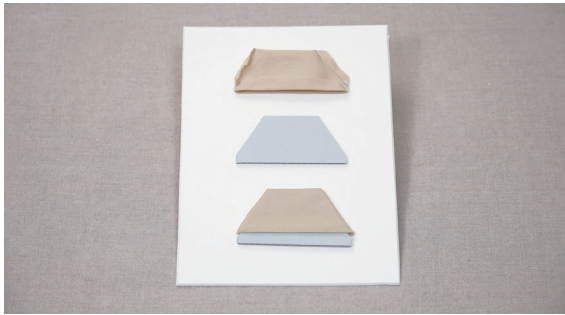


We will now demonstrate how to make a T-shaped stand for displaying kimono. Cut the wood according to the kimono's measurements. Apply two coatings of acrylic varnish to seal the wood with resin.

T-shaped stand

69

T-SHAPED STAND



To make the collar stand up, cut out a cardboard pattern and cover it with a fabric.

70

T-SHAPED STAND



Make an incision in the center of the sleeve and insert the pattern.

71

T-SHAPED STAND



Cover the sleeve pole with polyester wadding and fabric to protect the kimono from any wood splinters.

72

T-SHAPED STAND



Cover the pole tip with a dressing fabric so that it appears unobtrusive.

LIGHT INTENSITY CONTROL

73

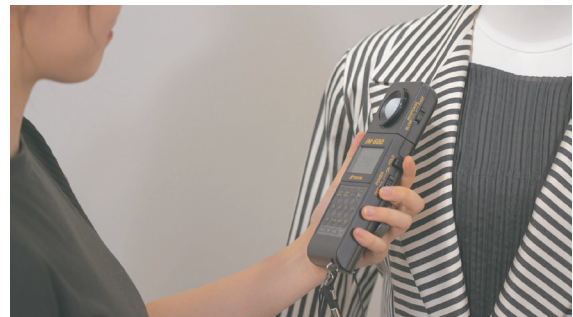
LIGHT INTENSITY CONTROL



Since fading in textiles can occur easily, The International Commission on Illumination recommends museums to display textiles at 50 lux, the annual cumulative light exposure should be 15,000 lux.

74

LIGHT INTENSITY CONTROL

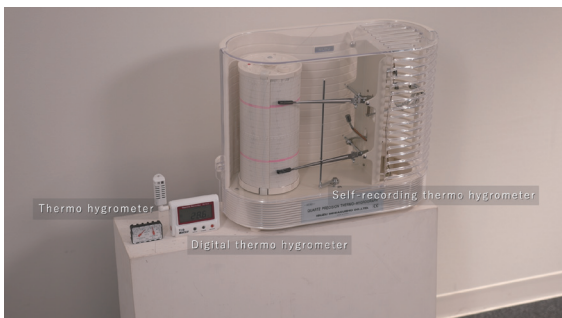


This means that if a textile is on display for 8 hours per day, the display period should be approximately 6 weeks. The conservation management of textiles is very important in order to maintain long-term, stable conditions. Consequently textiles should not be on permanent display and if they are on display in exhibitions, they should be changed after a certain period of time.

TEMPERATURE AND HUMIDITY CONTROL

75

TEMPERATURE AND HUMIDITY CONTROL



The museum's environment should be monitored by measuring the temperature and humidity in order to keep the environment constant.

- Self-recording thermo hygrometer
- Digital thermo hygrometer
- Thermo hygrometer

SUMMARY

76

SUMMARY



In order for museums to continue storing and displaying textiles under stable conditions, it is necessary not only to pay attention to the form, materials, techniques, conditions of the textiles but also to handle the textiles with a respect towards their culture.

2

Examination and Investigation of Cultural Properties



ISHII Mie

Saga University,

Faculty of Art and Regional Design

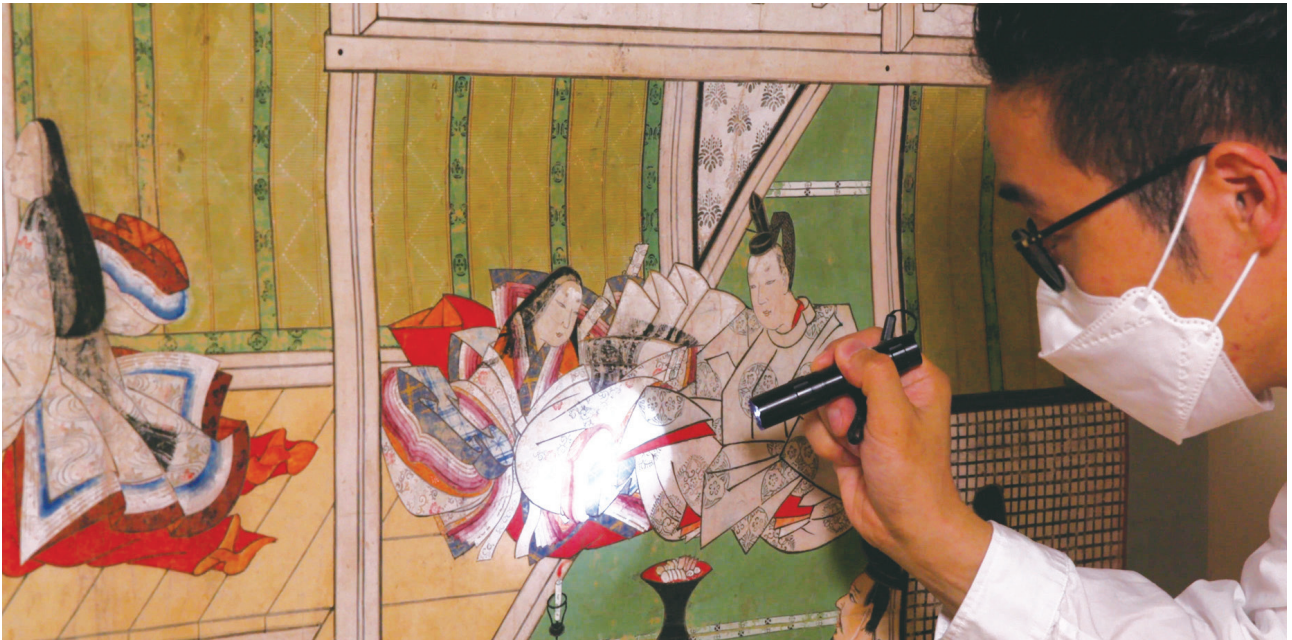
KONDO Keisuke

Saga University,

Faculty of Art and Regional Design

MATSUSHIMA Tomohide

Kochi University, Center for Teacher Education Development



Examination and Investigation of Cultural Properties

2

Cultural properties help us to understand the state of society in the past to the present day.

Furthermore, they are an important heritage for creating the future.

This is the reason why it is very important to pass on cultural properties in a good condition for the next generation.

We will explain the examination and investigation method of cultural properties.

To deepen the understanding of and to preserve cultural properties, we scientifically examine and document them along with their historical background, materials, production techniques, and conditions.

In principle, a non-destructive examination method is used to investigate cultural properties.

Since research requires various knowledge, an inter-disciplinary research is important.

ISHII Mie

*Saga University,
Faculty of Art and Regional Design*

KONDO Keisuke

*Saga University,
Faculty of Art and Regional Design*

MATSUSHIMA Tomohide

Kochi University, Center for Teacher Education Development



Yoka Shrine, Saga City, Japan



THEME

01

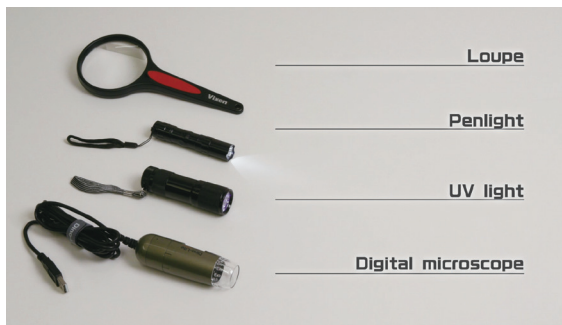
“*Hoshimatsuri-zu*” is by KOHARA Yukansai, a follower of the Kano school, who became the painter of the Nabeshima main domain in 1656. The theme of the painting is “Star Festival” which is a fusion of Chinese customs and Japanese faiths.



The Herdsman and the Weaver are depicted on both banks of the Milky Way in the upper left of the screen. They can meet only once a year over the Milky Way on the Star Festival Day which is on July 7th. In the center of the screen, a Star Festival scene of court nobles is depicted in a *Yamato-e* (Japanese) style.

EXAMINATION OF CULTURAL PROPERTIES

02



Cultural properties are examined directly with the naked eye and then through magnification.

VISUAL EXAMINATION

03



Visual examination is the most important part of the investigation. First carefully observe the entire painting, then magnify the painting's surface with a loupe for a more detailed observation. It will be easier to observe the painting if you illuminate it with a penlight.

INORGANIC PIGMENTS

04

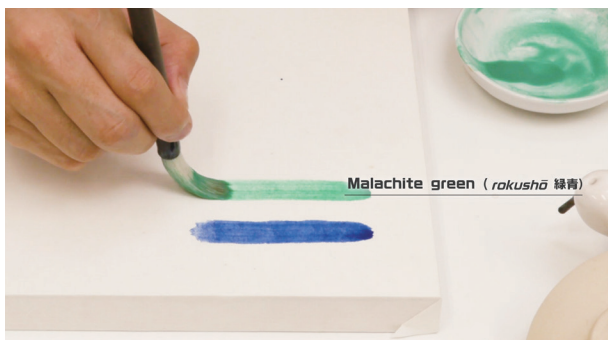
In Japanese paintings, inorganic pigments are made by crushing minerals, soil and shells and organic pigments are extracted from plants and insects.

From among many coloring materials, we will introduce several traditional pigments.



The white “*gofun*” is made from the shells of oysters and clams and the main component is calcium (Ca).

Gofun can be used in many ways. Not only as a white pigment, but also as a base for the ground or as a base for mixing colors.

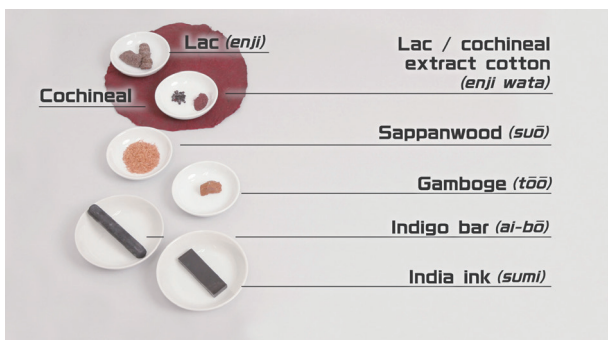


The green “*rokushō*” is made from malachite and the main component is copper (Cu).

The blue “*gunjō*” is made from azurite and the main component is copper (Cu).

ORGANIC PIGMENT

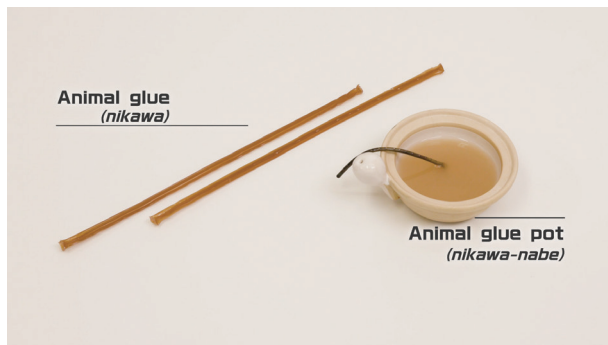
05



The red is “*enji*” made by extracting lac and /or cochineal dye, “*suō*” is sappanwood, the yellow is “*tōō*” gamoge, the blue is indigo bar, and the black is indian ink.

BINDER

06



The pigments have no adhesive strength.

Therefore, we make paints by mixing collagen concentrate, boiled from animal bones and skins, as a binding adhesive.

THE BASE MATERIAL

07



When painting a picture, the base material (also known as the support) is the material which acts as the base onto which the pigment is applied. Currently, Washi paper is widely used, but silk and wood, and in ancient times, hemp and plaster were also used.

Washi paper is used in *Hoshimatsuri-zu*.

From the right: silk, wood, Washi paper

OBSERVATION AND INVESTIGATION OF PAINTINGS

DIGITAL MICROSCOPIC EXAMINATION

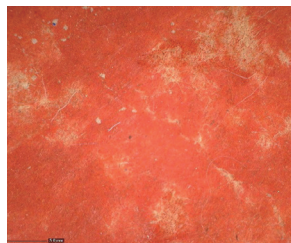
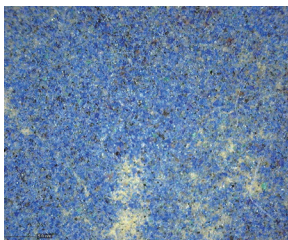
08



Use a portable digital stereo microscope.



Document your observations.



Fine particles can be observed in minerals and soil-based inorganic pigments.
This is a micro image of red lead.

VISIBLE LIGHT PHOTOGRAPH

09



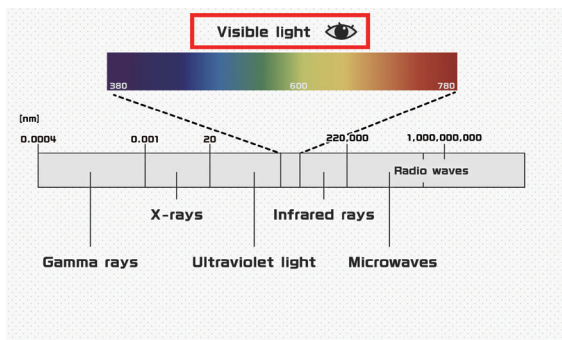
Photographic documentation is required when surveying cultural properties.

First, take a photograph using visible light.

Next, take a photograph using oblique rays, as it will be easier to observe conditions such as the surface crease, which can be documented in the photograph.

TYPES OF ELECTROMAGNETIC WAVES

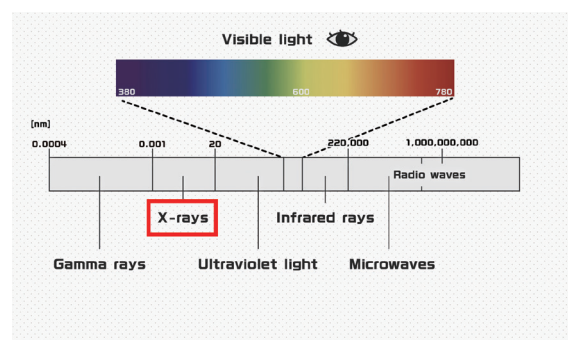
10



Scientific analysis prioritizes non-destructive testing methods that do not destroy cultural properties. Therefore, analytical methods that use electromagnetic waves are often used. The types of electromagnetic waves are distinguished by the length of the wavelength. The light we see is “visible light rays.”

X-RAY FLUORESCENCE ANALYSIS

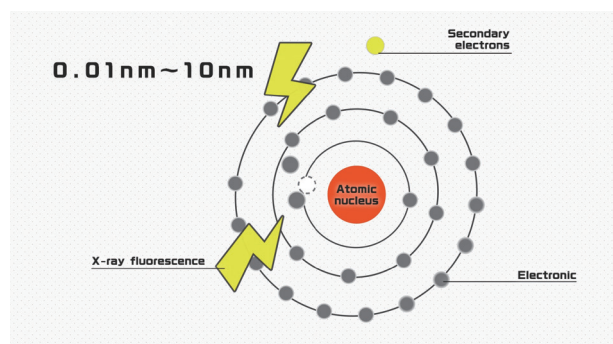
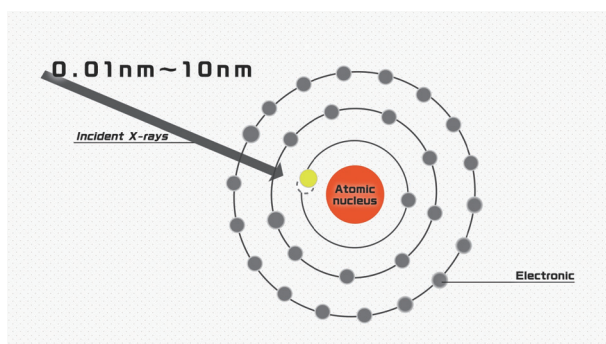
11



X-rays are electromagnetic waves with wavelengths of about 0.01 nm to 10 nm. The X-ray fluorescence analysis method is often used to examine the materials of cultural properties.

PRINCIPLE OF X-RAY FLUORESCENCE ANALYSIS

12



When a substance is irradiated with X-rays, the inner-shell electrons of the atom are ejected to the outer shell, and the outer-shell electrons fall into the vacant space. When this occurs, an energy which is characteristic to the element (fluorescent X-ray) is generated and emitted. Once this fluorescent X-ray is detected, a qualitative and quantitative analysis of the element can be carried out. It is necessary to take into consideration that the information obtained is limited to the surface area of the material.

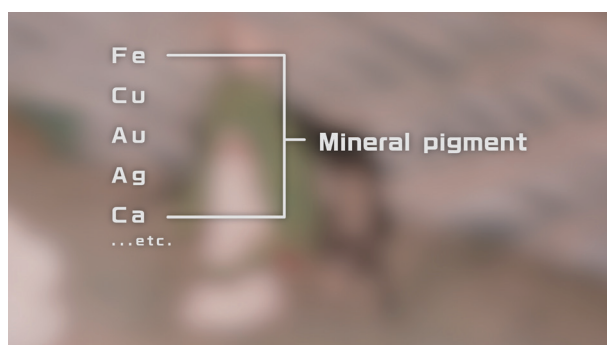
13



The handheld X-ray fluorescence analyzer is an instrument widely used for the non-destructive analysis of inorganic substances in cultural property examination.

Originally it was developed for the purpose of on site analysis where minerals are collected.

It is suitable for the analysis of mineral pigments mentioned above since it is measured in an environment exposed to the outside air. However, light weight elements in small quantity, such as alum (Al) which is used for dyeing may be difficult to detect.

X-RAY FLUORESCENCE ANALYZER
SHIMADZU EDX-800HS

14



In such a case, there is a high possibility that it can be measured using a stationary type X-ray fluorescence analyzer where the analysis can be carried out in a vacuum environment. However, the stationary type can only be used when a sample can be collected.

"HOSHIMATSURI-ZU" PIGMENT ANALYSIS

15



Let's analyze pigments using a handheld X-ray fluorescence analyzer.

Bring the analyzer close to the measurement point and measure 3 times to check the reproducibility of the measured value.

ANALYSIS RESULTS

16



Copper (Cu) was detected from the blue color which indicates the presence of azurite.



Gold (Au) and calcium (Ca) are detected in the gold color which indicates the presence of gold and shell pigment.



Lead (Pb) and calcium (Ca) are detected in the orange color which indicates the presence of lead tan and shell pigment.



Calcium (Ca) was detected in the white color which determined the presence of shell pigment.

THE PURPOSE OF SCIENTIFIC INVESTIGATION ON CULTURAL PROPERTIES

17



Clarifying the material of a painting is not just about identifying authenticity and gaining knowledge of the production techniques used at the time.

Accurate material information is useful for the conservation and restoration of paintings and maintaining the environment, and is necessary for passing down the works into the future.



X-RAY TRANSMISSION RADIOGRAPHY

18

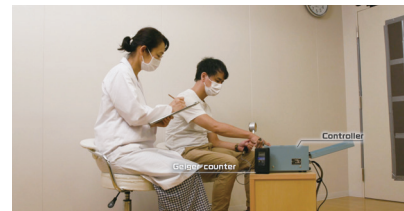
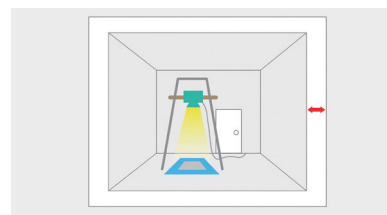
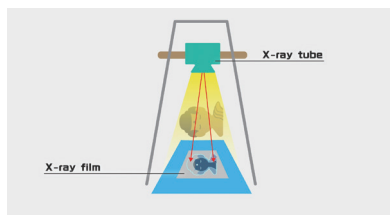


Next, we will introduce the diagnostic imaging analysis method from among the non-destructive examination methods used for cultural properties.

Since there is a risk of exposure, X-ray transmission radiography is carried out in the presence of a qualified specialist.

X-ray transmission radiography, commonly known for taking X-rays, was adopted early on in conservation as an image inspection method to determine the interior of cultural properties.

※ This is an image.
The actual examination will take place in a room without any objects.



In X-ray transmission radiography, X-rays are emitted from a generator onto the cultural property.

X-ray transmission radiography is carried out in a room with thick walls to prevent the X-rays from passing through.

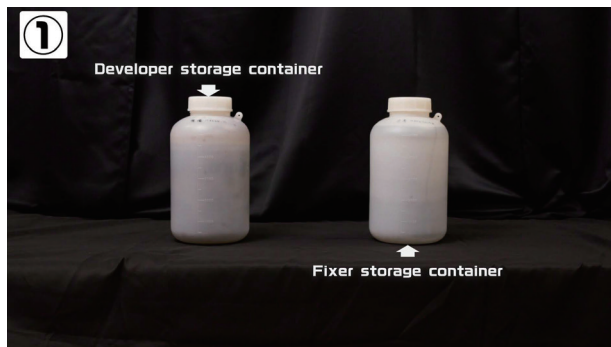
The X-rays penetrate through the cultural property and reach the film or digital photoconductor where they are intercepted. The image is subsequently visualized through film developing or image processing devices.

In addition, the X-rays are operated from a distant room in order to avoid radiation exposure.



The X-ray film developing procedure is carried out in a dark room.

These are the chemicals and tools used in the X-ray film developing procedure.



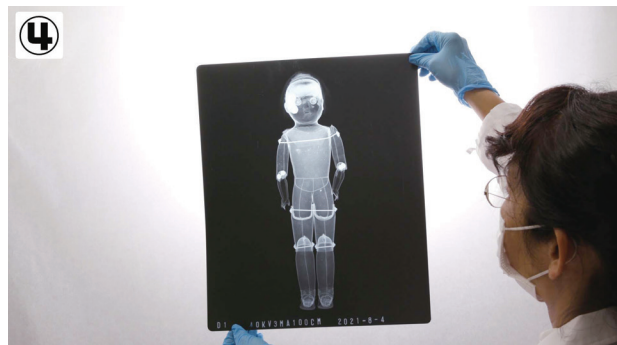
01 Mix the developers A and B with water in a developer storage container.
Mix the fixer with water in a fixer storage container.



02 Develop the film with the developer and fix the latent image with the fixer.
Rinse in water to remove any residual fixer on the film.



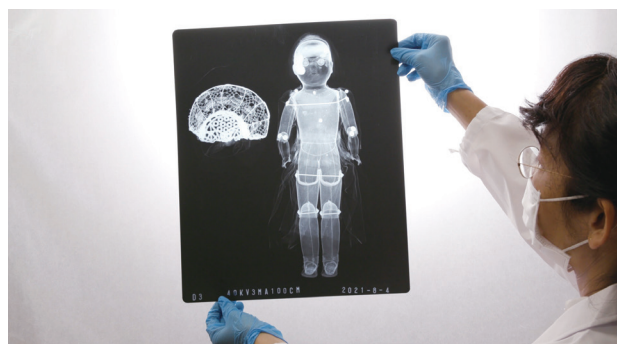
03 Dry the film.



04 Observe the developed film using transmitted light.



The X-ray photograph has made it possible to examine the doll's interior structure.



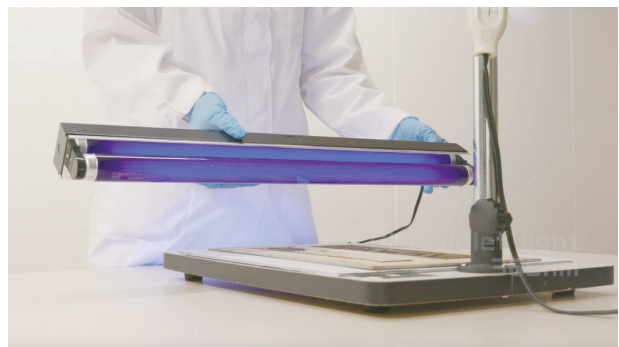
We can see the metal wire located inside the doll which cannot be identified from the surface.

MULTISPECTRAL PHOTOGRAPHY

19

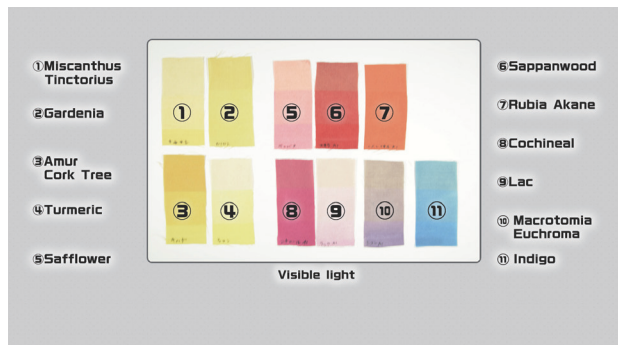
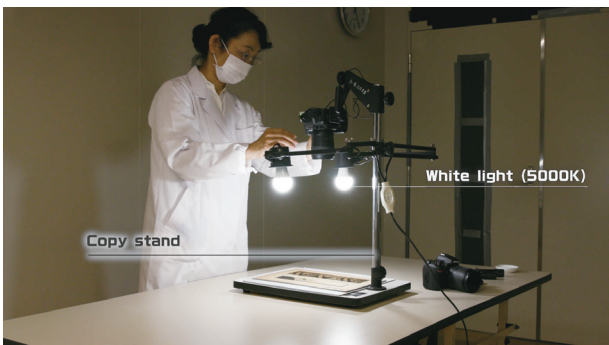


Using textiles as a case study, we will show how to make an image diagnosis by taking photographs using visible light, ultraviolet light, and infrared light.



VISIBLE LIGHT PHOTOGRAPHY

20



First, using visible light, take a photograph of the silk cloth (reference), dyed with natural dye and discolored, as well as the textile which needs to be examined.

ULTRAVIOLET FLUORESCENCE PHOTOGRAPHY

21



Next, take a photograph using ultraviolet light. Some pigments absorb the ultraviolet light and create energy so that they become fluorescent.

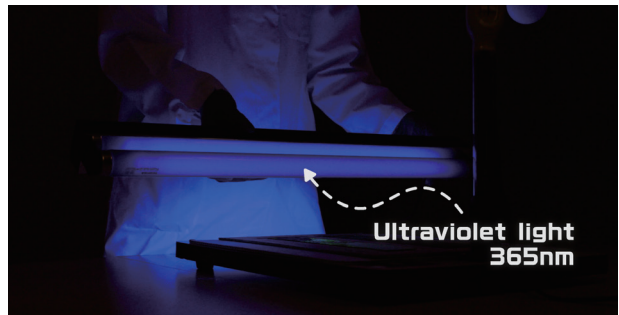


As a safety measure, wear long sleeves and wear UV protection glasses.

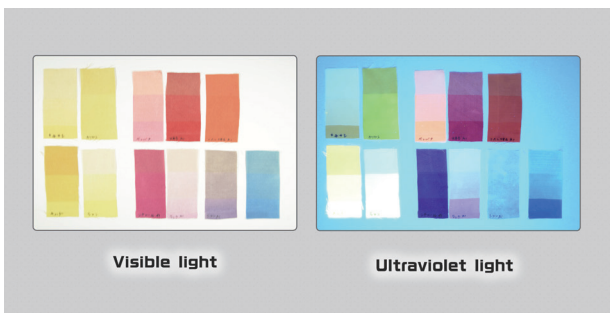
Ultraviolet rays can damage the artifact, so the photography session must be completed within a short time.



Set the digital single lens reflex camera to manual or auto aperture priority mode.

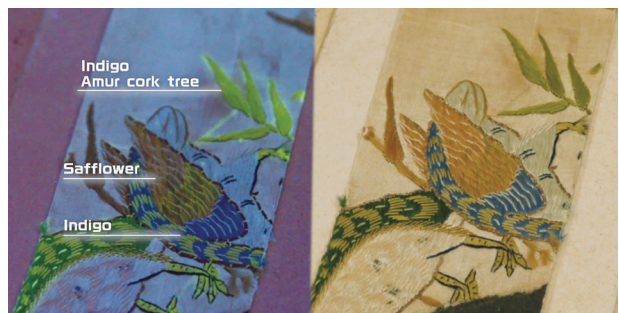


A 365 nm ultraviolet light is used here.



This is a reference photographed using ultraviolet light.

When the color is vibrant, many dyes fluoresce, but only a limited number of dyes become fluorescent after fading.



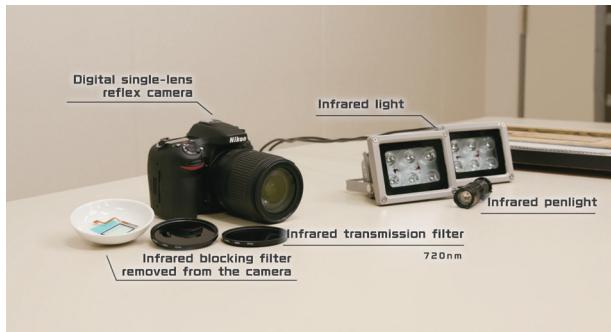
This is a Japanese embroidery photographed using an ultraviolet light.

Compared to photographs taken with white light, you can see that.

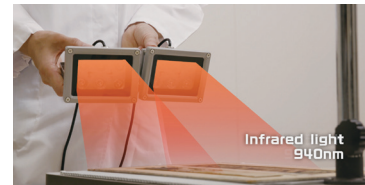
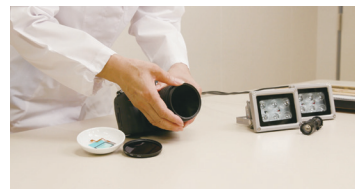
the yellow dye from the Amur cork tree, the red dye from the safflower, and blue dye from the indigo fluoresced.

INFRARED PHOTOGRAPHY

22



Finally, a photograph is taken using infrared light. You can buy special cameras to take photographs using infrared light but they are very expensive. Here, we will use a digital single-lens reflex camera with the infrared blocking filter removed from the interior of the camera.



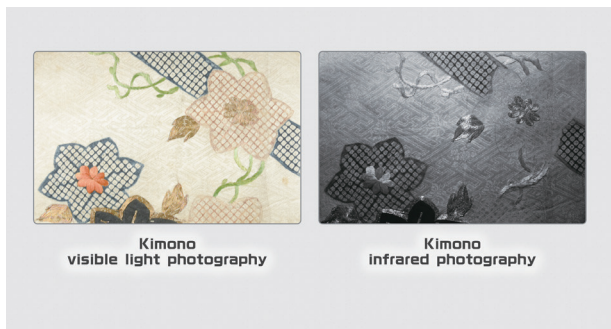
Attach to the lens an infrared transmission filter that blocks light lower than 721 nm. Irradiate infrared light that is higher than 720 nm.



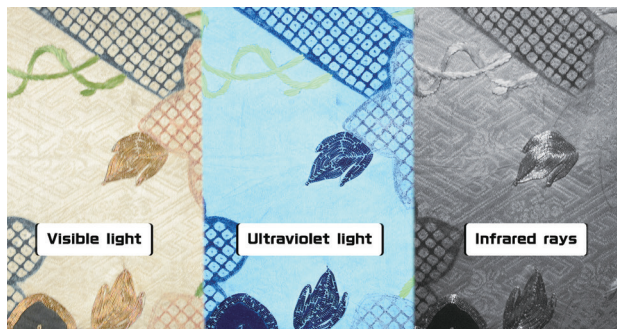
An image that appears red is converted into black and white.



By absorbing the infrared light, pigments appear black in the photograph. Dyes appear white since the infrared light passes through the dyes.



As the infrared light passed through the red and green embroidery threads and the brown colored material, it can be inferred that they are dyes. Since the dark blue appears black in the photograph, it may be an indigo or Indian ink pigment.



In this way, visible light, ultraviolet light, and infrared light are used to produce multispectral images used for the diagnosis of cultural properties.

HIGH DEFINITION DIGITAL STEREO MICROSCOPE

23



In the examination of *Hoshimatsuri* 星, a portable digital microscope was used on site.

This is a high definition digital stereo microscope.

It has a function which magnifies the surface of cultural properties from approximately 10 to 200 times to enable observations and obtain measurements.

OPTICAL MICROSCOPE

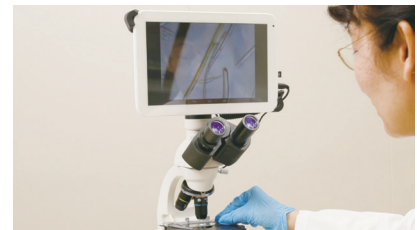
24



An optical microscope is used when you want to observe a material in detail. However, since you will need to collect a sample, be sure to get permission from the owner.



For example, if you want to identify a fiber from the textile, you will need a small yarn sample. Loosen fibers, place them on the slide, and observe the morphology for identification.



An optical microscope observes with transmitted light or reflected light at a magnification of about 100 to 500 times. Share your observations by taking micrographs of fibers.

SCANNING ELECTRON MICROSCOPE

25



If you want to magnify the material further to make observations, use a scanning electron microscope. The scanning electron microscope uses a small sample piece and observes it at a magnification of about 400 times or more.



A scanning microscope irradiates an object placed in a sample chamber with electrons, and the reflected electrons compose an image.

26



We have overviewed the procedures for examining and investigating cultural properties. In order to utilize the obtained information, it is important to take into account the researcher's research experience as well as attaining an interdisciplinary cooperation and various non-destructive analytical methods.

These methods are indispensable for researching cultural properties. Scientific analysis is very accurate with numbers, graphs and images. However, what is important is basic visual observation and knowledge of the materials, techniques, and history of cultural properties. Prioritize non-destructive examination methods when observing and examining cultural properties.



3

The Observation and Measurement of Artifacts



KANSHA Hiroo

Tokyo National Institute for Cultural Properties

The Observation and Measurement of Artifacts



The observation of an archaeological artifact is an essential procedure for measuring an artifact. We will explain the method for measuring an earthenware vass.

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Tokyo National Institute for Cultural Properties

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The process for drawing an artifact is similar to taking a photograph which involves converting a three-dimensional form into a two-dimensional form. The drawing can be published in a report or research paper and provides information to a large audience who are unable to view the actual object. Furthermore, the drawing process supports the As a result, it is important to decide in advance, for example, the drawing method regarding artifacts excavated from the same site development of a keen

eye which is necessary for carrying out surveys and research.

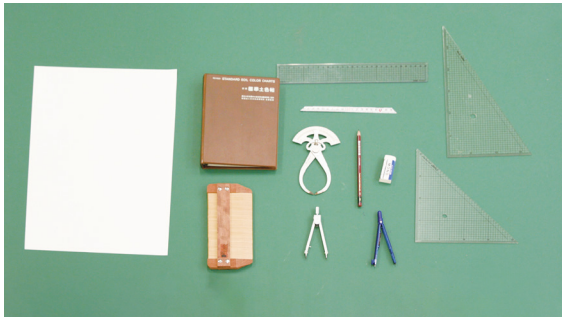
A hand-drawn measurement of an artifact utilizes the human eye and hand, reflecting information which is selected and based on the subjectivity of the person measuring the artifact.

Deciding which information from the artifact to include in the drawing is closely connected to determining the future research of the artifact.

HAND-DRAWN MEASUREMENTS

01

HAND-DRAWN MEASUREMENTS

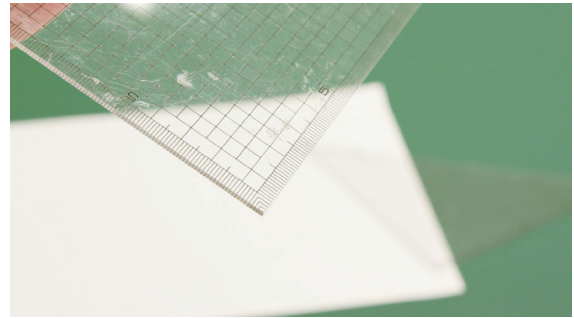


These are the tools used for measuring an artifact.
They include tools which are not commonly found but it useful to have them ready.

Contour gauge
Rulers (straight and triangular rulers)
Compass / Caliper / Divider / Pencil / Eraser
Graph paper / Color charts

02

HAND-DRAWN MEASUREMENTS



Select a straight and triangular ruler with the measurements starting from the edge (without any surplus space).

03

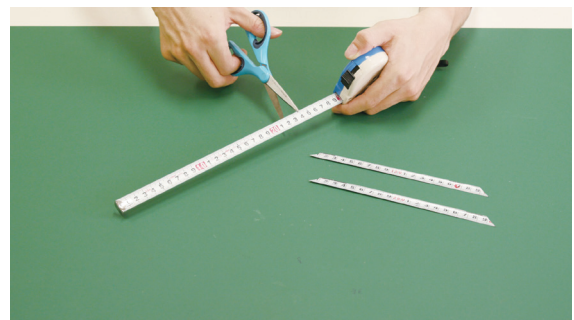
HAND-DRAWN MEASUREMENTS



Use a pencil with a hard lead.
Use a cutter to sharpen the pencil.

04

HAND-DRAWN MEASUREMENTS

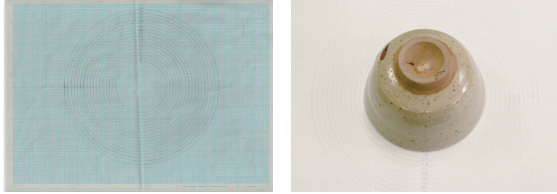


It is also useful to cut a metal tape measure to use as a ruler.

MEASUREMENT OF POTTERY MEASURING THE RIM

05

MEASUREMENT OF POTTERY MEASURING THE RIM

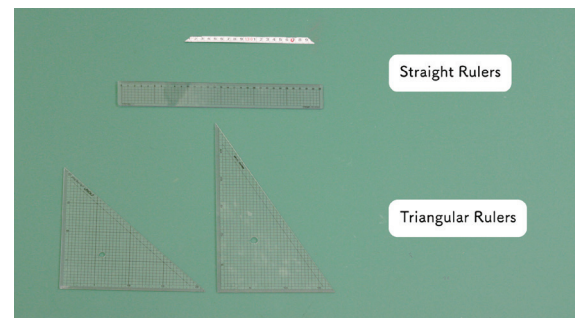


Let us begin with the measuring procedure
First, measure the rim diameter of the vessel.
Prepare beforehand a graph paper with
concentric lines drawn 5mm apart using a
compass.
Match the rim of the earthenware vessel with a
concentric line to measure the rim diameter.

MEASURING THE EXTERNAL FORM

06

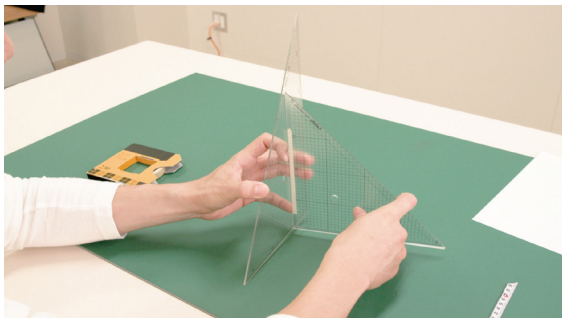
MEASURING THE EXTERNAL FORM



Use a triangular and straight rule to measure the
external form of the vessel.

07

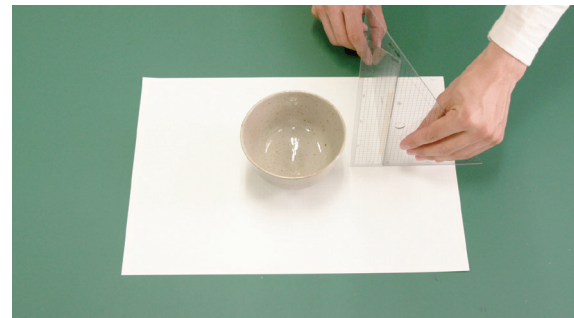
MEASURING THE EXTERNAL FORM



First, combine two triangular rulers and secure
them using tape so that they stand vertically.

08

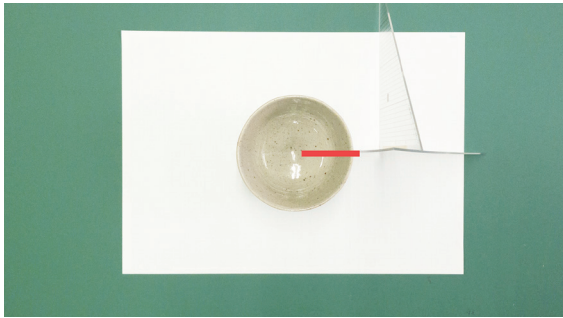
MEASURING THE EXTERNAL FORM



Place it on the right side of the pottery to be
measured.

09

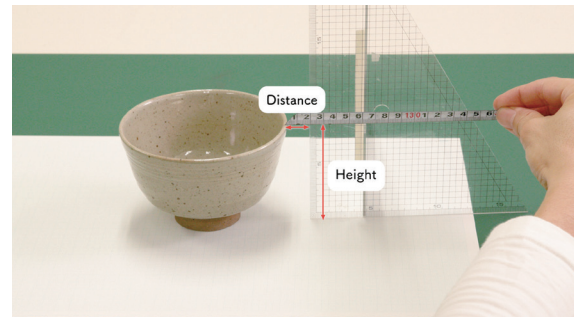
MEASURING THE EXTERNAL FORM



When viewed from above, make sure that the triangular ruler is aligned along the center of the pottery.

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MEASURING THE EXTERNAL FORM

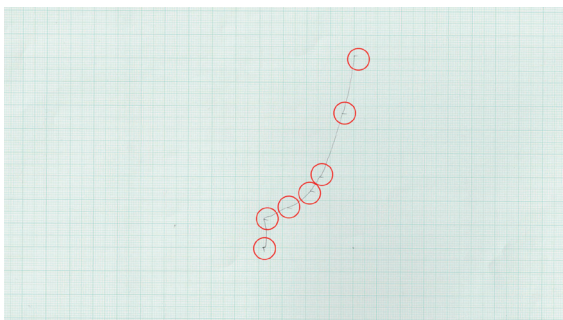


Position the straight ruler horizontally along the triangular ruler and measure how far the distance is to points along the exterior of the vessel.

At the same time, measure the height of the positioned straight ruler using the measurements on the triangular ruler.

11

MEASURING THE EXTERNAL FORM



Plot the distance and height of the measured points onto the graph paper.

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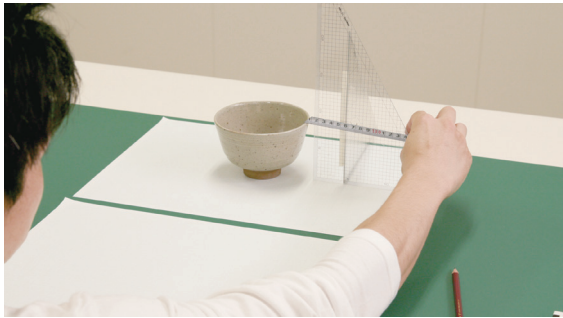
MEASURING THE EXTERNAL FORM



Read the measurements at eye level.
An accurate measurement cannot be obtained by reading from above or below.

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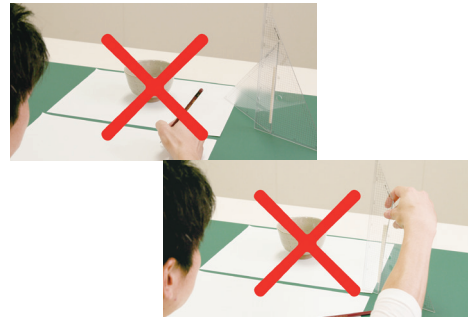
MEASURING THE EXTERNAL FORM



Repeat this procedure to draw an outline of the pottery's exterior.

14

MEASURING THE EXTERNAL FORM



Make sure not to change the position of the triangular ruler and pottery during the measuring process. If the position of the pottery and triangular ruler is moved, the measured drawing will be inaccurate.

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MEASURING THE EXTERNAL FORM

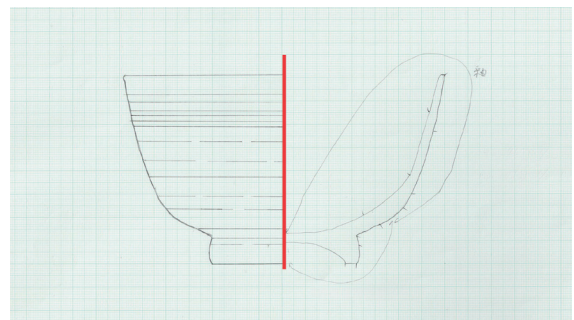


In Japan we have a tool known as *Mako* (contour gauge) with finely cut bamboo teeth. The pottery's outline can be drawn by simply pressing the contour gauge against the vessel.

MEASURING THE THICKNESS OF POTTERY

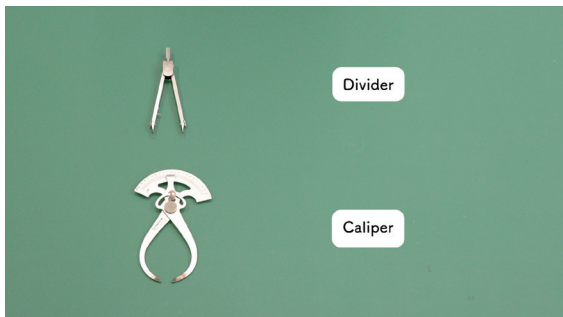
16

MEASURING THE THICKNESS OF POTTERY



After the measurements of the pottery's external form is completed, proceed with measuring the interior and cross-section of the vessel. Separate the measured drawing's left and right side with a central line and record the information regarding the exterior as well as the interior and cross-section of the pottery.

17 — MEASURING THE THICKNESS OF POTTERY



Use a divider and caliper to measure the pottery's thickness.

18 — MEASURING THE THICKNESS OF POTTERY



Determine the point on the pottery's exterior, which forms the basis for measuring the vessel's thickness, and use a divider to measure the length between the rim and the point.

19 — MEASURING THE THICKNESS OF POTTERY



Place the caliper's tip so that it is perpendicular to the point and slide the caliper's jaws between the pottery to measure the vessel's thickness.

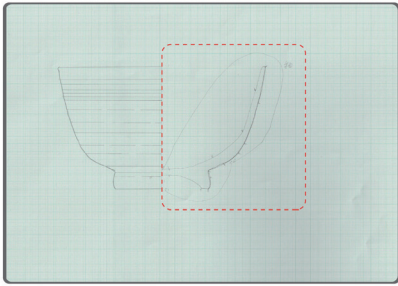
20 — MEASURING THE THICKNESS OF POTTERY



After completing the measurements, place the caliper over the graph paper containing a drawing of the pottery's external form and record the thickness.

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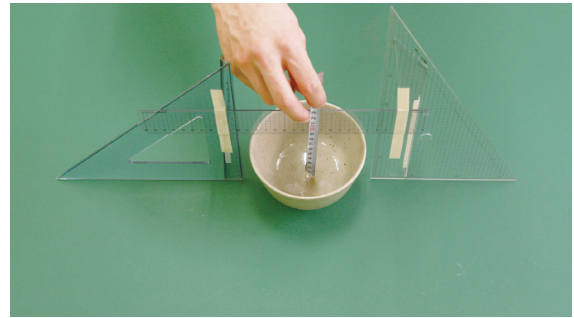
MEASURING THE THICKNESS OF POTTERY



Repeat the same procedure to draw a cross-section of the pottery.

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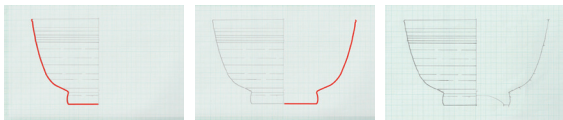
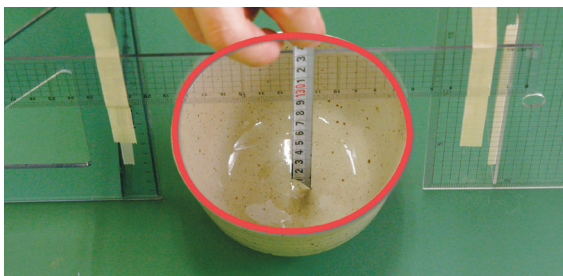
MEASURING THE THICKNESS OF POTTERY



In order to measure parts which cannot be reached using a caliper, use an apparatus consisting of a straight ruler attached horizontally between two sets of triangular rulers. The depth can be measured by lowering a straight ruler vertically from above.

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MEASURING THE THICKNESS OF POTTERY



When viewed from above, if the pottery closely resembles a circular form, invert using a tracing paper to reproduce the left side of the drawing.

OBSERVATION

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OBSERVATION



After completing the measurements, observe the type of techniques used to create the pottery and record your observations. With this pottery, we can observe horizontal lines known as nade (smoothing), which are created when a potter's wheel is used.

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OBSERVATION



Here we can observe traces where the earthenware vessel's interior has been rubbed and smoothed.

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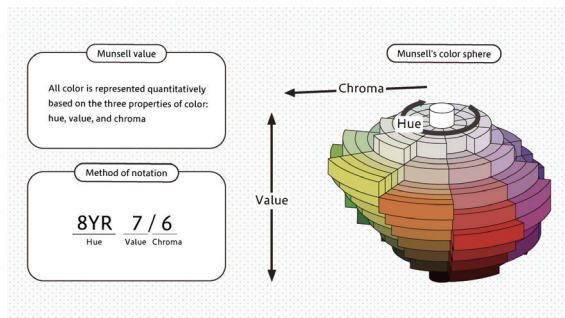
OBSERVATION



Here we can observe traces where the surface has been polished in a vertical direction. Observe the pottery to identify how certain parts of the vessel's interior and exterior use a certain type of technique and record your observations in the drawing.

27

OBSERVATION



Munsell color value

All color is represented quantitatively based on the three properties of color: hue, value, and chroma.

Method of notation

Chromatic color (example) 8YR7/6

Achromatic color (example) N6.5

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OBSERVATION

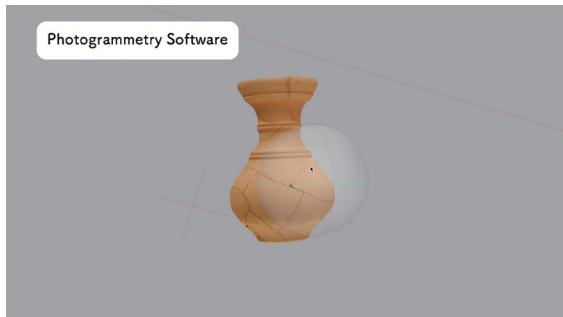


Determine each of the colors for the exterior, interior and cross-section of the pottery and record them in the drawing.

PHOTOGRAMMETRY

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PHOTOGRAMMETRY



In recent years photogrammetry technique has developed and it is now applied for the measurement of archaeological sites and artifacts.

Photogrammetry solves the issue of "information which is selected and based on the subjectivity of the individual making the measurement."

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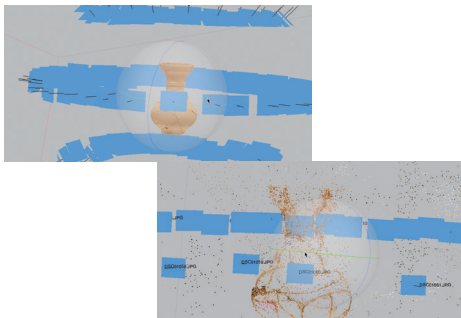
PHOTOGRAMMETRY



However, photogrammetry requires expensive equipment such as a camera, a high-performance PC, and exclusive software etc.

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PHOTOGRAMMETRY



Furthermore, it requires taking between tens to hundreds of photographs to measure a single pottery.

Taking into consideration the photographing and the image processing on the PC, photogrammetry requires more time than taking measurements by hand.

Photogrammetry Software (Metashape)

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PHOTOGRAMMETRY



Furthermore, since 3D data cannot be published in print form, the method for releasing the data raises problems. Consequently, the documentation technique of taking measurements by hand will still be needed in the future.

CONCLUSION

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CONCLUSION



In addition, there is the measurement of surface decorations (such as patterns), but let us begin by learning to accurately measure an outline. When taking measurements of artifacts, there is a tendency to focus on "measuring" the object. Begin by determining what information needs to be recorded and do not forget "to observe."

4

The Characteristics of a Digital Single-Lens Reflex Camera and Lenses



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Faculty of Art and Regional Design



The Characteristics of a Digital Single-Lens Reflex Camera and Lenses

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TSUCHIYA Takayoshi
Saga University Faculty of Art and Regional Design

We will study the optical principles and characteristics of the camera and lens as well as more advanced photographing methods which respond to the photographing situation and intention.

EXPOSURE

01

EXPOSURE

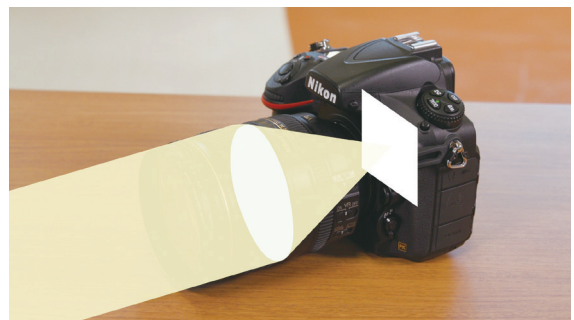


Relationship between the aperture, shutter speed and ISO

Exposure refers to the amount of light which reaches the camera sensor through the lens. When taking a photograph, adjusting the exposure will determine the photograph's brightness and will significantly affect its finish.

02

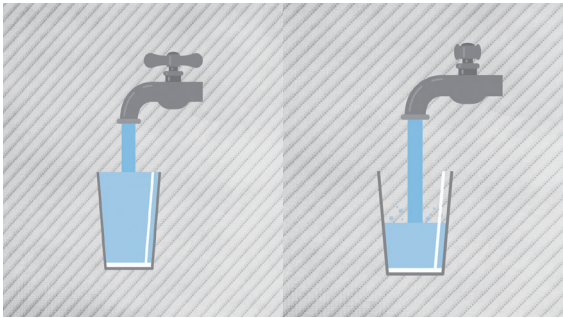
EXPOSURE



The exposure is determined by the relationship between three factors: the aperture, shutter speed (SS), and ISO. The aperture refers to the part which adjusts the size of the lens' opening through which light enters the camera.

03

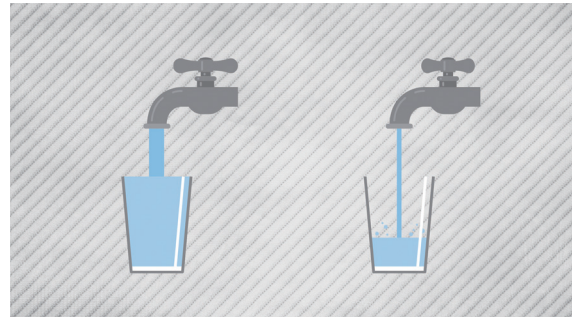
EXPOSURE



The shutter speed (SS) is the length of time (seconds) it takes for the light to enter through the opening.
 ISO refers to the setting which increases the sensitivity to light.
 The relationship between the aperture and the shutter speed can be compared to opening a tap to allow the water to flow and the time it takes for the water to fill up a cup.

04

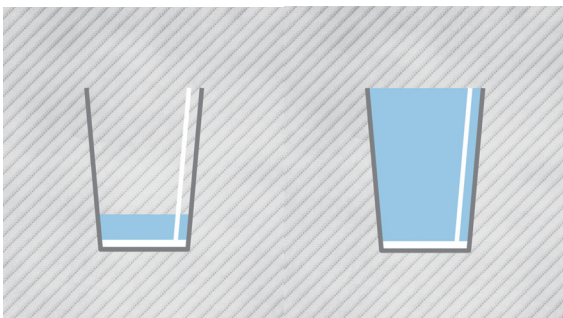
EXPOSURE



If we take water to represent light, opening and closing the tap represents the "aperture" and the time it takes for the water to fill up is the "shutter speed."
 If the tap is fully opened, the amount of flowing water will increase and it will take less time for the water to fill up.
 If the tap is tightened, the amount of flowing water will decrease and it will take more time for the water to fill up.

05

EXPOSURE



The higher the value of the ISO, the camera's sensitivity to low light increases.
 If we use the example mentioned above, the ISO adds to the amount of water in the cup and can increase the speed of the shutter speed.

06

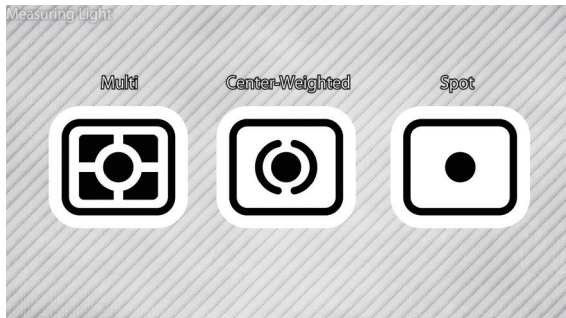
EXPOSURE



However, as the value of the ISO becomes higher, the noise in the photograph also becomes more prominent.
 It is important to understand these relationships and take photographs using the appropriate exposure.

07

EXPOSURE

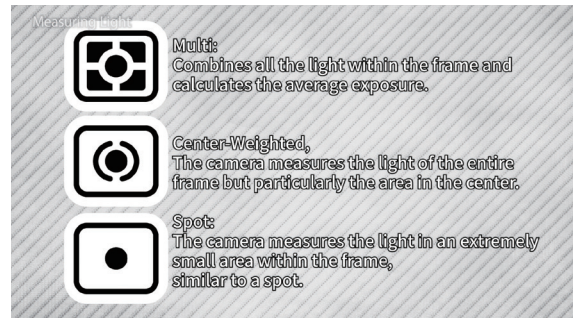


Measuring light

In order to determine the appropriate exposure, the camera measures the subject's brightness. There are several types of methods for measuring light (light measuring modes) and each have their own characteristics.

08

EXPOSURE



Center-Weighted:

The camera measures the light of the entire frame but particularly the area in the center.

Spot:

The camera measures the light in an extremely small area within the frame, similar to a spot.

Multi:

Combines all the light within the frame and calculates the average exposure.

09

EXPOSURE



Most cameras today use the Multi Light Meter Mode as the basic setting.

It is important to understand the mechanism behind how a camera determines the exposure in order to be able to take the photograph you desire.

10

EXPOSURE

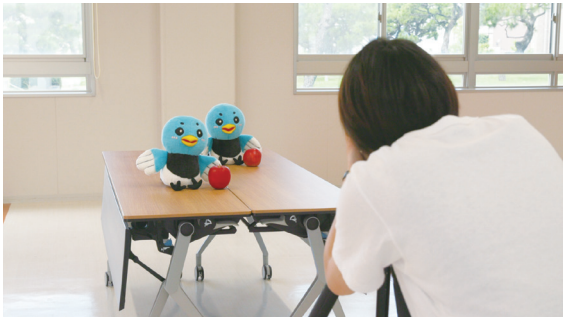


The subject's darkness and the appropriate exposure

Appropriate exposure has two main meanings.

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EXPOSURE



The first meaning is used when referring to recording or reproducing purposes.

In this case, the exposure is adjusted to accurately reproduce the black and white areas, color tones of the subject.

12

EXPOSURE



The approach towards basic exposure compensation.

When taking a photograph for recording or reproducing purposes, it is necessary to accurately reproduce the black and white areas of the subject.

This photograph was taken using the camera's light meter, but it has an overall dark impression.

13

EXPOSURE



In cases where an appropriate exposure cannot be obtained due to the subject's dark color, make adjustments using the camera's exposure compensation function.

14

EXPOSURE



With a white subject, use the exposure compensation by dialing towards the plus numbers and with a black subject, dial towards the minus numbers. Make adjustments to obtain the appropriate exposure. (Minus compensation 0.15.)

15

EXPOSURE



The second meaning is used when referring to expressive and creative purposes. The photographer adjusts the exposure so that the final photograph approximates the atmosphere which the photographer has created in his mind.

In this case, it is not important whether the black and white areas or color tones of the subject have been accurately reproduced.

THE CHARACTERISTICS OF THE LENS

16

THE CHARACTERISTICS OF THE LENS



Learn how to exchange lenses according to the subject and expression as well as how to select the appropriate lens.

Depending on the lens which is selected, the same subject can be photographed to create a completely different impression.

Select the correct lens which best fits your purpose.

When exchanging lenses, carefully avoid damaging or smearing the camera and lens.

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THE CHARACTERISTICS OF THE LENS



Focal length: Standard, Wide-angle, Telephoto lens

Interchangeable lenses are classified according to different focal lengths into standard, wide-angle and telephoto lenses.

Select your lens depending on the situation which you are photographing.

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THE CHARACTERISTICS OF THE LENS



The focal length for each lens will appear on the lens' body.

The focal length for standard lenses is approximately 50 mm and it is regarded as being similar to the human eye.

The focal length for wide-angle lenses is under 35 mm and it is possible to photograph a large area in a single shot.

The focal length for telephoto lenses is above 85 mm and it is possible to magnify a small area into the camera's frame.

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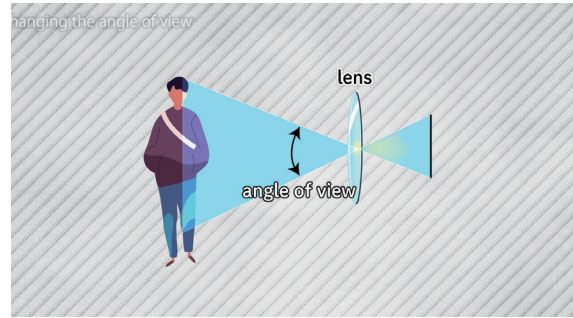
THE CHARACTERISTICS OF THE LENS



A zoom lens enables the photographer to change the focal length continuously without exchanging lenses.

20

THE CHARACTERISTICS OF THE LENS



Changing the angle of view

The angle of view changes in interchangeable lenses according to whether it is a standard, wide-angle, or telephoto lens. The angle of view represents the angular extent of the scene which is captured in the photograph.

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THE CHARACTERISTICS OF THE LENS

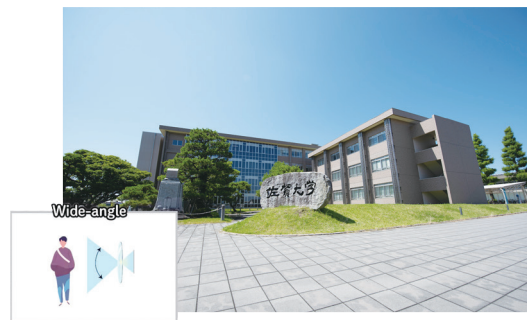


Lens / angle of view	“ Standard ” The angle of view is approximately 47 degrees.
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The angle of view is highly versatile and is best suited for everyday use. It can cover a wide variety of subjects such as landscapes, street photography, and portraiture.

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THE CHARACTERISTICS OF THE LENS



Lens / angle of view	“ Wide-angle ” The angle of view is above 63 degrees.
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It is possible to photograph a scene extensively. It is useful in cases where there is not enough distance between the camera and subject.

23

THE CHARACTERISTICS OF THE LENS



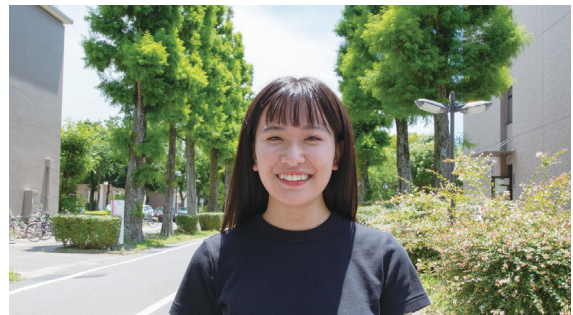
Lens / angle of view

“Telephoto” The angle of view is above 29 degrees or less.

It is possible to frame a scene and magnify it. It is useful in cases where it is impossible to get closer to the subject.

24

THE CHARACTERISTICS OF THE LENS



Changes in perspective: Compression

An introduction of the characteristics found in photographs which use a telephoto lens and a wide-angle lens.

As the lens' focal length decreases and the lens' angle widens, the difference between the background and foreground becomes more pronounced.

This increases the perspective.

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THE CHARACTERISTICS OF THE LENS



Conversely, when the lens' focal length increases with an extending telephoto reach, the difference between the background and foreground diminishes.

The perspective becomes less pronounced so that the space between the foreground and background appears compressed.

This effect is known as compression.

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THE CHARACTERISTICS OF THE LENS

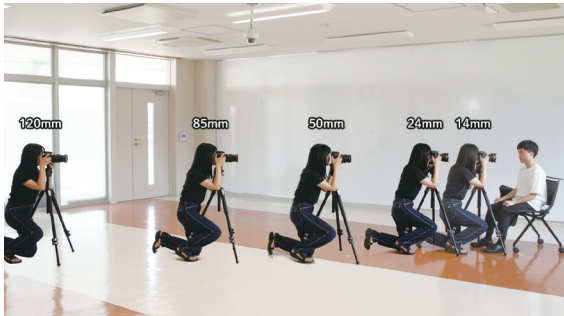


Compare the images of a person photographed from above the chest in the outdoors using a telephoto lens and a wide-angle lens.

If you focus your attention on the background, you will notice the difference.

27

THE CHARACTERISTICS OF THE LENS

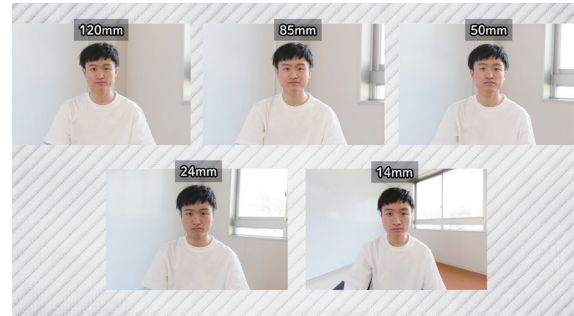


Increase and decrease in distortion

As the lens' angle widens, the foreground will appear larger and the background will appear smaller than the actual scene.

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THE CHARACTERISTICS OF THE LENS



As a result, in cases such as portraiture where the subject occupies a large area of the frame, the subject's shape may appear distorted. The shape's distortion diminishes as the telephoto reach increases.

29

THE CHARACTERISTICS OF THE LENS



Conclusion

There are three main angles of view known as standard, wide-angle, and telephoto, depending on the distance of the focal length. It is important to understand the characteristics of each type before taking a photograph. Exchange the lenses to fit the purpose of your photograph and distinguish between the characteristics of each lens type.

The handling and function of the aperture

30

THE HANDLING AND FUNCTION OF THE APERTURE



The aperture, which adjusts the size of the opening in the lens through which light enters the camera, plays an important role in adjusting the exposure. The amount of light entering the camera is increased by enlarging the size of the aperture which also quickens the shutter speed.

31 - THE HANDLING AND FUNCTION OF THE APERTURE



Conversely, the amount of light entering the camera is restricted by reducing the size of the aperture which slows down the shutter speed. The aperture also has another important function. It controls blurs, in other words, it adjusts the depth of field.

32 - THE HANDLING AND FUNCTION OF THE APERTURE



Depth of field

Rotate the dial to enlarge or reduce the size of the aperture.

33 - THE HANDLING AND FUNCTION OF THE APERTURE



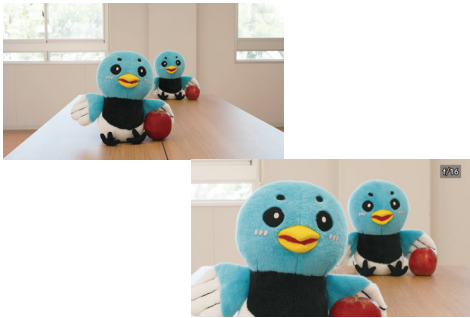
The size of the aperture enlarges as the number of the aperture value becomes lower. Conversely, the size of the aperture is reduced as the number of the aperture value becomes higher.

34 - THE HANDLING AND FUNCTION OF THE APERTURE



By enlarging the size of the aperture, the amount of area between the foreground and background which remains sharply in focus is reduced, thus increasing the amount of blurred areas.

35 - THE HANDLING AND FUNCTION OF THE APERTURE



Conversely, by reducing the size of the aperture, it is possible to take a photograph with extensive areas sharply in focus. Depth of field refers to the range of distances in your photograph that remain sharply in focus.

36 - THE HANDLING AND FUNCTION OF THE APERTURE



As the size of the aperture is reduced (the aperture value becomes higher), the shutter speed will slow down. Be careful to avoid any camera movement.

37 - THE HANDLING AND FUNCTION OF THE APERTURE



Besides the aperture value, the amount of blur in a photograph will vary depending on the lens' focal length and the distance between the subject and background. Please also take into consideration these factors when adjusting the aperture value.

38 - THE HANDLING AND FUNCTION OF THE APERTURE



Bright lens and dark lens

The wide-open aperture value or maximum f-number aperture value refers to the aperture value where the lens' aperture is opened to its maximum size. The lower the lens' f-number aperture value, the more light passes through it. This makes it possible to attain a brighter image. Thus, a lens with a low f-number aperture value is referred to as a bright lens. A bright lens is ideal for taking photographs in a dark environment or when you want to blur the background.

39 - THE HANDLING AND FUNCTION OF THE APERTURE



In order to lower the f-number aperture value, the lens' aperture needs to be large. This means that the lens will become large, heavy, difficult to design, and expensive.

40 - THE HANDLING AND FUNCTION OF THE APERTURE



Conclusion

The aperture has two main functions. The larger the aperture opening, the greater the amount of light that passes through it, and it also becomes possible to quicken the shutter speed. The aperture controls the range of distances which remains sharply in focus and the depth of field.

LIGHT AND COLOR

41 - LIGHT AND COLOR



Digital cameras have the Auto White Balance setting which automatically corrects the color balance. However, have you ever experienced a photographing environment where you cannot reproduce the colors that you desire? In order to obtain control over the colors you desire, it is necessary to understand the relationship between white balance and color temperature.

42 - LIGHT AND COLOR

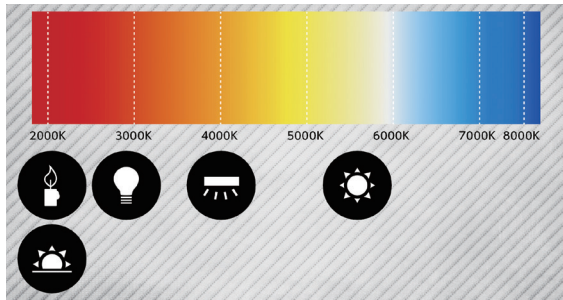


White balance

White balance refers to the color correction setting which enables the camera to reproduce white objects as white in the photograph. Depending on the type of light source, light can appear reddish or bluish. As a result, the color of the light source will have an effect on the color of the subject being photographed. White balance will make the necessary corrections.

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LIGHT AND COLOR



Color temperature

Color temperature refers to the color of light which is measured in units of Kelvin (K).

As the number of the color temperature becomes lower, the more reddish it becomes.

Conversely, as the number becomes higher, the more bluish it becomes.

The light from a candle, sunrise and sunset is approximately 2000K.

White incandescent light bulb 2850K.

White fluorescent lamp 4000K.

Sunlight at noon 5000K-6000K.

Each light source has a different color temperature.

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LIGHT AND COLOR



Setting the camera's color temperature

An accurate color can be attained by selecting the camera's color temperature setting to fit the color temperature of the lighting in the environment.

Adjustments can be made using the white balance settings.

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LIGHT AND COLOR



When making adjustments using the camera's white balance setting, the lower the color temperature number, the more bluish it becomes and the higher the color temperature number, the more reddish it becomes.

The result is the opposite of the actual color temperature. incandescent light bulb 3000K, fluorescent lamp 4200K, sunny sky 5200K, cloudy sky 6000K, sunny sky and shade 8000K

This occurs because corrections are made to reproduce the subject's actual color by adding to it the opposite color to the actual light source's color.

In other words, it involves the addition and subtraction of colors.

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LIGHT AND COLOR



Preset (manual) setting

When photographing in certain environments it will be difficult to attain the desired white balance using the camera's color temperature setting.

In such circumstances, a more accurate white balance can be attained by using the camera's preset setting.

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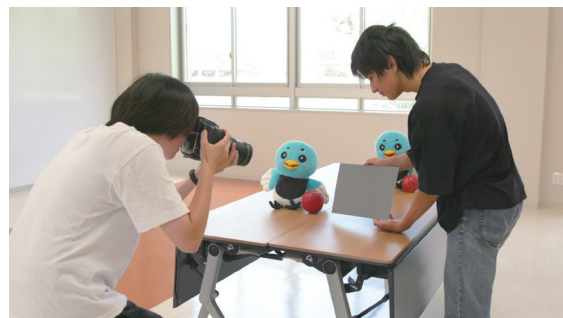
LIGHT AND COLOR



When using the preset setting, please prepare a white or grey card to act as the standard.

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LIGHT AND COLOR



Take a photograph at the actual site using the white or grey card as the standard. The accurate white balance data obtained from the photographed data can subsequently be registered in your camera.

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LIGHT AND COLOR



Lens filter

The lens filter controls the light and color and it is a tool which allows the subject to be effectively photographed.

50

LIGHT AND COLOR



Depending on the subject and photographing environment, it is most effective when used flexibly.

Select a filter that fits the front of the lens.
UV Cut Filter/ND Filter/PL Filter

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LIGHT AND COLOR



UV Cut Filter

The UV Cut Filter blocks ultra-violet light and reproduces the subject "just as it is."
It can remain attached at all times to protect the lens.

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LIGHT AND COLOR



ND Filter

The ND Filter reduces the amount of light entering the lens and it adjusts the shutter speed.

By drastically slowing down the shutter speed, moving objects, in this case people going down the stairs, have been removed from the photograph.

It is also possible to photograph a waterfall and running water to appear like streaks.

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LIGHT AND COLOR



PL Filter

The PL Filter controls the reflection of light. It can control the reflections from glass and water surfaces.

54

LIGHT AND COLOR



Note the differences between the reflections from the stone wall located behind the person.
With a PL Filter/without a PL Filter

55

LIGHT AND COLOR



There are many other types of lens filters and each one has a specific purpose. You can also make your own filters. You can even create your own individual "light and color" effect.

CONCLUSION

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CONCLUSION



A correct answer does not necessarily exist regarding the method for taking a photograph. There are no rules which enforce you to take a photograph in a certain way. At times, accidental factors may also have a significant effect on the final photograph.

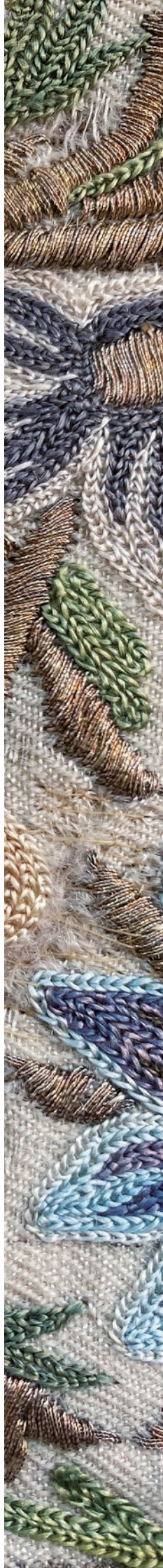
57

CONCLUSION



However, it can also be said that by gaining knowledge of the optical characteristics of the camera and lens, the choices available to you when taking a photograph will also ultimately increase. You will also be able to logically devise a shooting method to achieve your desired photograph. Once you have repeatedly taken photographs, and are able to take the photographs you desire, you will find yourself making many discoveries and increasingly enjoying the process of taking a photograph.





ARMENIA / JAPAN

