REMBRANDT'S ETCHINGS AND JAPANESE ECHIZEN PAPER

The following are the slightly revised introductory texts and captions for the objects shown in the exhibition *Rembrandt's Etchings and Japanese Echizen Paper*, Rembrandt House Museum, Amsterdam, 12 June — 20 September 2015.

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Editing and translation: The Rembrandt House Museum, Amsterdam

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INTRODUCTION

Europeans first encountered paper from China and Japan at the beginning of the seventeenth century. Rembrandt was the artist to frequently use oriental paper for his prints and drawings. In 1647 he began printing the majority of his etchings on Japanese paper and used it for drawing too. Some of his pupils and contemporaries followed his example. Thirty seventeenth-century works on Japanese paper have been brought together for this exhibition of *Rembrandt's Etchings and Japanese Echizen Paper*. As the selection shows, Rembrandt was interested in the special characteristics of the exotic paper. The typical colour and slight sheen of the Japanese paper produces greater depth and glow than matt white western paper.

This exhibition was prompted by a research project initiated in 2014 by the Japanese prefecture of Fukui, in collaboration with the Rijksmuseum in Amsterdam. Its aim is to investigate whether Rembrandt really did use Japanese paper for his etchings and, if so, to endeavour to identify the region in Japan from which the paper came. The Rembrandt House is providing a platform on which to bring the project to the attention of the public at large.

Some of the prints on display are in the Rembrandt House Museum's own collection. The rest have been borrowed from other museums. The print room of the Statens Museum for Kunst in Copenhagen, the Fondation Custodia in Paris, Museum Boijmans Van Beuningen in Rotterdam, the Amsterdam Museum in Amsterdam and Teylers Museum in Haarlem have been extremely generous in lending works.

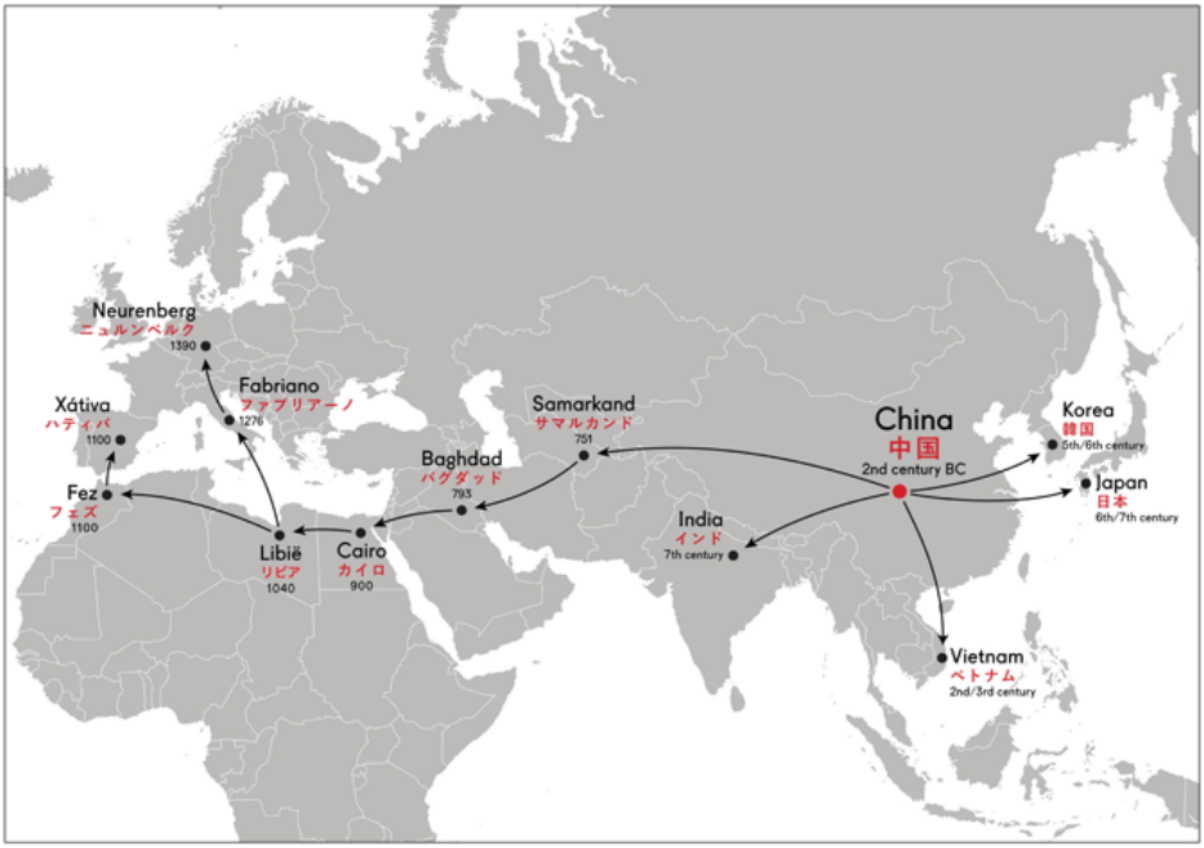
PAPER FROM THE EAST

B1 A Brief History of Paper and the First Developments in Japan

The earliest known remnants of paper were found in China and date from the second century BC. Recent archaeological exploration discovered paper made from hemp fibre and possibly also from the bark of the mulberry tree. In AD 105 the Chinese official Cai Lun presented the emperor with an improved type of paper. The knowledge of how to make paper spread from China to western Asia and north Africa. Paper manufacture began in Europe around the twelfth century. The Japanese imperial court first encountered paper around 400, when the Korean scholar Wani presented the emperor with a number of Chinese books. Paper was being made in Korea itself in the sixth century, and according to tradition the priest Doncho introduced papermaking into Japan in 610. Chinese or Korean papermakers were probably already working in Japan in this period.

The growing Japanese bureaucracy had an insatiable appetite for paper. Initially it was made from hemp fibre, but at the end of the seventh century papermakers started to use *kozo*, the inner bark of the mulberry tree. In the Heian period (794–1185) the inner bark of the *gampi* tree was also used. Paper made from hemp fibre gradually disappeared. Shortly before 1600 paper was made from *mitsumata* fibre.

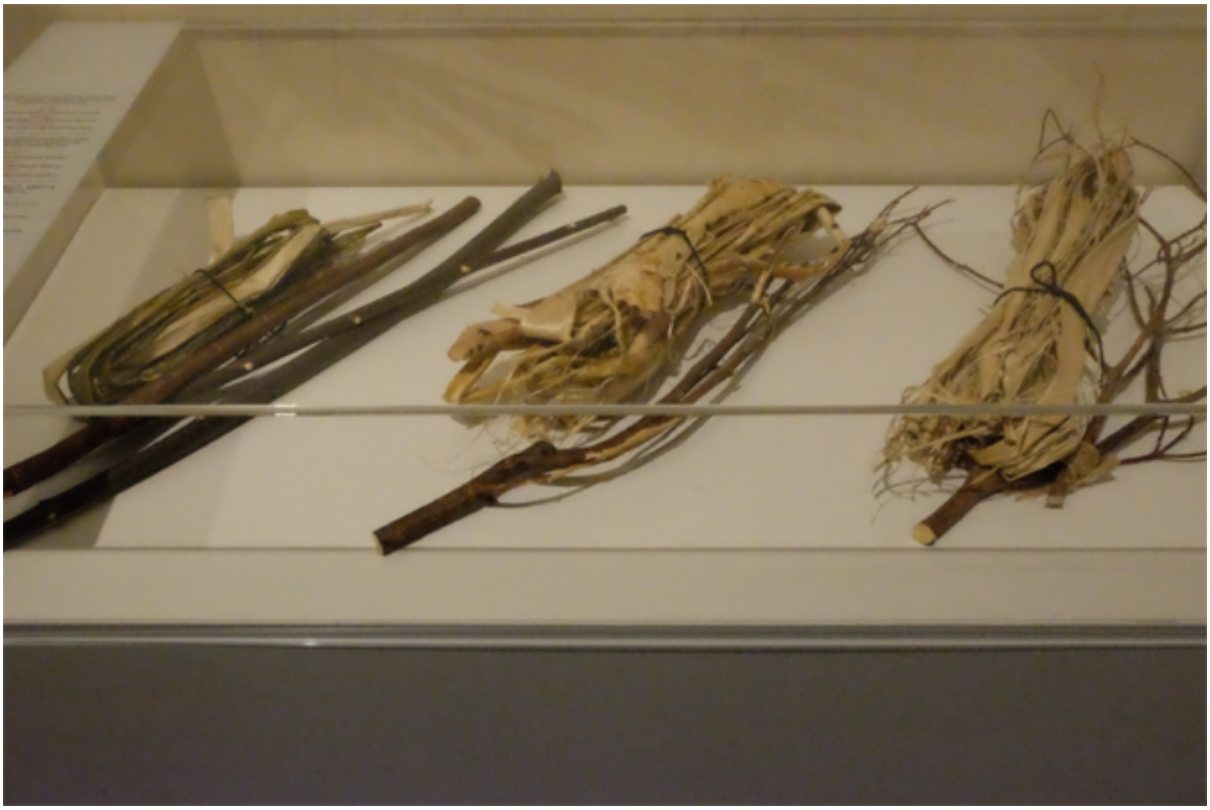
Spread of papermaking



Fragments of the earliest, still primitive paper have been discovered in excavations in China. They date from the second century BC. An improved type of paper appeared three centuries later. The map of Asia, Africa and Europe gives a broad indication of the spread of papermaking from China as far as Europe in the west and Japan in the east.

Raw materials

The earliest reference to paper production in Japan dates from 610, but it is possible that paper was being made there as early as the sixth century. Initially, as in China, it was made from hemp fibre, and by the end of the seventh century also from *kozo* (the inner bark of the mulberry tree). In the Heian period (794–1185) Japanese papermakers started to use the inner bark of the *gampi* tree as well as *kozo*. Hemp fibre paper gradually disappeared, and starting shortly before 1600 paper began to be made also from the bark of the *mitsumata* bush.



© Photo Mayumi Ikeda

Three main raw materials are used for papermaking in Japan, from left to right: (1) *kozo (Broussonetia papyrifera* mixed with *Broussonetia kazinoki)*, (2) *gampi (Diplomorpha sikokiana or Wikstroemia sikokiana)* and (3) *mitsumata (Edgeworthia chrysantha* or *Edgeworthia papyrifera)*.

Handmade paper is still made in Japan in essentially the same way as it was in the past. Branches are cut from the trees or bushes and are stripped of their bark. The dark outer bark is scraped off and the white inner bark prepared to a pulp. The papermaker makes sheets of this pulp, squeezes the water out and lays the wet sheets on wood planks to dry. The characteristic texture of the grain in the wood can sometimes be seen in the paper.

Finished sheet of gampi *paper*

01 Rembrandt
Verso of *St Francis Praying Under a Tree*, 1657
Etching on Japanese paper (laminated *gampi*), NHD 299/II(2)
Amsterdam, Rembrandt House Museum, B. 107

The characteristics of the Japanese *gampi* paper that Rembrandt often used are evident on the back of this etching. It has a yellowish tinge, is smooth and shiny, and is rather thicker than the western paper with which he usually worked.

USING JAPANESE PAPER

B2 Europeans Use Japanese Paper

In 1542 or 1543 a Portuguese ship ran aground on the Japanese island of Tanegashima. The first trading contacts were established, and six years later Jesuits, arriving in the wake of the Portuguese, began converting the Japanese to Christianity. In 1590 the Jesuits brought a printing press and the associated equipment from Europe to assist in the dissemination of religious writings. They used it to print twenty-nine books in Japanese with European technology, but on Japanese paper. A number of copper plates were also engraved and printed in Japan—as individual prints and illustrations for title pages. Only a few copies of these volumes survive. Two of them are displayed here. The Jesuits were compelled to cease their activities in Japan in 1614; they moved to Macao (China), taking their printing press with them.

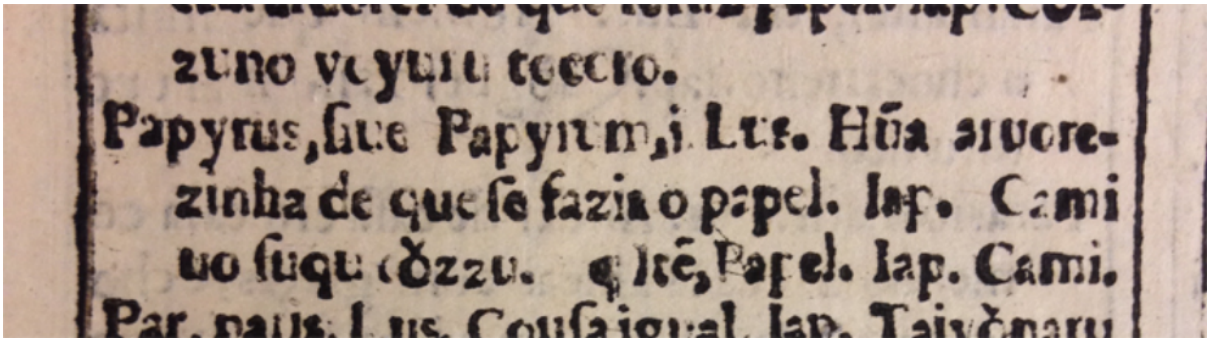
Meanwhile the Dutch East India Company (VOC) was setting up a trading post in Japan. It was established in Hirado in 1609 and moved to Nagasaki in 1641. In the 1620 to 1660 period the company regularly purchased local paper for their own record keeping. They used it for ledgers, letters and documents of all kinds. Japanese paper was also sold on to passing VOC ships and many thousands of sheets were shipped to the trading posts of Taiwan and Batavia.

02 Luis de Granada, *Fides no doxi to xite P.F. Luis de Granada amaretaru xo no riacu*, Amakusa (Japan) 1592
Letterpress on Japanese paper (*kozo*?)
Leiden, Leiden University Library, OOSHSS (kluis), Serrurier 614

In 1582 Jesuits brought four young Japanese men to Europe, the so-called Tensho Embassy. On their return journey they took with them a printing press and the associated equipment. This press was used for printing, always on Japanese paper, from 1591 to 1614. This book, the second by the Jesuits in Japan, is a condensed translation of the fifth volume of De Granada's *Introducción del Símbolo de la Fe*. The print on the title page is one of the earliest known engravings on Japanese paper, made half a century before Rembrandt would start to use it.

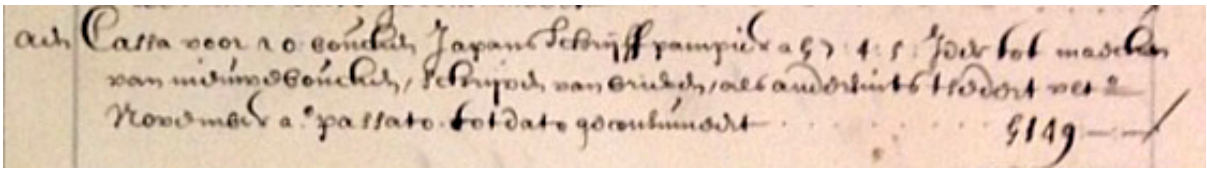
03 Dictionarium Latino Lusitanicum, ac Japonicum, Amakusa (Japan) 1595
Letterpress on Japanese paper (*gampi*?)
Leiden, Leiden University Library, OOSHSS (kluis), 21521 D 1

This dictionary in three languages (Latin, Portuguese, Japanese) was printed typographically in Japan on Japanese paper and bound western style. It contains Latin terms for ink, printing and paper, translated into Japanese. The book is open at *Papyrus*, the Latin word for paper, *Cami* (紙) in Japanese.


zuno vcyuru toccro.
Papyrus, ſiue Papyrum, i. Lus. Hũa aruore-
zinha de que ſe fazia o papel. Iap. Cami
uo ſuqu ōzzu. q. kē, Papel. Iap. Cami.

04 Trade Journal of the Dutch East India Company (VOC) Trading Post in Nagasaki (Japan), November 1642 / November 1643
Handwritten on Japanese paper (laminated *gampi*)
The Hague, National Archives, 1.04.21, NFJ 843

This trade journal of the Dutch East India Company (VOC) trading post in Japan contains a number of entries concerning the purchase and sale of Japanese paper. On 10 November 1643 (see arrow), for instance, there is an entry for the purchase of *20 boucken Japans schrijfpampier* (20 books = 2,000 sheets of Japanese writing paper) for the company's own record-keeping over the previous financial year. The paper used for this journal is a heavy, yellowish, shiny, laminated *gampi*. It looks very much like the *gampi* paper used for Rembrandt's etchings, but is thicker.



B3 Rembrandt on Japanese Paper

Rembrandt printed almost all his etchings on oriental paper from around 1647 to his last print in 1665. There are some plates, such as the portrait of his son Titus displayed here, of which only impressions on oriental paper are known. Rembrandt would have chosen it because he liked to experiment with printing techniques and the yellowish tinge to this paper gives the print a deep, warm glow.

The majority of the oriental papers Rembrandt used for his etchings have a yellowish tinge, and are fairly thick and quite opaque. Unlike laid paper, they show no visible chain and laid lines. The surface is smooth and slightly shiny. Western paper dating from Rembrandt's day is lighter in tone, has a coarser, matt surface and is always laid. Impressions on both western and oriental paper and on vellum are displayed here side by side; the differences are clearly visible.

An important characteristic of this oriental paper is that it is built up of thin layers that are compressed to form one sheet. In the seventeenth century this technique (laminating) was not known outside Japan. The paper was made from *gampi*, so it is known as 'laminated *gampi'*. The yellowish tinge is imparted by the base material and probably strengthened by a yellow clay that was added to the paper pulp, a well-known Japanese method of colouring paper and making it less translucent.

05 Rembrandt
Male Nude, Seated and Standing ('The Baby Walker'), c. 1646
Etching on Japanese paper (laminated *gampi*), NHD 233/I(4)
Paris, Fondation Custodia, Frits Lugt Collection, inv. no. 2468

This sheet is one of the earliest impressions Rembrandt made on Japanese paper. The paper is yellowish, smooth, slightly shiny and relatively thick, without laid texture, which indicates laminated *gampi*. The verso shows the impressed vertical lines of the grain of the plank on which the paper was laid to dry.

06 Rembrandt
Portrait of the Painter Jan Asselijn, c. 1647
Etching on Japanese (?) paper, state II (7)
Amsterdam, Rembrandt House Museum

This is one of Rembrandt's earliest etchings on oriental paper. The paper used for this impression is ivory-coloured and thin, but smooth, shiny and without laid texture, which could indicate a *gampi* paper without pigment.

07 Rembrandt
Christ Preaching ('The Hundred Guilder Print'), c. 1648
Etching and drypoint on Japanese paper (laminated *gampi*), NHD 239/II(4)
Amsterdam, Amsterdam Museum, C.J. Fodor Bequest, inv. A 11112

Rembrandt chose a smooth, yellowish *gampi* paper for this impression of his spectacular staging of the preaching Christ. The yellow tinge gives the hatching a deep, warm glow, and the print as a whole has gained depth.

08 Rembrandt
Self-Portrait, Drawing at a Window, 1648
Etching on Japanese paper (laminated *gampi*), NHD 240/II(9)
Paris, Fondation Custodia, Frits Lugt Collection, inv. no. 4087

Rembrandt observed himself in a mirror as he drew this etching. He then retouched the plate several times, always making small changes, and pulled various impressions on western and oriental paper. The paper is yellowish, smooth and slightly shiny, without laid texture, which indicates laminated *gampi*.

09 Rembrandt
Three Gabled Cottages beside a Road, 1650
Etching on Japanese paper (laminated *gampi*), NHD 248/I(3)
Teylers Museum, Haarlem, KG3780

The Japanese *gampi* paper on which this etching is printed is a yellowish grey shade, fairly thin, smooth with a slight shine, and without laid texture. In raking light it is possible to see diagonal lines created by the brush with which the papermaker smoothed out the wet paper on the drying plank.

10 Rembrandt
View of the Diemerdijk with a Milkman and Farmhouses ('The Milkman'), c. 1650
Etching and drypoint on Japanese paper (laminated *gampi*), NHD 255/III(3)
Rotterdam, Museum Boijmans Van Beuningen, DN.2001/322

The paper is yellowish, has a very slight shine and is thick, which is typical of Japanese *gampi*. The burr of the drypoint hatching is still clearly visible. Collectors of Rembrandt's landscape etchings were particularly fond of this support and technique.

11 Rembrandt
Landscape with a Farmhouse and the "House with the Tower", Seen from the Amstelveenseweg, 1650
Etching on Japanese paper (laminated *gampi*), NHD 256/IV(4)
Teylers Museum, Haarlem, KG3787

The yellowish Japanese paper used for this impression is slightly shiny and when held up to the light looks cloudy, without laid texture. Tiny layers of paper have been peeled away in two places on the back, evidence of the lamination of this sort of *gampi*.

12 Rembrandt
The Bathers, 1651
Etching on Japanese (?) paper, NHD 258/I(3)
Amsterdam, Rembrandt House Museum, inv. nr. 140

For this summery scene of men bathing Rembrandt chose a slightly shiny Japanese paper with an ivory tinge—perhaps because it creates the effect of sunlight better than the usual yellowish paper.

13 Rembrandt
Christ in the Garden of Gethsemane, c. 1652
Etching on western paper, NHD 269/I(3)
Amsterdam, Rembrandt House Museum, inv. nr. 59

Compare this impression on western paper with the impression on Japanese paper beside it. The western paper is cream-coloured and matt, and the texture of the mould's screen is clearly visible when the paper is held up to the light.

14 Rembrandt
Christ in the Garden of Gethsemane, c. 1652
Etching on Japanese paper (laminated *gampi*), NHD 269/I(3)
Copenhagen, Statens Museum for Kunst, Den Kongelige Kobberstiksamling, KKSGB9075

The Japanese paper is fairly thick and smooth. In comparison with the same print on western paper, the yellow tinge of the Japanese paper gives the highly-charged scene more sombre lighting.

15 Rembrandt
A Scholar in his Study ('Dr Faust'), c. 1652
Etching, engraving and drypoint on western paper (oatmeal paper), state I (7), NHD 270/I(7)
Amsterdam, Amsterdam Museum, C.J. Fodor Bequest

Rembrandt experimented with different types of supports also when selecting western papers. This impression is printed on oatmeal paper, a sort of packing paper made of unselected rags. It is rough, quite thick, coarse and full of dark fibres.

16 Rembrandt
The Three Crosses, 1653
Drypoint on vellum, NHD 274/I(5)
Amsterdam, Rembrandt House Museum, B. 78

Rembrandt also used vellum as a support. The vellum used for this impression is slightly darker than white western paper. It is smooth and has a slight sheen, like the *gampi* paper used for other prints. Its similarity to vellum may help explain Rembrandt's interest in *gampi* paper.

17 Rembrandt
St Jerome in an Italian Landscape, c. 1653
Etching and drypoint on Japanese (?), NHD 275/I(2)
Amsterdam, Rembrandt House Museum, B. 104

A comparison of impressions pulled from the same plate on three different supports clearly shows how Rembrandt experimented with the potential of the printing process. This first state is printed on smooth, shiny, ivory-coloured oriental paper.

18 Rembrandt
St Jerome in an Italian Landscape, c. 1653
Etching and drypoint on western paper, NHD 275/II(2)
Amsterdam, Rembrandt House Museum, B. 104

Compare this impression on western paper with the other two impressions. The western paper is white and has a fairly coarse, matt surface.

19 Rembrandt
St Jerome in an Italian Landscape, c. 1653
Etching on western paper (oatmeal paper), NHD 275/II(2)
Paris, Fondation Custodia, Frits Lugt Collection, inv. no. 2051

This oatmeal paper has a dark yellowish brown tinge, is coarse and full of dark fibres. It also has coarse chain lines, which means that the screen of the mould was made of thick wires, so that the water ran out quickly, speeding up the papermaking process.

20 Rembrandt
Christ at Emmaus, the Large Plate, 1654
Etching on oriental paper, NHD 283/I(5)
Copenhagen, Statens Museum for Kunst, Den Kongelige Kobberstiksamling, KKS2206

The oriental paper used for this print is extremely thin, but also homogeneous without any visible chain or laid lines. Further research is required to identify the paper type.

21 Rembrandt
Christ at Emmaus, the Large Plate, 1654
Etching and drypoint on western paper, NHD 283/III(5)
Amsterdam, Rembrandt House Museum, B. 87

While the yellow tinge of the oriental paper gives the scene greater 'warmth', this impression on white, matt western paper looks flatter with sharper contrasts.

22 Rembrandt
The Entombment, c. 1654
Etching and drypoint on Japanese paper (laminated *gampi*), NHD 284/III(4)
Amsterdam, Rembrandt House Museum, B. 86

The yellowish, smooth *gampi* paper causes the reflection of the weak light that shines on Christ's body to glow. The effect draws the viewer more strongly into the scene and evokes a more personal experience.

23 Rembrandt
The Entombment, c. 1654
Etching and drypoint on western paper, NHD 284/IV(4)
Copenhagen, Statens Museum for Kunst, Den Kongelige Kobberstiksamling, KKSGB9062

The impression on white and, in comparison to the Japanese paper, coarse and matt western paper gives the scene a harder edge.

24 Rembrandt
Christ Presented to the People (Ecce homo), 1655
Drypoint on Japanese paper (laminated *gampi*), NHD 290/VII(8)
Paris, Fondation Custodia, Frits Lugt Collection, inv. no. 2086

Should the handprint and fingerprints on this impression be those of Rembrandt himself, they underline just how closely he was involved in the printing process. From the specific choice of the slightly shiny *gampi* to the printing of the plate, he determined the appearance of the print.

25 Rembrandt
Titus, c. 1656
Etching on Japanese paper (laminated *gampi*), NHD 297/I(1)
Paris, Fondation Custodia, Frits Lugt Collection, inv. no. 2076

Rembrandt made this engaging portrait of his son Titus when the boy was about fifteen. It is a simple etching, but it conveys Rembrandt's special bond with his son, his only living child. All the known impressions are on Japanese paper.

26 Rembrandt
Portrait of Abraham Francen, c. 1657
Etching and drypoint on Japanese paper (laminated *gampi*), NHD 301/VI(12)
Copenhagen, Statens Museum for Kunst, Den Kongelige Kobberstiksamling, KKS5961

Rembrandt continued to work on this plate of the art collector Abraham Francen. The considerable hatching in this state almost wholly conceals the Japanese paper from view, but its underlying yellowish tinge gives the composition a deep glow.

27 Rembrandt
Christ and the Woman of Samaria, 1658
Etching on Japanese paper (laminated *gampi*), NHD 302/II(5)
Copenhagen, Statens Museum for Kunst, Den Kongelige Kobberstiksamling, KKS2205

This impression has a light surface tone (plate tone), but the yellowish and slightly shiny *gampi* paper can clearly be seen in the unprinted corners above the arch.

28 Rembrandt
The Phoenix, or The Statue Overthrown, 1658
Etching on Japanese (?) paper, NHD 303/I(1)
Amsterdam, Rembrandt House Museum, inv. nr. 89

Rembrandt possibly used Japanese paper for this extraordinary composition, whose meaning has still not been deciphered. The slight shine and ivory tinge create an effect different from that of matt western paper.

29 Rembrandt
Recumbent Nude Woman, 1658
Etching on Japanese (?) paper, NHD 308/II(6)
Teylers Museum, Haarlem, KG3771

The slightly shiny, ivory paper that can be seen in the bedsheet contrasts with the completely hatched body of the woman. It heightens the light in the foreground and adds depth to the image.

30 Rembrandt
Nude Woman, 1658
Etching and drypoint on Japanese paper (laminated *gampi*), NHD 310/II(2)
Teylers Museum, Haarlem, KG3765

This and the following work show the same nude woman sitting on the edge of a bed. Rembrandt probably made these prints in the same period. They are printed on the same type of thick, yellowish *gampi* paper.

31 Rembrandt
Nude Woman Sitting on the Edge of a Bed, 1658
Etching on Japanese paper (laminated *gampi*), NHD 309/I(2)
Copenhagen, Statens Museum for Kunst, Den Kongelige Kobberstiksamling, KKS2329

The yellowish tinge of the paper used for these two impressions creates an effect of gentle morning light, reinforcing the intimacy of the image.

32 Rembrandt
Jupiter and Antiope, the Large Plate, 1658
Etching on Japanese (?) paper, NHD 311/II(3)
Amsterdam, Rembrandt House Museum, inv. nr. 148

Here Rembrandt plays with light and shade, with reflection and contrasts. The smooth, ivory oriental paper helps to give greater volume to the white bedsheets and to Antiope's fair skin.

B4 Works by Rembrandt's Contemporaries on Japanese Paper

It is estimated that Rembrandt printed several hundred etchings on shiny, yellowish *gampi* paper. He also used it for drawing copies of Indian 'Mughal' miniatures. There are a few impressions of his etchings on oriental papers with a different appearance: with an ivory tone, usually thinner, sometimes translucent. In some prints the pattern of chain and laid lines of the paper mould is clearly visible. This suggests that Rembrandt had a 'book' of *gampi* paper containing a hundred sheets, and loose sheets of other types of oriental paper.

There are some—extremely rare—etchings on the same sort of *gampi*-paper by a few of Rembrandt's contemporaries, among them Abraham Blooteling, Nicolaes Flinck, Philips Koninck and Jan de Visscher. Artists including Anthonie van Borssom, Philips Koninck and Rembrandt's former pupil Pieter de With also used that type of paper for drawings. No fewer than twenty drawings on the same sort of *gampi* paper by Rembrandt's childhood friend Jan Lievens have survived. It is quite possible that the artists received sheets of this Japanese paper from Rembrandt. Drawings by De With and Lievens on *gampi* paper are displayed here.

33 Anonymous, attributed to Pieter de With
Mountain Landscape with Buildings, 1650-1660
Pen and browned[1] ink on Japanese paper (laminated *gampi*), Giltaij 81
Rotterdam, Museum Boijmans Van Beuningen, inv. no. H38 (Koenigs Collection, box 366)

Pieter de With must have studied drawing in Rembrandt's workshop. He concentrated on landscapes. We know of a few drawings by De With on *gampi*. Rembrandt may have given his pupil one or two sheets of Japanese paper.

34 Jan Lievens
The Forester's House near the Hague Woods, later called 'The Cream House', c. 1665
Pen and browned ink on Japanese paper (laminated *gampi*), Schatborn 118
Paris, Fondation Custodia, Frits Lugt Collection, inv. no. 1411

Rembrandt will have supplied his old friend Jan Lievens with sheets of Japanese paper, on which Lievens made a number of landscapes like this. The grain of the plank on which the wet *gampi* paper was dried is visible in raking light.

[1] The original blue-black ink has turned brown, not so much faded, as is common with iron gall ink.

MODERN RESEARCH

B5 Research into Rembrandt's Japanese Paper

Although it was known in the seventeenth century that Rembrandt had printed many of his etchings on oriental paper,[2] centuries passed without any specific investigation of the subject. In 1968 George Biörklund became the first person to carry out analyses of the paper used in Rembrandt's etchings.[3] He found laminated *gampi* paper, never *kozo*. In 1997 Jacobus van Breda's research confirmed that Rembrandt had usually used thicker, laminated *gampi* paper and that in some cases uncooked rice powder had been added as a filler.[4] In two cases he found thin paper made from a mixture of *mitsumata* and bamboo. *Mitsumata* paper was manufactured exclusively in Japan from the late sixteenth century onwards. Van Breda assumed that in Japan bamboo was added to the *mitsumata* pulp solely as a filler.

Both researchers, however, failed to take account of the yellow or yellowish-brown tinge of much of Rembrandt's *gampi* paper. These tones were probably caused by the clay that was added to the pulp as a filler and colouring agent. The research project initiated by the Fukui Prefecture in Japan, being carried out in close collaboration with the Rijksmuseum, aims to build on this knowledge and hopes to arrive at new insights into the types of paper Rembrandt used.

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[2] Cornelis Daniël van Strien, *British travellers in Holland during the Stuart period, Edward Browne and John Locke as tourists in the United Provinces*, Leiden: Brill, 1993 (Brill's studies in intellectual history; 42), p. 255; Roger de Piles, *Abregé de la vie des peintres*, Paris: De Sercy, 1699, p. 434; François le Comte, *Cabinet des singularitez d'architecture, peinture, sculpture et gravure … [etc.]*, Paris: Nicolas le Clerc, 1699–1700, 3 vol., vol. 3 (1700), p. 126.

[3] George Biörklund, *Rembrandt's Etchings True and False. A Summary Catalogue in a Distinctive Chronological Order and Completely Illustrated*, 2nd ed., Stockholm (etc.): Biörklund, 1968, pp. 165–179.

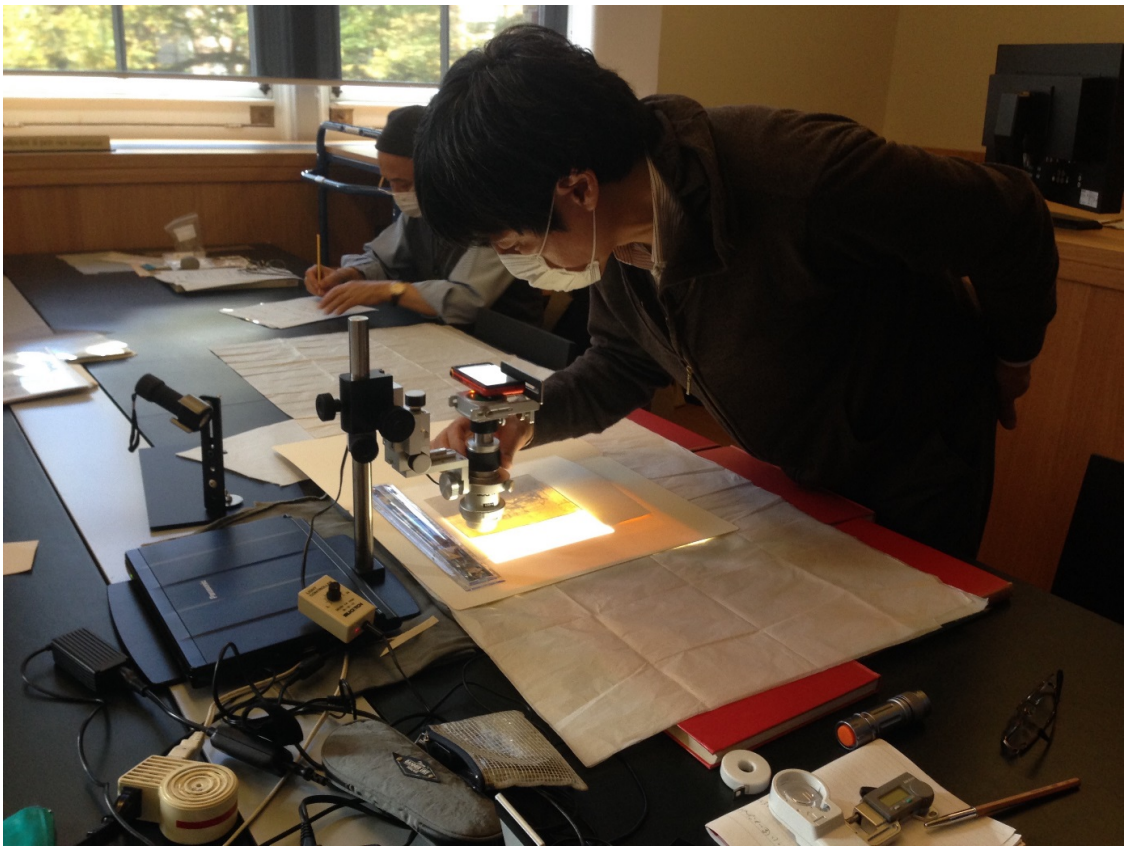
[4] Jacobus van Breda, 'Rembrandt's Etchings on Oriental Papers, Papers in the Collection of the National Gallery of Victoria', in: *Art Bulletin of Victoria* 38 (1997), pp. 25–38. For an overview of historical and modern use of oriental paper by western printmakers see: Ad Stijnman, *Engraving and Etching 1400-2000: Historical Developments of Manual Intaglio Printmaking Processes*, London: Archetype; Houten: Hes & De Graaf, 2012, pp. 262–264.

B6 Rembrandt's Etchings and Echizen Paper: the research project

In the fall of 2014 a team of distinguished scholars from Fukui prefecture visited the Rijksmuseum to study etchings by Rembrandt in the collection. They worked with prints curator Erik Hinterding and chief paper conservator Idelette van Leeuwen to study the physical and chemical properties of the Japanese paper on which a number of the prints were made.

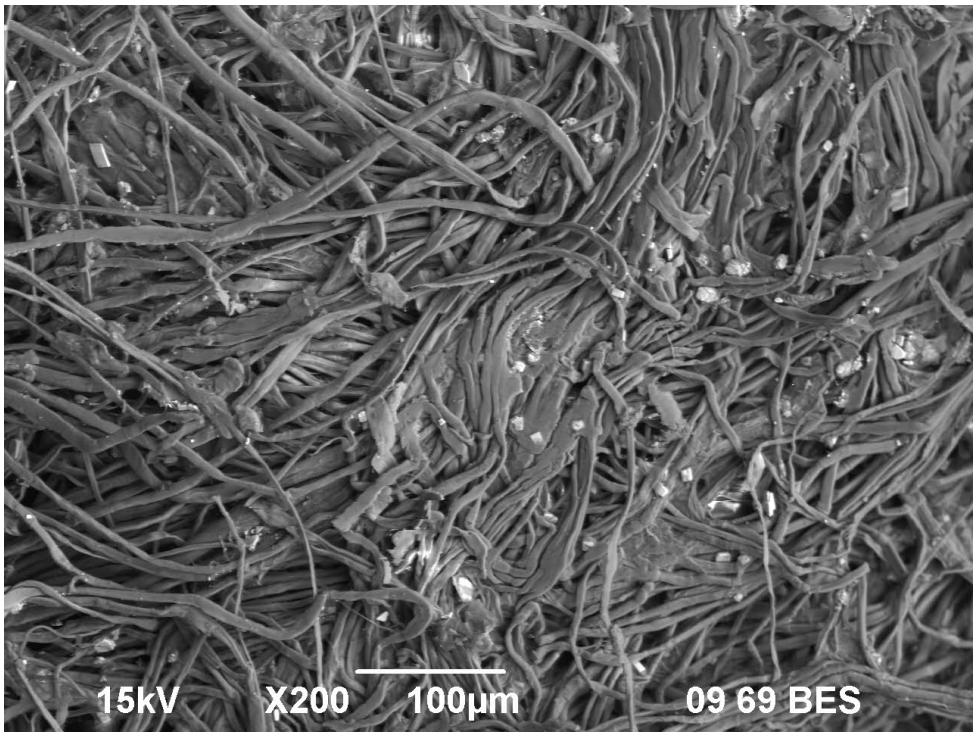
The paper was examined on a light table, with the naked eye and through a microscope, for indications of mould patterns. Because these are obscured through the lamination of various layers, beta x-rays were also taken for more detailed study of the paper structure. In two prints it was possible in thin areas of the paper to measure the chain line spacing. At 30.3 mm, it corresponded to guidelines for production in Echizen.

Very small fibre samples were also taken from the back of several prints. These were analysed and identifyed using x-ray fluorescence, energy dispersive x-ray analysis, and a scanning electron microscope. All samples were clearly Japanese *gampi*. Equally significant was the presence of clay. This material can be linked to specific geographic locations by way of its composition, and researchers hope that further analysis will confirm a systematic link between Rembrandt and the paper of Echizen.

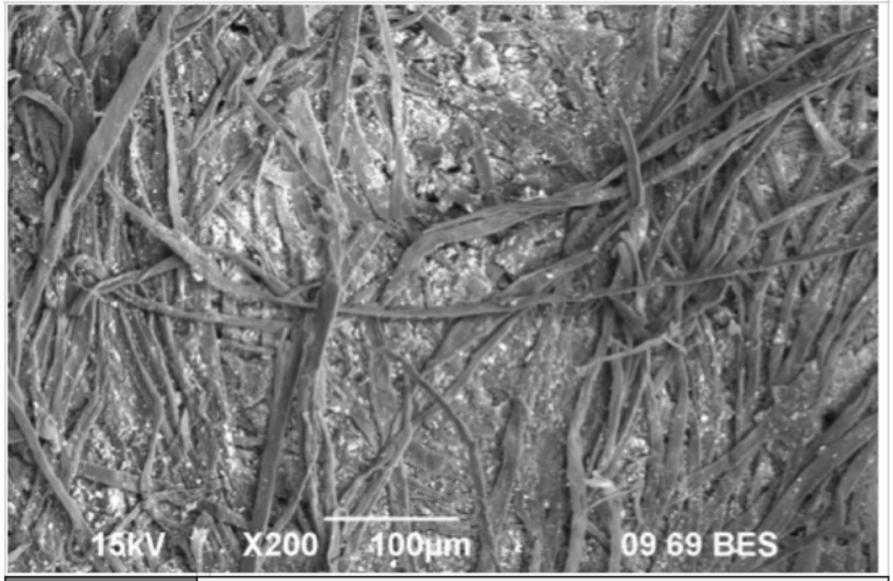


Researchers from the Fukui team examine a Rembrandt etching at the Rijksmuseum on a lightbox, using a digital microscope.

Idelette van Leeuwen, Head of Paper Conservation, Rijksmuseum Amsterdam, extracts a fibre sample from the back of a Rembrandt etching.



Scanning electron microscope image of a modern sample of *gampi* fibres, 200× magnification, showing the characteristic flat profile. Compare the appearance of the fibers with those of the samples taken from two Rembrandt etchings produced in 1647 and 1658 respectively. Note the particles in between and on top of the fibres, see the analysis below.



RP-P-1962-111	Main fiber
	Gampi (violet)
	Accessory substances
	Rice powder ? (violet)
	Detected elements on fiber
	Si (61.8) , Al (20.2) , Ca (7.0) , Fe (3.1) , Mg (2.7) S (1.7) , K (1.3) , Cl (1.1)
	Detected elements on inorganic mixture
	Si (68.4) , Al (20.9) , Fe (5.6) , Ca (2.2) , Mg (1,1) K (1.0)
	Estimated inorganic mixture
	Smectite($(M^{+},M^{2+})_{0.2\sim0.6}(Al,Mg)_2Si_4O_{10}(OH)_2 \cdot nH_2O$) etc.

Rembrandt

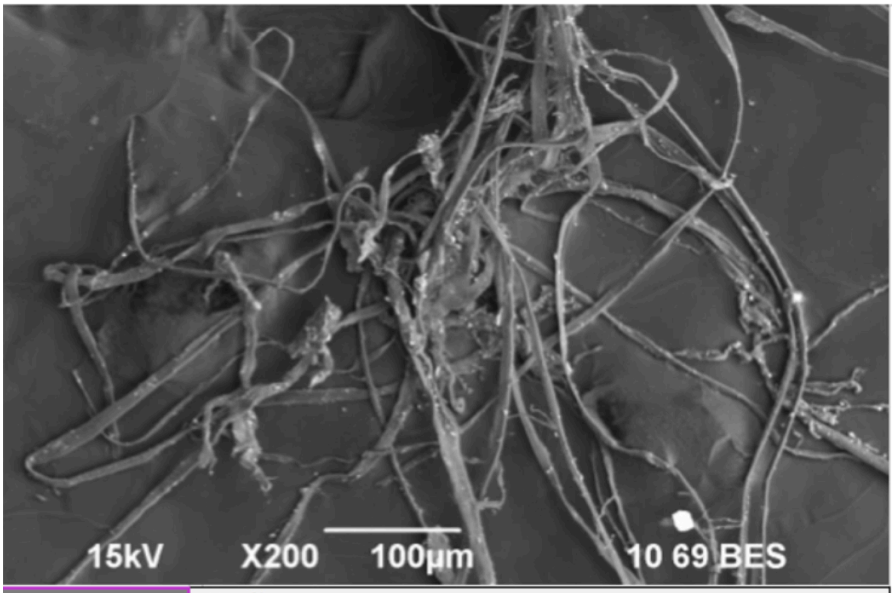
Portrait of Jan Six, 1647

Etching on Japanese paper (*gampi*, charged with clay), state II (5)

New Hollstein Dutch 238-2(5)

Amsterdam, Rijksmuseum, RP-P-1962-111

Scanning electron microscope image of fibres, 200× magnification



RP-P-1962-53	**Main fiber**
	Gampi (violet)
	Accessory substances
	Unknown
	Detected elements on fiber
	Si (66.7) , Al (17.5) , Ca (6.9) , Fe (2.4) , Cl (1.8) S (1.4) , Na (1.3) , K (1.1)
	Detected elements on inorganic mixture
	Si (75.9) , Al (13.2) , K (9.9)
	Estimated inorganic mixture
	Feldspar ($KAlSi_3O_8$) or Other Clay minerals etc.

Rembrandt

The Phoenix, or The Statue Overthrown, 1658

Etching on Japanese paper (*gampi*, charged with clay), state I (1)

New Hollstein Dutch 303-1(1)

Amsterdam, Rijksmuseum, RP-P-1962-53

Scanning electron microscope image of fibres, 200× magnification