

HIGHLIGHTING *Japan*

VOL.
163
DECEMBER
2021



THE DIVERSE WORLD OF ORIGAMI

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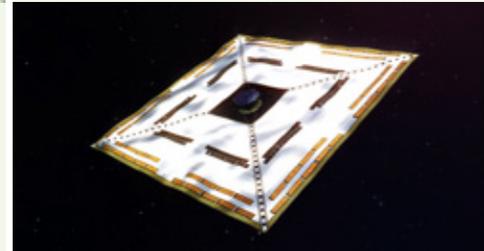
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On the cover: Origami works by Yamaguchi Makoto (top left), Otsuka Yurami (top right) and Fuse Tomoko

THEME FOR **DECEMBER:**

THE DIVERSE WORLD OF ORIGAMI

Origami, the art or craft of folding paper, has been enjoyed in Japan for several centuries and is now a popular pastime in many countries around the world. Origami takes on many forms, both simple and complex, and even finds application in space technologies. In this month's issue, we introduce the diverse world of origami.



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PRODUCTION The Japan Journal

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ON THE COVER

Origami works by Yamaguchi Makoto (top left), Otsuka Yurami (top right) and Fuse Tomoko

Photos: Courtesy of Nihon Vogue Sha; Courtesy of Otsuka Yurami; Courtesy of Shimomura Shinobu

EDITORS' NOTE

Japanese names in this publication are written in Japanese order: family name first, personal name last.

THE TOKYO NUTRITION FOR GROWTH (N4G) SUMMIT 2021 (HIGH LEVEL SESSIONS)



Prime Minister Kishida delivering an opening speech at the Tokyo Nutrition for Growth (N4G) Summit 2021

ON December 7, 2021, the High Level Sessions of the Tokyo Nutrition for Growth (N4G) Summit 2021 was held. This Summit was hosted by the Government of Japan and held in a hybrid format that combines on-site participation of domestic participants and on-line participants from overseas. At the Opening Session, Mr. Kishida Fumio, Prime Minister of Japan, delivered an opening speech and Mr. Hayashi Yoshimasa, Minister for Foreign Affairs, made a welcome speech.

The overviews of the sessions are as follows.

The Tokyo N4G Summit 2021 was organized to direct ways for the international community to improve nutrition as well as to encourage a wide range of stakeholders to take concrete actions through their announcements of policy and financial commitments, and to lead global measures for nutritional improvement. More than 50 participants in total attended the High Level Sessions on the first day of the Summit, which included leaders and ministerial levels from about 30 countries, such as President of the Democratic Republic of the Congo, H.E. Mr. Félix Antoine Tshisekedi Tshilombo; Prime Minister of the People's Republic of Bangladesh, H.E. Sheikh Hasina; Prime Minister of the Democratic Republic of

Timor-Leste, H.E. Mr. Taur Matan Ruak, heads of international organizations such as Secretary-General of the United Nations, Mr. António Guterres; President of the World Bank Group, Mr. David R. Malpass; Director-General of the World Health Organization, Dr. Tedros Adhanom Ghebreyesus; representatives from civil society organizations, the private sectors and academia including the Bill & Melinda Gates Foundation. Many participants pointed out that “it is the critical time for the world to tackle nutritional problems that have been worsened by the COVID-19 pandemic,” and expressed appreciation by stating “it was timely that the Government of Japan hosted the Tokyo Nutrition for Growth Summit.”

Prime Minister Kishida stated that the “double burden of malnutrition,” where we see the co-existence of undernutrition that hinders growth, and overnutrition that causes lifestyle related diseases, has become a common global challenge. Furthermore, Prime Minister Kishida stated that the COVID-19 pandemic has worsened especially nutritional status of children, and he announced that Japan will provide nutrition-related assistance to the world, which will amount to over 300 billion Japanese yen, equivalent to more than around 2.8 billion U.S. dollars, for the next three years. Prime Minister Kishida also stated that, in the fight against COVID-19, Japan will donate approximately 10 million doses of vaccines to Africa given its urgent need, upon coordination with international organizations and relevant partners.

Minister Hayashi explained that this Tokyo Nutrition for Growth Summit focuses on five priority areas: (1) nutrition and Universal Health Coverage, (2) safe, sustainable, and healthy food systems, (3) measures against malnutrition in vulnerable situations, (4) data-



Prime Minister Kishida (left) and Foreign Minister Hayashi (right) listen to the speech by H.E. Mr. Félix Antoine Tshisekedi Tshilombo, President of the Democratic Republic of the Congo

driven accountability, and (5) financing for nutrition. In addition, he pointed out the necessity for governments, regardless of income level, private sectors, civil society organizations, and academia to unite to tackle this important issue. At the Closing Session, Minister Hayashi expressed gratitude for commitments from participants and said that each and all need to steadily fulfill its commitments in order to improve malnutrition and to solve the problems that the world is facing.

At the Summit, a wide variety of stakeholders, such as governments, international organizations, private sectors, civil society organizations, and academia, announced their policy and financial commitments. Over 390 commitments from approximately 180 stakeholders including 66 countries and 26 private sectors have been submitted and the financial contribution of over 27 billion U.S. dollars has been announced. In addition, the Tokyo Compact on Global Nutrition for Growth was issued as an outcome which indicates a direction for the international society to improve nutrition. The Tokyo Compact was endorsed by 214 stakeholders including 64 governments, 11 international organizations, 60 private sectors, and 58 civil societies.

Ryu-zin 3.5 is known as one of Kamiya Satoshi's most intricate works. Height 20 cm



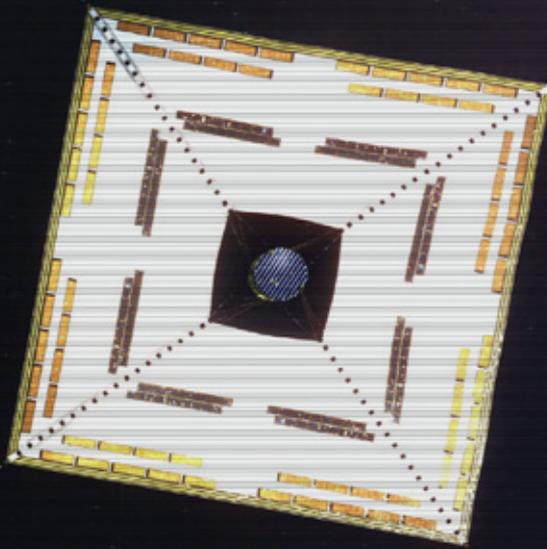
THE DIVERSE WORLD OF ORIGAMI

Photo: Courtesy of Kamiya Satoshi

O

rigami, the art or craft of folding paper, has been enjoyed in Japan for several centuries and is now a popular pastime in many countries around the world. Origami takes on many forms, both simple and complex, and even finds application in space technologies. In this month's issue, we introduce the diverse world of origami.

Illustration of the small solar power sail demonstration satellite IKAROS
Photo: Courtesy of JAXA



Cover of an OrigamiUSA magazine
Photo provided courtesy of OrigamiUSA



Traditional Japanese motifs such as cranes, turtles, and samurai helmets feature in the Classic Origami series
Photo: Courtesy of COCHAE, by Obama Harumi



Arisawa Yuga making washi paper at the handmade washi studio Corsoyard
Photo: Courtesy of Arisawa Yuga

The World of Origami



Yamaguchi Makoto
Photo: Courtesy of Origami House

FOLDING paper to create a variety of shapes, or *origami*, is one Japanese cultural tradition. We spoke with Yamaguchi Makoto, an origami artist, Board of Directors President for the Japan Origami Academic Society, and representative of Origami House, a Tokyo gallery that specializes in origami, about the history and characteristics of Japanese origami.

Please tell us about the origins of Japanese origami.

In fact, it is not clear precisely when origami began in Japan. But when the samurai ruled during the Muromachi period (from the 1430s until the second half of the 16th century), *origata*, a method of folding paper to wrap gifts and letters, had developed as a form of etiquette for the

samurai and that tradition was passed down through the Edo period (1603-late 1860s). This *origata* is considered one of the origins of modern Japanese origami.

By the Edo period, paper mass production began and origami spread to the general public as a form of entertainment. We see modern Japan's most common paper creation, *orizuru* (paper crane), appearing in books introducing ukiyo-e prints and kimono fabric patterns from the early eighteenth century. *Hidden Senbazuru Orikata* ("Secret to Folding One-thousand Cranes") was published in 1797 and it is believed to be the world's oldest book on recreational origami. This book introduces *renzuru* folding methods, using which many interlocked cranes can be folded from a single sheet of paper.

There was also paper folding in Europe, though its origins are unclear. One traditional paper-folding technique is Spain's *pajarita* (meaning "small bird" in Spanish). As the name suggests, a popular *pajarita* creation imitates a small bird and most Spanish people know it, just as people in



NIHON VOGUE SHA
Yamaguchi Makoto's work *Renjishi*
Photo: Courtesy of Nihon Vogue Sha



Christmas Tree, one of Yamaguchi Makoto's best-known works
Photo: Courtesy of Nihon Vogue Sha

Japan know the orizuru paper crane.

Friedrich Fröbel (1782-1852), the German educator renowned for creating the world's first kindergarten, incorporated traditional European paper folding into his early childhood learning curriculum. Paper folding for such educational purposes was brought to Japan during the Meiji period (1868-1912) when Japan created an education system modeled on Western systems. So, in Japan, traditional European and Japanese origami was taught in kindergartens and elementary schools, and eventually became extremely popular at home.

When did Japanese origami find its way overseas?

It was after World War II that Japanese origami gained recognition as a form of art and spread around the world. That was largely the result of work by the origami artist Yoshizawa Akira (1911-2005). One after another, Yoshizawa created highly artistic origami that were full of life in the shapes of animals and other things. He held exhibitions and seminars in various countries and worked relentlessly to popularize origami around the world. That's why he is highly respected among origami artists both in Japan and abroad even today. It was the American origami artist Lillian Oppenheimer (1898-1992), someone who kept in touch with origami artists around the world including Yoshizawa, who suggested using the Japanese word "origami" to describe paper folding during her efforts to



Yamaguchi Makoto's work *Hina Dolls*, based on traditional Japanese ornamental dolls
Photo: Courtesy of Nihon Vogue Sha

popularize origami in the United States. We could say that it was thanks to her that the term origami came to be used all around the world.

I began my career as an origami artist in the late 1970s, when origami was not a common hobby in other countries. Recently, however, origami associations have been set up in different countries and origami festivals are held, so most people overseas have learned about origami. Before the spread of coronavirus, I traveled abroad almost every year for lectures and conventions on origami. At one time, when I told airport immigration officers that I was traveling to teach origami, they would often ask me what origami was. But recently that rarely ever happens.

In addition to your career as an origami artist, you have written approximately 150 books on origami. What particular kind of origami do you try and make?

I like making simple and cute pieces that anyone can make. Some of them are unique creations where you cut part of the paper, but I mostly use one sheet of square paper with no cuts. Sometimes I'll make single works from multiple pieces of paper so that they are easy to fold and have beautiful designs. For example, I made origami in the motif of *Renjishi* (Two Lions), a famous play in the Japanese traditional art of kabuki by request from an origami paper manufacturer. To make *Renjishi*, I used one sheet for the top half of the body and one sheet for the bottom, then joined

them together to make one kabuki actor. Also, the Christmas tree I made right at the start of my origami career uses one sheet of paper for the trunk and 5 or 6 papers of different sizes for the leaves.

I'm so fortunate that many people in Japan and abroad make these works, so they are my best-known works. I would like to create works that many people will love and pass down over the years.

What are the current trends in the origami world?

Origami is not unique to Japan, but I think it was Japan that developed the culture and techniques of origami. However, the number of origami enthusiasts around the world has grown as the Internet spreads information on origami beyond national boundaries, and I think it's fair to say that



OrigamiUSA convention participants with dolls designed by Yamaguchi Makoto (back row, far right)
Courtesy of Origami House

the origami world is becoming more and more international. Within that trend, we're seeing extremely talented young origami artists appear both in Japan and abroad.

Particularly in recent years, a style of extremely complex origami called "super complex" origami has become popular. Kamiya Satoshi, for example, has created numerous super complex pieces like *Ryu-zin 3.5* and he has a kind of "star" status among fans of super complex origami. Also, Miyamoto Chuya's piece *Grim Reaper* requires around 460 folds to complete and could probably be called one of the pieces of art made from a single piece of square paper with the largest number of folds in the world.

What about origami appeals to you?

The American origami artist Michael Shall (1949-1995) said, "Origami is for anyone, anywhere, any time." Those words perfectly convey the appeal of origami in that all you need



Attendees of a seminar by Yamaguchi Makoto at the OrigamiUSA convention in New York. Yamaguchi is in the center row, third from the left
Courtesy of Origami House

to enjoy origami is a single sheet of paper.

Origami also lets people connect with one another. For example, even if you can't speak someone's language, if you make a piece of origami and give it to them, anyone will be delighted. To me, I get the most joy from being able to connect with others in this way through origami. These days, you can learn origami easily through the Internet. If you learn a favorite origami folding technique, that will be very useful for making connections with every kind of person. 📖

Interview by SAWAJI OSAMU

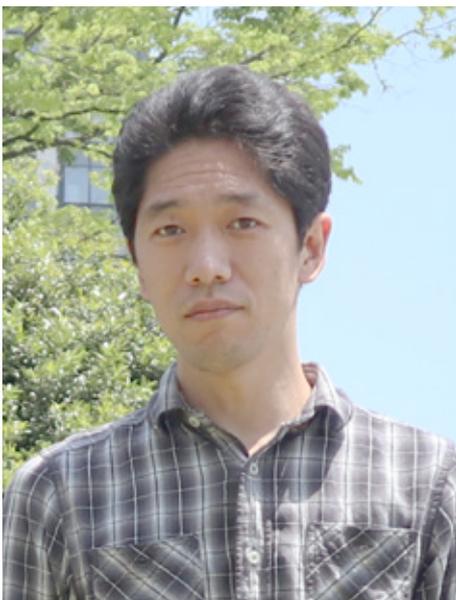
Miyamoto Chuya's work
Grim Reaper
Courtesy of Origami House



“Super Complex” Origami



Ryu-zin 3.5 is known as one of Kamiya Satoshi's most intricate works. Height 20 cm



Kamiya Satoshi

The origami works of Kamiya Satoshi are referred to as “super complex” and they have won him many fans in Japan and abroad. Kamiya, who started origami in his childhood, continues to share his super complex origami creations with the world.

SASAKI TAKASHI

ORIGAMI comes in many forms, ranging from simple shapes to abstract creations. Some origami artists create what are termed “super complex” works, and Kamiya Satoshi is a leading expert in this field. “Super complex” origami refers to intricate and sophisticated works of art fashioned from a single sheet of paper. Kamiya’s works make a

strong impression on the viewer because they are so detailed that at first glance it is hard to believe they are made from a single sheet of paper. The unusually high level of detail owes to Kamiya’s desire to create the shapes he *wants* using origami, rather than create the shapes he *can* using origami. For Kamiya, the intricacy of the creation is not the goal but the result. Even when told that something is



Wasp 2.6 is one of Kamiya's important works. Height 5 cm; width 13 cm



Godzilla 2016 another. Height 23 cm. The work makes extensive use of irregular finishing touches that cannot be represented in pictorial folding instructions.



Kamiya's collected works with the author's comments in English and Japanese

too complicated to create with origami, he continues to refine his technique, producing exquisitely detailed work.

Born in Nagoya City, Aichi Prefecture in 1981, Kamiya began origami at the age of three. His parents would often buy him origami paper and borrow children's origami books from the local library. By the time he was ten years old, he had moved on to origami books for adults and was making quite intricate origami pieces.

Looking back on his childhood, Kamiya recalls, "Even I'm not sure when I started making super complex origami. But inspired by the works I saw in books, I began to create my own works in non-traditional origami forms. I enjoyed it and kept at it until at some point my works began to appear in books and magazines.

Kamiya shot to fame after appearing on a popular TV program called "TV Champion." He entered the program's Origami King Championship for the first time in 1999 at the age of 17, won the title and then retained it repeatedly, becoming a household name in Japan. From 2000, Kamiya studied in the United States for two years, where he gained valuable experience interacting with local origami artists and enthusiasts at the same time as learning English. It was in the United States, where good quality paper is hard to come by, that Kamiya once again realized the importance of paper quality for origami, learning from artists who were making their own origami paper by hand.

Some of Kamiya's origami creations have been compiled into three volumes of his collected works, illustrated with beautiful photographs and accompanied by precise pictorial folding instructions, together with the author's comments in both Japanese and English. These

volumes are regarded by aficionados as the bible of super complex origami. In particular, *Ryu-zin 3.5* (created in 2005), considered to be one of Kamiya's most intricate creations, is a major work that took around one month to complete, using only a single sheet of paper measuring two meters on each side. *Ryu-zin 3.5* is widely regarded as the one of most intricate origami pieces ever created. Overseas meanwhile, Kamiya's creations are highly regarded as art, with one of his important works, *Wasp*, having once been displayed in a store window of the French luxury brand Hermès.

"The most interesting thing about origami is that the more modifications you make to a work, the more its shape changes. That's why I enjoy the process of working with my hands, that feeling of anticipation that somehow what I'm folding will eventually turn out the way I want, more than the moment the piece I had in mind is actually completed," says Kamiya.

It could be that no one enjoys origami as much as Kamiya.

Kamiya says there are undoubtedly still many origami shapes and modes of expression that no one has ever thought of. His mission is to constantly devise new ways of folding, expanding the possibilities of origami. **7**

The Leading Expert in Unit Origami



“Unit origami” is a style of origami in which individual “units” are folded from single sheets of paper, then assembled to create one finished form. In this article, we introduce the creative work of Fuse Tomoko, an origami artist who has popularized unit origami around the world.

YANAGISAWA MIHO



Fuse Tomoko
Photo: Courtesy of Fuse Tomoko

TRADITIONALLY, origami is based on folding of a single sheet of paper to create a variety of forms. Unit origami, on the other hand, assembles a number of similar origami forms called units, each made from a single sheet of paper, to create one finished form. Fuse Tomoko is at the forefront of the unit origami world. Although Fuse was not the first to discover unit origami, she has produced many original works and authored over one hundred books, popularizing unit origami around the world. Some of her books have been translated into other languages such as English, German, Italian, Korean and Chinese.

One of Fuse’s most celebrated unit origami works is based on the motif of the *kusudama*, a traditional Japanese

decorative ball. The kusudama is created by making a set of units from a square or rectangular sheet of paper, which are then assembled into a single form without using glue. Most works are made from 12 or 30 units. In her published guide to making kusudama, Fuse explains that a piece made from 30 units takes at least five hours to create, requiring a great deal of persistence. So spectacular is the finished work, however, that it is hard to believe it is made from paper alone. Kusudama vary greatly in their appearance depending on a range of factors, including the size and color of the paper, the shape of the units, and the number of units assembled, so the scope of ideas is endless.

“When I first got into unit origami, I was able to put myself forward as an



A unit origami *kusudama* ball by Fuse
Photo: Courtesy of Shimomura Shinobu



An origami box by Fuse
©Tomoko Fuse2014 published by NIHON VOGUE Corp.



Galaxy of Stars by Fuse
Photo: Courtesy of Toyama Atsuko

artist because there was no one else trying to take it seriously and delve deeper into that world. That was really lucky. Back then, however, many people thought that origami was about creating a piece of work from a single sheet of paper. Unit origami uses many parts, so some people said it wasn't origami," says Fuse.

She goes on, "Japan is said to be the home of origami, and with paper for origami readily available at stationery stores and convenience stores, people have many opportunities to become familiar with origami from a young age. That's why people have a fixed idea of what origami is, and can't easily forget it. On the other hand, people overseas who are less familiar with origami have no preconceptions and judge works on their own merits, saying 'this is art.'"

Fuse's driving force is the limitless fun of origami. Even now, more than sixty years after her fascination with origami took hold, she says that its appeal has not waned.

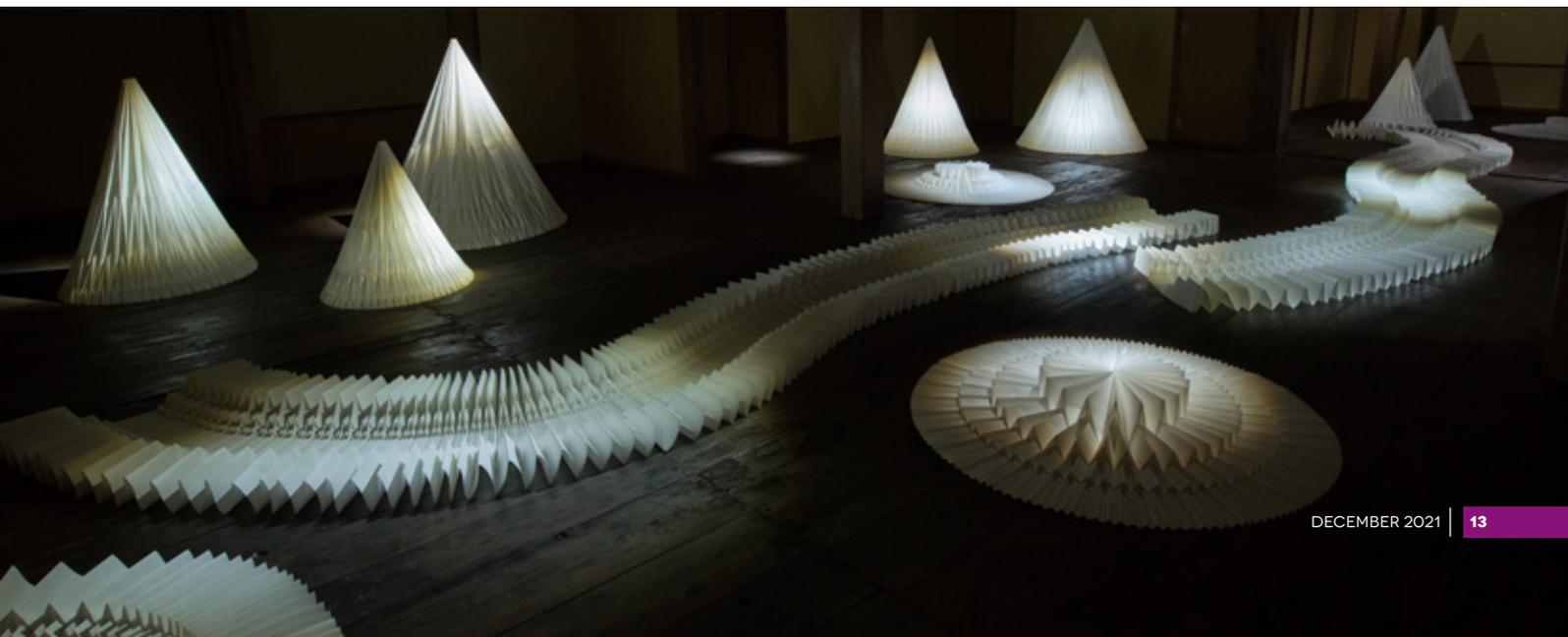
"In the case of unit origami, the success or otherwise of a work becomes apparent only when the work is completed. It's a really lovely moment when all the units are assembled and the work is complete, like placing the last piece of a jigsaw puzzle! Sometimes, patterns appear on the finished surface that even I didn't expect to see. When that happens, it's like

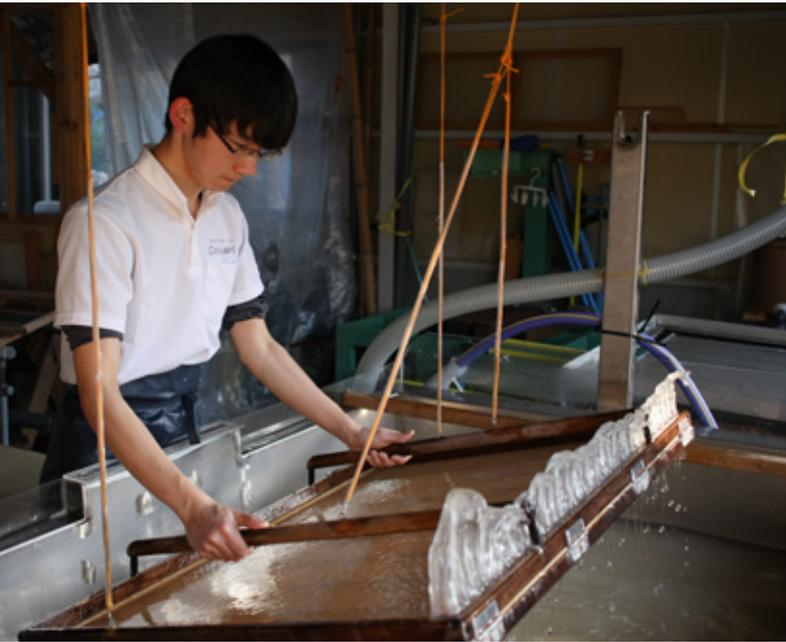
a gift from the god of origami. As an artist, my work is about wanting to discover new forms and ways of folding, and to share that joy with as many people as I can."

Having created many works and authored many books, since entering her 60s Fuse has taken on the new challenge of creating unprecedentedly large-scale installations. Her first such work, *Rock Garden Takagari by Infinite Folding Origami*, was shown at the Japan Alps Art Festival 2017 in a building on the summit of Mount Takagari in Omachi City, Nagano Prefecture, the area where Fuse resides. The "infinite folding" referred to in the title of the work is a method of folding that repeats the same folding pattern with a single sheet of paper over and over again. On seeing the geometric cones and spheres created by infinite folding, a German visitor commented that it looked like a Japanese rock garden (*karesansui*), and Fuse later gave the work that name.

Fuse's passion for origami is itself like an infinite fold, continuing with no end in sight. Though she has been making origami for more than 60 years, Fuse is as enthusiastic about her craft as ever. 📖

Fuse's large-scale installation *Rock Garden Takagari by Infinite Folding Origami*, exhibited at the Japan Alps Art Festival 2017
Photo: Courtesy of Hongo Tsuyoshi





ARTIST CREATES ORIGAMI WITH WASHI HE MAKES HIMSELF

To freely create the works he visualizes, the young origami artist Arisawa Yuga became an artisan papermaker.

SUGIYAMA MAMORU

Arisawa Yuga making *washi* paper at the handmade washi studio Corsoyard

ARISAWA Yuga was born in Hokkaido in 1997. He is an origami artist who has created a series of ambitious original works. These works are held in such high regard that he won a national contest organized by the Japan Origami Academic Society in 2018.

Arisawa first encountered origami in kindergarten. He learned how to fold from a TV show and showed his creations to everyone at school. Arisawa was so happy with the compliments he received from everyone that he started creating origami with great enthusiasm. In his later years at elementary school, he came in contact with the works of Kamiya Satoshi, a master of “super complex” origami, and started challenging himself to create his own unique works. In his first year of junior high school, he managed to complete an original stag beetle work all by himself.

Arisawa says, “I got a sense of achievement just from folding the six legs of a bug from a single sheet of paper. I noticed that I could make original origami too, which became a major turning point for me.”

Spurred on by the completion of the stag beetle, he pursued intricate and complex folding techniques, gradually producing his own original origami works. Recently he has used computer software to bring his designs close to perfection.

Arisawa is very particular about folding from a single sheet of paper without any cuts. However, as the folding processes become more complex, tears in the paper also become more frequent. Arisawa’s interest eventually moved beyond just origami to its raw material, the paper. In particular, he was drawn to the supple and sturdy *washi* (traditional Japanese paper), and during his high school years, he visited and walked round



The origami stag beetle created by Arisawa in his junior high school years



Resin-coated origami goldfish earrings created by Arisawa



Resin-coated origami cat necklace created by Arisawa

All photos: Courtesy of Arisawa Yuga

ten studios and factories in the four areas producing washi in Japan. Once he graduated from his high school in Hokkaido, he got a job at the handmade washi studio Corsoyard in Mino City, Gifu Prefecture, which is where one of Japan's best-known papers, Mino washi, is produced.

Arisawa comments, "When you repeatedly fold hundreds of times or have parts comprising dozens of paper layers, you want paper that's strong but also really thin. I thought it would be a joy to make my own washi, controlling the thickness and strength as I wish. So, I decided to become a papermaker."

Just as he says, once he was freed from the restrictions of the paper, not only did the precision and expressive power of his origami go up, but he could freely come up with ideas for things he wanted to make.

Normally, the paper Arisawa makes goes to lighting fixtures manufacturers and paper lantern artisans, but he also makes washi products for sale to the general public, such as washi origami sets and origami earrings. Recently, he has been receiving more orders from companies for original origami that can be used for promotional purposes such as in advertising or as novelty gifts. In the autumn of 2019, for example, he received a request to create and demonstrate an origami version of the *Spirit of Ecstasy*ⁱ, the hood ornament on Rolls-Royce cars, for an exhibition of the cars in Tokyo. Arisawa says that he made it by folding handmade washi more than one hundred times to complete the work.

Arisawa explains, "In the same way that we inherit the trials and errors of our seniors in the origami world to be able to create new ways of folding, new types of washi are only possible because we inherit the tradition of washi-making. I can feel myself being



Santa Crane, created by Arisawa at age 17

part of that tradition. Right now, I'm writing an origami book that explains how to fold my original works, and I look forward to seeing new enthusiasts and creators being born from this."

Arisawa is far from finished challenging himself as he folds new washi works and pursues his own unique world. **W**

ⁱ The *Spirit of Ecstasy* is the official Rolls-Royce mascot and depicts a woman wearing a billowing dress. Also known as the *Flying Lady*.



The Rolls-Royce *Spirit of Ecstasy* hood ornament fashioned in glass (left) and Arisawa's origami version (right)

Arisawa demonstrates his *Spirit of Ecstasy* origami creation at an exhibition of Rolls-Royce cars in Tokyo

Origami Techniques Applied to Space Development

Origami techniques are being applied in Japan to space development and are expected to play a role in interplanetary navigation.

SASAKI TAKASHI



Space Flyer Unit (SFU), a satellite equipped with a planar structure made using the Miura fold
Photo: Courtesy of JAXA



Map using the Miura fold
Photo: Courtesy of Inoue General Print Co., Ltd.

ORIGAMI has developed as a popular pastime in Japan, but in recent years its techniques have been applied in many different fields. One of the best examples of this is the *Miura-ori* or Miura fold, devised in 1970 by Dr. Miura Koryo (currently Professor Emeritus at the University of Tokyo and President of the Japan Origami Academic Society). The Miura fold is a folding technique that allows even a large sheet of paper to be quickly opened out and stowed again by simply pushing and pulling on its diagonals. In Japan, this technique is usefully employed in products such as handy maps, tourist guides, and train route maps.

The Miura fold was devised during research on deployable structures in space. The Space Flyer Unit (SFU), a satellite for space experiments and observations launched in 1995, used the Miura fold as a method of deploying and stowing a planar

structure. The Miura fold allows the solar panels to be compactly stowed in the satellite's confined space as well as to be easily deployed. Experiments have been successfully conducted in space on the deployment and stowage of solar panels for SFUs.

In recent years, Japanese researchers have been experimenting further with the application of these origami techniques to space development. One such application is the space yacht, which is powered by sunlight rather than fuel. Just as a yacht on Earth is propelled by the wind in its sails, the space yacht is propelled by the pressure from photons¹ emitted from the sun (solar light pressure) on a large, square and thin membrane called a solar sail. The space yacht is a dream come true as it requires neither engine nor fuel, making it ideal for interplanetary exploration and navigation. To demonstrate this spacecraft technology, in May 2010 the Japan Aerospace Exploration Agency (JAXA) launched the world's first small solar power sail demonstrator IKAROS which used origami techniques for the stowage and deployment of the solar sail.

IKAROS has a square sail approximately 14 meters long on each side and an ultra-thin membrane of 7.5 microns, around 13 times thinner than a human hair (measuring around 100 microns). It is propelled by solar pressure on its sail, and also generates electricity from a thin film of solar cells attached to part of the sail. During the launch, the large, thin solar sail is folded and stowed by wrapping around the cylindrical body. The satellite body is then rotated in space, with the centrifugal force generated by the rotation stretching the sail until it reaches full expansion. This is a proprietary technology developed by JAXA. After that, the main body continues to rotate to keep the sail fully expanded.

"The most challenging aspect of the IKAROS mission was the initial sail deployment. It was thrilling to see the 14-meter

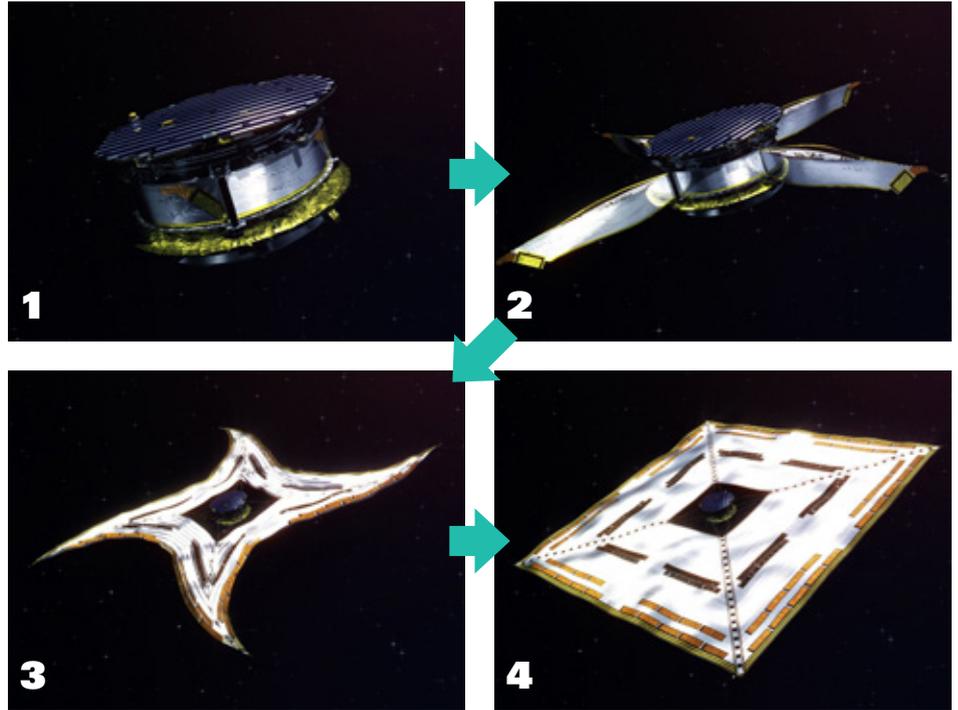
¹ A photon is a quantum (the smallest amount of many forms of energy) of electromagnetic radiation.

square solar sail beautifully unfurled, reflecting sunlight and shining in the jet-black space,” says Mori Osamu, Assistant Professor at JAXA’s Institute of Space and Astronautical Science and leader of the IKAROS project.

While developing the IKAROS sail, the project team tried out various folding methods for themselves using paper. Having been exposed to origami in Japan since their childhood, the idea of doing it this way came naturally to them. Rather than beginning with an idea imagined in their minds, the team used origami as a way of thinking with their hands. Later, they repeatedly experimented with the deployment of the sail using a massive piece of paper that was closer to the size of an actual solar sail in order to determine the optimal folding method. Having shared their envisaged ideas in advance, when it came to folding up the actual IKAROS sail the team members were able to work together with care and precision. Mori says that without this accumulation of experience and expertise inspired by the culture of origami, IKAROS would not have been successful.

“The technology we developed to fold the thin membrane of the sail compactly then unfurl it in space has the potential to dramatically change space development. In fact, I’ve heard that even NASA is directing its attention to the application of origami techniques,” says Mori proudly.

In the future, it is planned to apply the technology used successfully in IKAROS to thin-film solar panels for small satellites. Further, investigation is currently underway for the development of OKEANOS, a solar sail spacecraft even larger than IKAROS having a giant 40-meter square thin-membrane sail. The traditional Japanese technique of origami is expected to play a significant role in the future development of outer space. **7**



Deployment of a solar sail

- 1** After separating from the launch rocket, four weights attached to the corners of the square sail are released simultaneously.
- 2** The struts holding down the wrapped sail slide little by little, and the sail is gradually pulled out by centrifugal force. When fully extended, the sail forms a cross shape.
- 3** When the struts are flattened down, the folded sail is released and expands quickly due to centrifugal force.
- 4** The sail retains its expanded square shape by maintaining the rotation after deployment.

Photos: Courtesy of JAXA

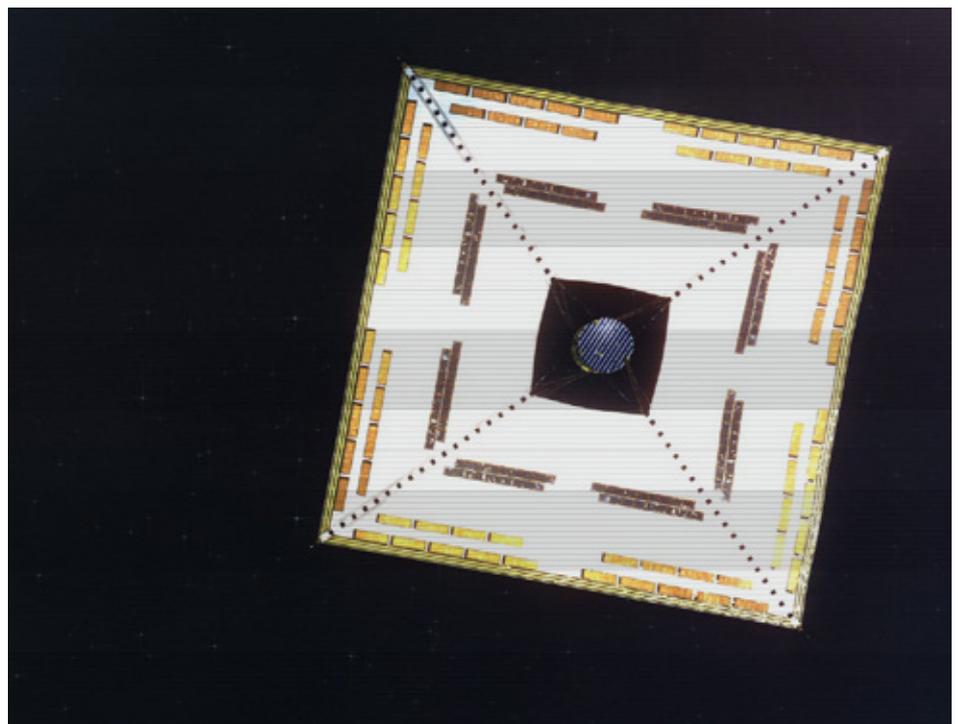


Illustration of the small solar power sail demonstration satellite IKAROS
Photo: Courtesy of JAXA

Hyakkaku—a string of ninety-seven cranes folded from a single sheet of paper



Renzuru

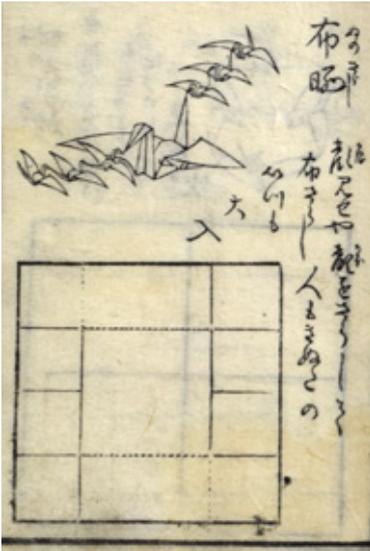
Linked Origami Cranes Made from a Single Sheet of Paper

***Renzuru* is a unique style of origami (folded paper) crane in which many interlocked cranes are folded from a single sheet of paper, using a technique that has been passed down for more than two centuries. Efforts are under way to revive this creative origami style and pass it on to future generations.**

SATO KUMIKO

All photos: Courtesy of Otsuka Yurami





A page showing how to make *Nunozarashi* from the *Hiden Senbazuru Orikata* book in the Choen-ji temple collection

FOLDED paper cranes are probably the most familiar form of origami to the Japanese. As the Japanese proverb “cranes live for 1,000 years; turtles for 10,000” suggests, in Japan cranes are birds considered to possess longevity and impart good luck. There is also a custom of making many origami cranes and threading them together to form a *senbazuru* (literally, “string of a thousand cranes”) as a prayer for peace, alongside health and safety.

In Kuwana City, Mie Prefecture, a traditional technique for making remarkably complex and graceful origami cranes continues to be passed down. This is the technique of *renzuru*, wherein cuts are made to a single sheet of paper to create an interlocking string of multiple cranes. Long ago, the technique was also referred to as *senbazuru*.

In 1797, *Hiden Senbazuru Orikata* (“Secret to Folding One-thousand Cranes”) was released by a Kyoto-based publisher. The book presented diagrams for various simple *renzuru* folding methods, illustrations of the completed designs, and accompanied each with an elegant title and *kyōka*ⁱ poem. Later investigations have determined that this book is the oldest publication on *renzuru*



Example of a *renzuru* design named *Nunozarashi* presented by Otsuka Yurami to representatives from seven countries at the Junior Summit in Mie in 2016

in existence, and that the author was Roko-an Gido (1762-1834), a Buddhist priest at Choen-ji temple in Kuwana City, Mie Prefecture. In 1976, this discovery led to Kuwana City designating the forty-nine varieties of *renzuru* featured in the book as an Intangible Cultural Property of Kuwana City, dubbed *Kuwana no Senbazuru* (“The Thousand Cranes of Kuwana”).

“The ‘Thousand Cranes of Kuwana’ depicts *renzuru* that link anywhere from two to a maximum of ninety-seven cranes folded from a single sheet of paper,” explains Otsuka Yurami, a history specialist working at the Kuwana City Museum.

At the time *Kuwana no Senbazuru* was designated an Intangible Cultural Property, only a handful of people had actually folded the origami creations to which it referred. *Hiden Senbazuru Orikata* did not include detailed explanations of folding methods, and the folding diagrams were vague in places. It was Otsuka who unlocked each of its mysteries and



Otsuka Yurami, history specialist at Kuwana City Museum

thereby ensured that its designs could be reproduced by anyone.

“I think the *renzuru* that Gido developed represent creative thinking that deserves to be passed on to future generations,” says Otsuka.

Today, Otsuka and one other staff member have been accredited by Kuwana City as keepers of the *Kuwana no Senbazuru* techniques, and are working hard to pass on their knowledge. Through various activities such as paper folding lessons at elementary and junior high schools around the city and public workshops offered at the museum, many residents of Kuwana City are now familiar with *Kuwana no Senbazuru*.

At the “Junior Summit in Mie” held in Kuwana City in connection with the G7 Ise-Shima Summit in 2016, Otsuka folded and presented children participating



Yatsuhashi—a circular design connecting eight cranes

from seven countries with *Nunozarashi*, one of the varieties of *renzuru* that appears in the *Kuwana no Senbazuru*. The children shouted with joy at the sight of seven origami cranes made from exquisite Japanese paper connected to one another, as if children from seven countries were holding hands.

“Long ago, people must have put their hearts into folding these time-consuming *renzuru* before presenting their creations to people close to them,” says Otsuka, who remains devoted to researching *renzuru* folding techniques for posterity. ■

ⁱ *Kyōka* is a humorous form of classical poetry similar to *tanka*, with five lines consisting of five, seven, five, seven and seven (5-7-5-7-7) syllables in each line. It was popular during the middle of the Edo period (1603-late 1860s).

Funny Face Cards can be folded to create many different three-dimensional faces
Photo: Courtesy of COCHAE, by Obama Harumi



SQUARES of paper printed with colorful images and patterns are folded to create animal shapes such as turtles and cranes, funny faces, finger puppets and more. This “graphic origami” is the brainchild of COCHAE, a graphic design group formed in 2003 around the key concept of “making origami more cool!” Today, the group has three members and creates packaging designs as well as graphic origami.

A Funny Face Card before folding
Photo: Courtesy of COCHAE, by Obama Harumi

MAKING ORIGAMI COOL

“Graphic origami,” which is folding paper pre-printed with colorful images and patterns to produce a new kind of “cool” origami, has been gaining much attention.

KATO KYOKO

At the time the group was formed, origami was generally made with plain paper, so when COCHAE released colorful origami paper with images and patterns, it was innovative and immediately became a hot topic.

COCHAE founding member Jikuhara Yosuke says, “Origami paper with patterns and images wasn’t being sold at the time and it wasn’t the usual thing to draw pictures on plain origami paper or make cuts in origami with scissors. We weren’t bound by the conventional style of origami, producing origami creations on the theme of ‘playful designs.’”

In fact, Jikuhara says he is not good at making complicated and difficult origami. He wanted to make origami that was easier and more fun, and focused on simply folded traditional Japanese origami such as cranes, frogs, windmills and paper cups.

“In the process of being handed down from one generation to the next, traditional origami has evolved to reach a point where anyone can easily do it. Its appeal lies in its simple beauty, which is also associated with “coolness.” Take the crane, for example, a very well-known traditional origami shape. Strictly speaking, it’s not the same shape as an actual crane, yet its form is nonetheless very beautiful and relatively easy to fold,” says Jikuhara.

The Classic Origami series is a kit

based on traditional origami comprising six types of origami accompanied by illustrated instructions for folding a crane, turtle, *kabuto* (samurai's helmet), and other traditional Japanese motifs. For each motif, a pattern is printed that matches the completed folded piece, making it easy to create colorful, geometric designs similar to ukiyo-e prints. The kit is now a standard among COCHAE's products and popular as a gift to take overseas.

As Jikuhara and other group members played with the papers, they noticed that a sheet of paper on which just a few eyes and a mouth have been drawn could be

folded in different ways to create a wide variety of faces. This discovery led to the creation of the Funny Face Card. Workshops are held where participants are free to fold the Funny Face Card in any way they like, with everyone from small children to the elderly creating many different origami faces. Every workshop produces faces that Jikuhara has never seen before.

In recent years, COCHAE's work has also attracted attention for its paper packaging designs that incorporate elements of graphic origami. The company's packaging for a condiment incorporating a daruma motif (a figurine

resembling the figure of Buddhist monk Daruma seated in meditation) became such a hot topic that it was featured in a Japanese women's fashion magazine.

Says Jikuhara, "When we held an origami workshop in Mexico, people were amazed at how a sheet of paper could take on so many different shapes, and they called me a "magician." In the future, I would like to have people enjoy origami in different ways by for example using playground equipment or visiting parks that we have designed using origami motifs."

COCHAE's unconventional ideas have opened up a new world of origami. 



Classic Origami inspired by traditional origami
Photo: Courtesy of COCHAE, by Obama Harumi

Classic Origami folded paper crane
Photo: Courtesy of COCHAE, by Obama Harumi



Traditional Japanese motifs such as cranes, turtles, and samurai helmets feature in the Classic Origami series
Photo: Courtesy of COCHAE, by Obama Harumi



Example of a paper packaging design incorporating elements of graphic origami
Photo: Courtesy of COCHAE, by Kato Shinpei



People enjoying origami at an OrigamiUSA event

"Origami Is for Anyone, Anywhere, Any Time!"

The History and Activities of OrigamiUSA

An American woman who encountered *origami* became fascinated by the artistry of paper folding and developed various pioneering activities to promote it. Her name is Lillian Oppenheimer, and her efforts ultimately led to the establishment of "OrigamiUSA," a non-profit organization which carries out educational and promotional activities. Today, OrigamiUSA collaborates with origami organizations around the world, including those in the United States, Canada, and South America. Here, we present some of the history and activities of OrigamiUSA.

SUGIYAMA MAMORU

ORIGAMIUSA (OUSA) is one of the largest origami organizations in the world, with an administrative base at the American Museum of Natural History in New York City. The organization's mission is to "share the joy of paper-folding," and today over 1,700 origami enthusiasts participate in more than 100 local origami groups across the United States and around the world. Origami was previously referred to by its English translation "paper folding," but it was OrigamiUSA that contributed to the popularization of the Japanese word "origami" worldwide.

"The establishment of OrigamiUSA

stemmed from the pioneering activities of the American Lillian Oppenheimer (1898-1992). She became charmed by paper folding in around 1953 when she learned how to fold the 'flapping bird,' an origami piece which flaps its wings when you pull its tail, and then started to promote paper folding in earnest," says Matsuura Eiko, who has researched the subject of origami.¹

Oppenheimer came to feel even more strongly that origami is a cultural activity which adults can enjoy when she read *Paper Magic: The Art of Paper Folding* (1956) by the British magician and author Robert Harbin, Matsuura explains.

She sent a letter to Harbin and



Lillian Oppenheimer, who helped to popularize origami in the United States beginning in the 1950s

traveled to the United Kingdom to meet him. Encouraged by this encounter, she started to correspond with origami artists around the world, including the "father of modern origami," Yoshizawa Akira (1911-2005), a Japanese artist who was considered the foremost authority on creative origami, and her activities became international.

Working from the Origami Center which she founded in 1958, Oppenheimer acquired knowledge, techniques

All photos provided courtesy of OrigamiUSA

OrigamiUSA event participants wearing their origami creations



and materials through her correspondence with people involved in origami around the world and sought to disseminate information about origami, such as by publishing books. In 1959, Oppenheimer went on a world tour and met with Yoshizawa in Japan in April of that year, an event which was covered in the Japanese media.

Eventually, albeit after she had passed away, the work of Oppenheimer and her fellow origami aficionados bore fruit, with the growing popularity of origami across the United States resulting in the founding of OrigamiUSA, which continues to this day.

OrigamiUSA has promoted origami in many different ways, including distributing newsletters, publishing books, and holding workshops. It also has started to hold online-workshops recently. At the American Museum of Natural History, OrigamiUSA has established the world's largest specialized origami library, created from Oppenheimer's collection. Márcio Hideshi Noguchi, a second-generation Japanese-Brazilian who also served as the chairman of the OrigamiUSA board, says, "I myself learnt origami from my mother, but the activities of OrigamiUSA are really important for giving Americans without that tradition a chance to encounter origami."

OrigamiUSA's biggest event is the annual convention held in New York each June. The event features the latest, most ambitious works produced by members of affiliated groups in the United States

and around the world.

"Works on a wide array of themes are presented at the event, including real animals and plants, imaginary animals, and geometric forms. Many prominent artists also take part, but works aren't judged or ranked—pieces by unknown amateurs are exhibited alongside those by celebrated artists. This is the unique spirit of OrigamiUSA," says Marcio with a smile.

Marcio's favorite quote is from Michael Shall (1949-1995), one of the co-founders of OrigamiUSA and someone who dedicated himself to promoting origami. Shall said, "Origami is for anyone, anywhere, any time!" This is also the official motto of OrigamiUSA. Marcio explains that the words of the motto ring true whenever his work takes him to different parts of the world and he starts doing origami, each time experiencing a powerful sense of opening up a circle of communication that transcends

differences of race, language and culture. "The surprise felt at being able to create an unexpected form, simply by folding a single sheet of paper, is universal," he says.

OrigamiUSA and Japanese origami organizations and artists have kept up their communication ever since Oppenheimer first began corresponding with them. As a testament to this, OrigamiUSA has designated the period from Oppenheimer's birthday on October 24 to Origami Day in Japan on November 11 as "World Origami Days."ⁱⁱ Along with the Convention in June, a variety of events will be held during this period in the United States and other countries where OrigamiUSA groups are active.

Inheriting the spirit of Oppenheimer and her fellow origami practitioners, these two events serve to connect origami enthusiasts around the globe and to spread the joy of origami across the world. 

i Thi Matsuura Eiko, The Birth of "Origami"—Focusing on the dissemination pursuits of Lillian Oppenheimer—, *Toyo University Repository Academic Resources*, Vol. 57 2021 pp.199-214
 ii Origami Day was designated by the Nippon Origami Association (NOA) in 1980. November 11 was selected for two reasons. Firstly, the 11th day of the 11th month contains four number 1's. The number 1 is likened to one side of a square, so together these form four sides of a square sheet of origami paper. Secondly, November 11 is World Peace Day (the day the armistice of World War I was signed), and origami shares much in common with the spirit of wishing for peace.



World Origami Days 2021 flyer



Cover of an OrigamiUSA magazine



Storage tanks for ALPS treated water

Decommissioning of Fukushima Daiichi Nuclear Power Station and ALPS Treated Water

In April 2021, the government of Japan decided on a policy to discharge ALPS (Advanced Liquid Processing System) treated water stored at the site of the Tokyo Electric Power Company Holdings (TEPCO) Fukushima Daiichi Nuclear Power Station (hereinafter “Fukushima Daiichi NPS”) into the sea, in order to safely and steadily proceed with the decommissioning of the Fukushima Daiichi NPS for the reconstruction of Fukushima. Preparations are now under way to implement this policy in cooperation with the international community while ensuring the safety of the operation.

SAWAJI OSAMU

THE Great East Japan Earthquake that occurred on March 11, 2011 caused the Fukushima Daiichi NPS to lose all power, which led to the loss of the stable cooling function of the reactors. This resulted in damage to the reactor cores from the high-temperature fuel, and the release of radioactive materials into the atmosphere. However, the cooling of the reactors and other measures taken immediately following the accident achieved a “cold shutdown” in December 2011, since which time the release of radioactive materials has been kept to a very low level.

Immediately following the accident, an evacuation order was issued to approximately 81,000 residents in twelve municipalities in the vicinity of the Fukushima Daiichi NPS. However, as a result of the removal of radioactive materials and restoration work on infrastructure, the evacuation order has been lifted in all areas in six municipalities and in most areas in the remaining six municipalities as of December 2021, reducing the number of people still subject to the evacuation order to 22,000.

Moreover, while the accident led to the imposition of import restrictions on food products from Japan by fifty-five countries and regions, that number has been decreasing year by year, with 2021 seeing the lifting of restrictions by Israel, Singapore and the United States. Of the fourteen countries and regions that continue to impose import restrictions, nine allow the import of food products accompanied by a test certificate.

DISCHARGE OF ALPS TREATED WATER

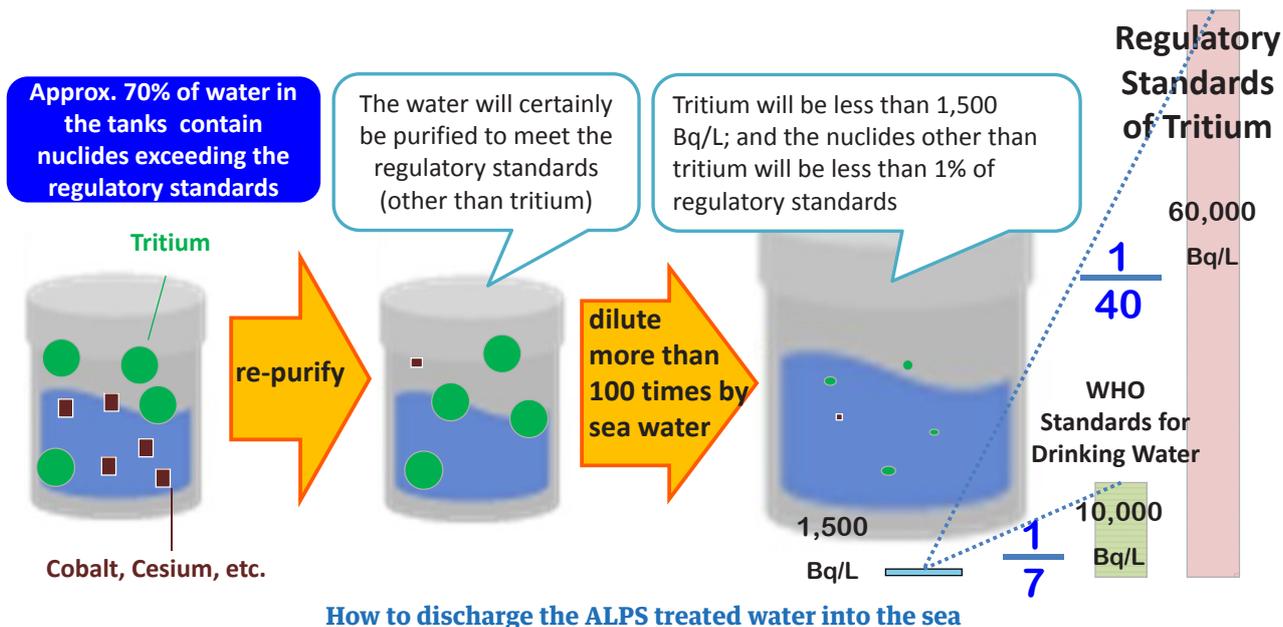
The reactor buildings of Unit 1, Unit 2, and Unit 3 of the

Fukushima Daiichi NPS still contain “fuel debris,” which is melted fuel mixed with structural materials that has solidified. These buildings are continuously cooled with water to maintain a cool temperature, and the water used for cooling is contaminated by radioactive materials. In order to reduce the risk of radiation from the contaminated water, the Fukushima Daiichi NPS is using a purification system called ALPS (Advanced Liquid Processing System) to remove radioactive materials.

One of the major challenges for the decommissioning of the Fukushima Daiichi NPS has been this method for handling the ALPS treated water (hereinafter “treated water”). Although most of the radioactive materials have been removed by the purification process, concerns have been expressed about the social impact that may arise from the discharge such as adverse impacts on reputation.

A particular point of contention has been tritium, which cannot be removed by the purification process. Tritium is a relative of hydrogen and exists in drinking water, food and the human body. Tritium produced in nuclear power stations and reprocessing facilities has been discharged from many nuclear facilities around the world into the oceans, rivers and the atmosphere in compliance with national and local laws and regulations. No effects ascribed to tritium have been found in the vicinity of those facilities.

The tanks used to store the treated water take up a great deal of space, making it difficult to secure the site to allow the decommissioning of the Fukushima Daiichi NPS. For this reason, in April 2021 the government of Japan decided on a policy to discharge the treated water into the sea following a prepa-



ration period of around two years. In order to maintain strict compliance with laws and regulations related to safety and to minimize adverse impacts on reputation to the maximum extent possible, the policy states that treated water should be diluted more than 100 times using seawater in order to reduce the concentration of tritium to below 1/40th of the regulatory standard. In addition, measures that limit the social impact should be thoroughly implemented. These include dissemination of information based on scientific evidence and support for developing sales channels for industries that may be affected by adverse impacts on reputation.

Japan will provide information to the international community in a highly transparent manner, while obtaining international cooperation such as scientific reviews by the International Atomic Energy Agency (IAEA) with its expertise. Immediately after the announcement of the government of Japan's policy decision, IAEA Director General Rafael Mariano Grossi welcomed the policy and said, "IAEA stands ready to provide technical support in monitoring and reviewing the plan's safe and transparent implementation" and "Japan's chosen water disposal method is both technically feasible and in line with international practice."

An international review has already begun. In November 2021, IAEA officials and experts from France, Russia and South Korea came to Japan to visit the Fukushima Daiichi NPS and have technical discussions with the relevant staff of TEPCO and the Ministry of Economy, Trade and Industry.

The government of Japan will continue to make efforts for the safe discharge of treated water in cooperation with the international community under the principle of achieving both reconstruction and decommissioning of the Fukushima Daiichi NPS.

(For more information on ALPS treated water, see <https://www.meti.go.jp/english/earthquake/nuclear/decommissioning/atw.html>).



IAEA officials and experts inspecting the Fukushima Daiichi Nuclear Power Station in November 2021



IAEA officials and experts looking at a bottle containing a sample of ALPS treated water at the Fukushima Daiichi Nuclear Power Station in November 2021

In Kenya, a clinician examines a patient's eye using Smart Eye Camera (the white rectangular device) attached to a smartphone

Diagnosing Diseases of the Eye with a Smartphone

A Japanese startup company founded by ophthalmologists has developed a game-changing device that can easily diagnose diseases of the eye with a smartphone.

UMEZAWA AKIRA

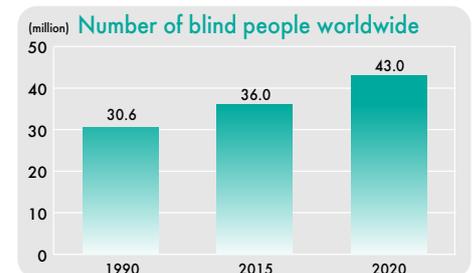
ACCORDING to data for 2020,¹ there are 43 million blind people worldwide, predicted to reach about 120 million by 2050. In order to prevent this catastrophe, it is necessary to prevent and treat diseases that lead to blindness. In order to accurately perform such diagnoses, there is an absolute need for medical equipment for ophthalmic examination to facilitate detailed observation of the eye's interior. However, at present, there are few ophthalmologists and not enough hospitals and clinics with the medical devices that are essential for diagnosis, especially in rural areas of developing countries.

Smart Eye Camera has brought hope about resolving this issue. It is an attachable medical device that fits over the camera and light source of a smartphone and can create the light necessary for eye examinations and take images of the eye.

The device was developed by an ophthalmologist, namely Dr. Shimizu Eisuke, who is also CEO, co-founder, MD, PhD of OUI Inc. OUI Inc. is a startup company that was established by Shimizu and other ophthalmologists from the Keio University School of Medicine. The idea for Smart Eye Camera was inspired when Shimizu visited Vietnam in 2017 as a volunteer for Fight for Vision, a Japanese NPO that aims to deliver eye care to patients in developing countries.

Shimizu recalls, "I visited a rural village about four hours away from Hanoi City to conduct medical examinations and surgery. In the rural clinic, there was no diagnostic device for ophthalmology. The medical staff examined patients' eyes with penlights, and when the batteries ran out, they started using the light of a smartphone."

A "slit-lamp microscope" is a medical



Source: <https://www.statista.com/statistics/740496/blind-population-in-1990-and-2015/>, IAPB, [https://www.thelancet.com/journals/eclinm/article/PIIS2589-5370\(21\)00132-2/fulltext](https://www.thelancet.com/journals/eclinm/article/PIIS2589-5370(21)00132-2/fulltext)

device for diagnosis of the anterior segment of the eye. It is a device for observing the cornea and lens by shining a thin oblong bundle of bright light (slit light) onto a patient's eye and magnifying the image. "It is a very basic and important device for ophthalmologists, like a stethoscope is for physicians," says Shimizu. However, it is not in widespread use in rural areas of developing countries because it is bulky, heavy and expensive.

"Cataracts, a disease causing cloudy areas in the lens of the eye, account for more than half of the cases of blindness in the world. Cataracts affect everyone as they get older, but proper prevention and treatment increases the chance of avoiding blindness. Based on my experiences in Vietnam, I came up with the idea to invent a smartphone attachment medical device to convert the light of a smartphone into

i. [https://www.thelancet.com/journals/eclinm/article/PIIS2589-5370\(21\)00132-2/fulltext](https://www.thelancet.com/journals/eclinm/article/PIIS2589-5370(21)00132-2/fulltext)



OUI Inc. CEO Shimizu Eisuke



OUI Inc. CEO Shimizu Eisuke using Smart Eye Camera to examine a patient's eye in Vietnam



Smart Eye Camera attached to a smartphone

the light necessary for ophthalmic diagnosis of the anterior segment of the eye.”

After returning to Japan from Vietnam, Shimizu and his colleagues started making a prototype. After one and a half years of trial and error, they finally completed Smart Eye Camera.

Smart Eye Camera can generate three types of light—slit light, white diffused light, and blue diffused light—all of which are necessary for the diagnosis of the anterior segment of the eye. Using Smart Eye Camera it is possible to diagnose almost all eye diseases of the anterior segment with equal function to the conventional slit-lamp microscope.

OUI Inc. has also developed a dedicated software application for Smart Eye Camera which enables users to preview, manage and share the captured ophthalmic images in a secure environment.

“There exist other smartphone attachment medical devices for the anterior segment of the eye. However, most of them require extra batteries,” explains Shimizu. “Smart Eye Camera does not require an extra battery since it uses the camera and light source of the smartphone. In addition, compared to other such devices, it is very reasonably and competitively priced. We envision overcoming the increase of world blindness with our Smart Eye Camera. Therefore, we need to provide it at an affordable price so that it is widely used by many medical institutions in developing countries.”

Smart Eye Camera was registered as a medical device in Japan in 2019 and is already in use in Japanese clinical settings.

Smart Eye Camera will also make possible a new remote-diagnosis model of ophthalmology. By installing its software application, doctors (non-ophthalmol-

ogists) can capture images of the eye of patients and send them to remote ophthalmologists for consultation.

Since April 2021, Smart Eye Camera has been introduced on Miyako Island in Okinawa Prefecture and on seven of the Izu & Ogasawara Islands, where the local doctors employ the remote-diagnosis model in collaboration with ophthalmologists on the mainland.

“In many cases, the specialty of the doctors based on remote islands is not ophthalmology. However, with Smart Eye Camera, they can at least easily capture the ophthalmic images needed for diagnosis. By sending the images to the ophthalmologists on the mainland for consultation, patients on remote islands can be diagnosed without having to travel all the way to the mainland,” Shimizu explains.

OUI Inc. has also been conducting pilot projects in more than twenty countries worldwide, including in Africa, Latin America, and Southeast Asia, in cooperation with local ophthalmologists, medical institutions, NGOs and international organizations.

OUI Inc. is now also developing auto-diagnostic artificial intelligence (AI) for cataract evaluation, by putting the images taken by Smart Eye Camera into machine learning. Once completed, this work will help to bring a dramatic improvement in quality to eye-screening in rural areas.

“OUI Inc. envisions overcoming 50% of world blindness by 2025,” Shimizu says. “I hope that Smart Eye Camera is introduced by many medical professionals and support organizations all over the world as an innovative tool that can detect patients in need of treatment and connect them to ophthalmologists for medical solutions.”



Ophthalmic diagnosis using Smart Eye Camera in an indigenous people's village in Brazil



Examination using Smart Eye Camera in Malawi



OUI Inc. VP of Global Business Nakayama Shintaro (center) with members of partnering medical institutions in the pilot project using Smart Eye Camera in Kenya

A Canadian Flying Paper Airplanes in the Japanese Sky

Andrew Dewar flying one of his paper airplanes

Andrew Dewar, a Canadian fascinated by Japanese paper airplanes, shares his love for the creations with his students in Japan and people around the world.

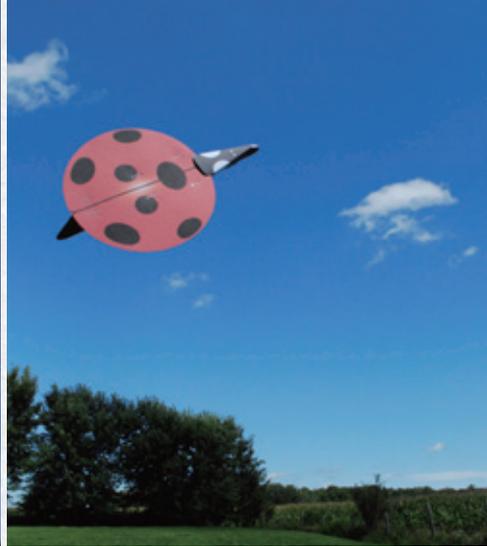
SATO KUMIKO

A paper airplane made using Mino washi

Dewar's studio at home, decorated with countless paper airplanes



Cricket, a Mino washi glider



A flying ladybird model



Dewar teaching children how to fold paper airplanes

CANADIAN-BORN Andrew Dewar explains that “Paper airplanes, which you can make from folding a single sheet or by combining parts cut from paper, are not just child’s play but have real depth.” A resident of Gifu Prefecture, Dewar works as a professor of library and information science at Tokai Gakuin University, and is the principal of a kindergarten attached to the university. He is also active as a paper airplane artist in Japan and abroad.

Dewar says, “You can enjoy looking at your creations, but the best thing about paper airplanes is that they can *fly*.” Paper airplanes lack propulsion and fly using just the lift of their wings. They are quite simple, but the planes will not fly unless made in a shape that fulfills the requirements for flying well. Dewar comments, “A neat way of saying the same thing is that a paper airplane *flies because the sky allows it to*.”

Dewar has created numerous unique paper airplanes. Many of his folding methods run counter to what one would expect, such as being right-left asymmetrical, or three-dimensional with a bulging fuselage. He has authored more than forty books in English and Japanese, explaining how paper airplanes fly and presenting creations that recreate actual aircraft using paper, and is admired in North America and countries around the world.

Dewar first encountered paper airplanes in a book he read when he was a child in Toronto. The book was about the International Paper Airplane Competition in 1967. Dewar was especially fascinated by the paper airplane of Ninomiya Yasuaki from Japan, who

won the grand prize. Dewar made up his mind and wrote a letter to Ninomiya in English. Perhaps Dewar’s enthusiasm shone through, because he soon received a reply from Ninomiya along with several books in Japanese with paper airplane patterns. That was the start of contact between Dewar and Ninomiya over many years.

After finishing his graduate studies in library and information science at the University of Toronto, Dewar had the opportunity to study abroad in 1988 and picked Japan. Later, he became a university professor here and still lives in Japan. A major reason why Dewar decided to study in Japan was because he felt that paper airplane making is popular here, with many enthusiasts, national competitions, a variety of books, and an established culture of paper airplanes.

Dewar believes that one reason for the popularity of paper airplane making in Japan is the long history of Japanese paper culture. Gifu Prefecture, where Dewar lives, is home to Mino washi paper, one of Japan’s oldest types of traditional washi paper. Mino washi is thin but also uniform in quality, and has a delicate and beautiful texture. Moreover, because of its high durability, it is popular not only in Japan but also abroad. Dewar also makes beautiful paper airplanes out of Mino washi that take advantage of its attributes, achieving soft forms and letting through faint sunlight.

Dewar runs his own workshops where anyone, young or old, can immerse themselves in making paper airplanes.

Sometimes, Dewar himself has fun flying paper airplanes in the kinder-

garten yard or nearby parks with the children at the kindergarten where he serves as principal.

He says, “It’s more fun to fly out in nature than to compete indoors over how far you can fly or how long you can stay aloft.” He gently smiles and adds, “You need to look up at the sky and feel the wind when you fly a paper airplane. When the paper airplane returns to the ground, you can find small flowers or mushrooms there. Once in a while it will ride on an updraft and get carried far up into the sky. When that happens, I tell the children that the sky must have wanted to have that plane.” He is filled with affection for paper airplanes, and with a love for Japan’s nature and children. **I**



Children flying paper airplanes in the kindergarten yard under Dewar’s supervision

A Noh Actor Discovers that “Art Knows No Borders”

Taneda Michikazu, noh master of the Kongo School, served as a Japan Cultural Envoy in 2018, teaching noh at workshops in the United States, France, Spain, Italy and Hungary. Taneda tells us about his experiences.

YANAGISAWA MIHO



Taneda Michikazu

NOH, one of Japan’s great traditional performing arts, is a type of musical theater in which the actors perform while wearing masks and beautiful costumes. The actors speak lines and dance or use gestures to bring the narrative forward, doing so to the sounds of Japanese traditional instruments and chanting called *utai*.

Of the five schoolsⁱ of noh in Japan, the Kongo School is the only school to be based in Kyoto. Taneda Michikazu comes from a lineage that has supported this school over generations.

According to Taneda, “Noh has been passed down without interruption for

about 650 years and is considered the world’s oldest extant performing art. Noh’s longevity is likely because it was protected by the rulers of every age; however, it is not the case that noh actors have clung to the powerful or pandered to their tastes. Put very simply, noh may have provided people with a kind of ‘healing.’ The expression of multi-faceted human relationships in noh, such as parent-child and teacher-student relationships, still has relevance for modern society. This must be because noh explores people’s true nature. I believe that is why “nohgaku” (noh theater) was the first art form in Japanese culture to be inscribed on UNESCO’s Representa-

tive List of Intangible Cultural Heritage of Humanityⁱⁱ.”

In 2018, Taneda visited the United States, France, Spain, Italy and Hungary in his capacity as a Japan Cultural Envoy. Normally, noh is performed by twenty or so people, each playing a specific role (see photo below), but as a Japan Cultural Envoy Taneda was the only actor who could perform, so putting on a noh play as usual was impossible. “Therefore,” says Taneda, “for those shows, I decided to show everyone a performance where I use my body as much as possible, performing parts of plays that only involve one actor. I also decided that participants should not just watch these per-



Scene from a performance on a noh stage in Japan

i There are five schools of *shite* (main role) actors.

ii Nohgaku was inscribed on UNESCO’s Representative List of Intangible Cultural Heritage of Humanity with Ningyo Johruri Bunraku and Kabuki in 2008.



Taneda performs at the Maison de la culture du Japon in Paris, France



Audience members try on noh masks following a performance in Paris



Participants in the Budapest, Hungary workshop study the various uses of fans in noh



Taneda dresses a participant in the costume for the noh play *Hagoromo* (The Feather Mantle)

formances but also experience noh using their own bodies. To achieve this, with the help of staff from the Japanese Government's Ministry of Foreign Affairs and the Japan Foundation, I made pronunciation cards for each language so that the participants could recite the Japanese lyrics as closely as possible and do the utai chant while I performed a dance in accompaniment."

Additionally, Taneda took along twenty-five folding fans from his collection. In noh, the fan is a tool for expressing mental images, scenery, and also objects. As part of his workshops, Taneda had the participants hold the various fans and gave instruction in their use and movements so that participants could

feel the different meanings through the experience of using their own bodies.

Taneda recalls a moment that left an especially strong impression on him after giving a workshop in Barcelona, Spain. "We had just finished a workshop for drama students, and one person said, 'Noh is *silencio*' (meaning "silence" in Spanish). I hadn't specifically taught quiet movements, but I think that person had nevertheless grasped the essence of noh."

In *Kakyo* (A Mirror of the Flower), a treatise on acting by the noh master Zeami, who brought noh to perfection in the second half of the 14th century, the concept of *yugen* (profound grace and subtlety) is considered of utmost impor-

ance. For example, even if you are playing an *oni* (demon or fiend), you should dance quietly and beautifully.

Taneda says, "The root of *silencio* is the same as for *yugen*. I was moved by the high spirituality of that person who perceived this after just a one-week workshop."

Even for a Japanese person, it is difficult to truly understand the essence of noh, but Taneda felt that traveling the world as a Japan Cultural Envoy allowed him to experience the depth of feeling foreign people have towards Japanese traditional art. He says that he came to understand firsthand that "art knows no borders" and deepened his sense of noh's potential. 7



GI JAPAN PRODUCTS



Echizen Gani

越前がに

Echizen Crab

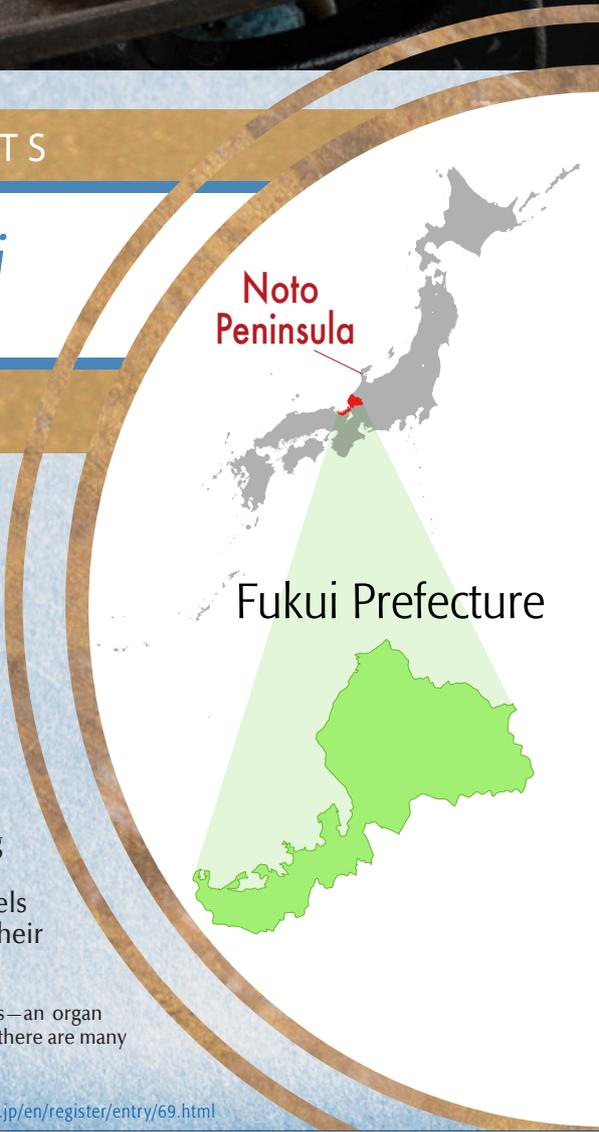
ECHIZEN Gani (also known as Echizen Kani) is a male snow crab caught by bottom trawling off the coast of Fukui Prefecture and the surrounding sea areas, and landed in the ports of Fukui Prefecture. The crabs are stored in a cool temperature immediately after catching until landing, resulting in the characteristics of fresh and high quality meat and richly flavored *kanimiso* (crab paste) * which can easily lose freshness. In Japan, Echizen Gani is sometimes called the “King of Crabs.”

The sea west of Noto Peninsula in the Sea of Japan is inhabited by snow crabs, making it an important fishing area for Japan. In particular, the topography off the Echizen Coast characterized by the sudden drop-off has contributed to the establishment of an ideal fishing area for snow crabs within a short distance from the coast.

Echizen Gani is shipped fresh to distributors, restaurants and hotels and retailed mainly as boiled snow crabs. They are highly valued for their high quality as a major local specialty of Fukui Prefecture.

* *Kanimiso* (crab paste): The miso/paste-like substance found when taking the shell off crabs—an organ biologically referred to as hepatopancreas (digestive gland). It is a highly prized delicacy, and there are many enthusiastic fans of its unique flavor in Japan.

Text and images courtesy of Ministry of Agriculture, Forestry and Fisheries: <https://gi-act.maff.go.jp/en/register/entry/69.html>



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