Makiko Kuga

1. Introduction

I never grew chrysanthemums or even gave them my attention before coming to England to study horticulture. Back in November 2008, I had a memorable occasion, by chance, to see the Chrysanthemum exhibiton at Shinjuku Gyoen National Garden (later the Gyoen) in Tokyo. The visit changed completely my view of chrysanthemums: uniformity, scale of displays and encountering with never-seen-before four classical varieties – **Ise, Saga, Higo Choji and Edo (Tokyo) chrysanthemums** which derive from specific regions of Japan. The artistic deployment was also the core of the exhibition as well as the varieties.

The entrance of the Chrysanthemum exhibition (November 2008). This is a single plant.

Artistic display of Single-stemmed, Single Broad-petalled and Spider Chrysanthemums (2008). The collars are used because these are very special plants and they are being treated carefully.

2. Overview of the project

When I started working for the Kitchen Garden in 2006, I soon realised that there were very few plants which flower in the autumn through to Christmas. For the Victorian Kitchen Garden, growing chrysanthemums seemed most appropriate, and I introduced the flowers to the Garden in 2009 for late season display in the Vinery (October - December). It has been hugely successful in extending the season and has become my speciality. I do everything from propagation to the final display. Now I have had extensive experience in working with chrysanthemums at the garden for over five years, I have endless questions for the specialists in order to improve both the quality of plants and the display.

One of the purposes of my visit to Japan was to observe highly skilled craft and growing techniques. Moreover, the style of exhibition between the UK and Japan are different; Japan's exhibition is a whole plant (with a pot); on the other hand, the UK's is a couple of flower heads in an exhibiton vase. So I wished to consult, particularly, with Japanese professional growers as my displays in the garden were of a Japanses style. I grew chrysanthemums in pots as they did in the Victorian era.

Finally, I never worked with horticulture specialists in Japan. So it was one of my missions to make a horticultural bridge between the UK and Japan.

2. 1 History of chrysanthemums

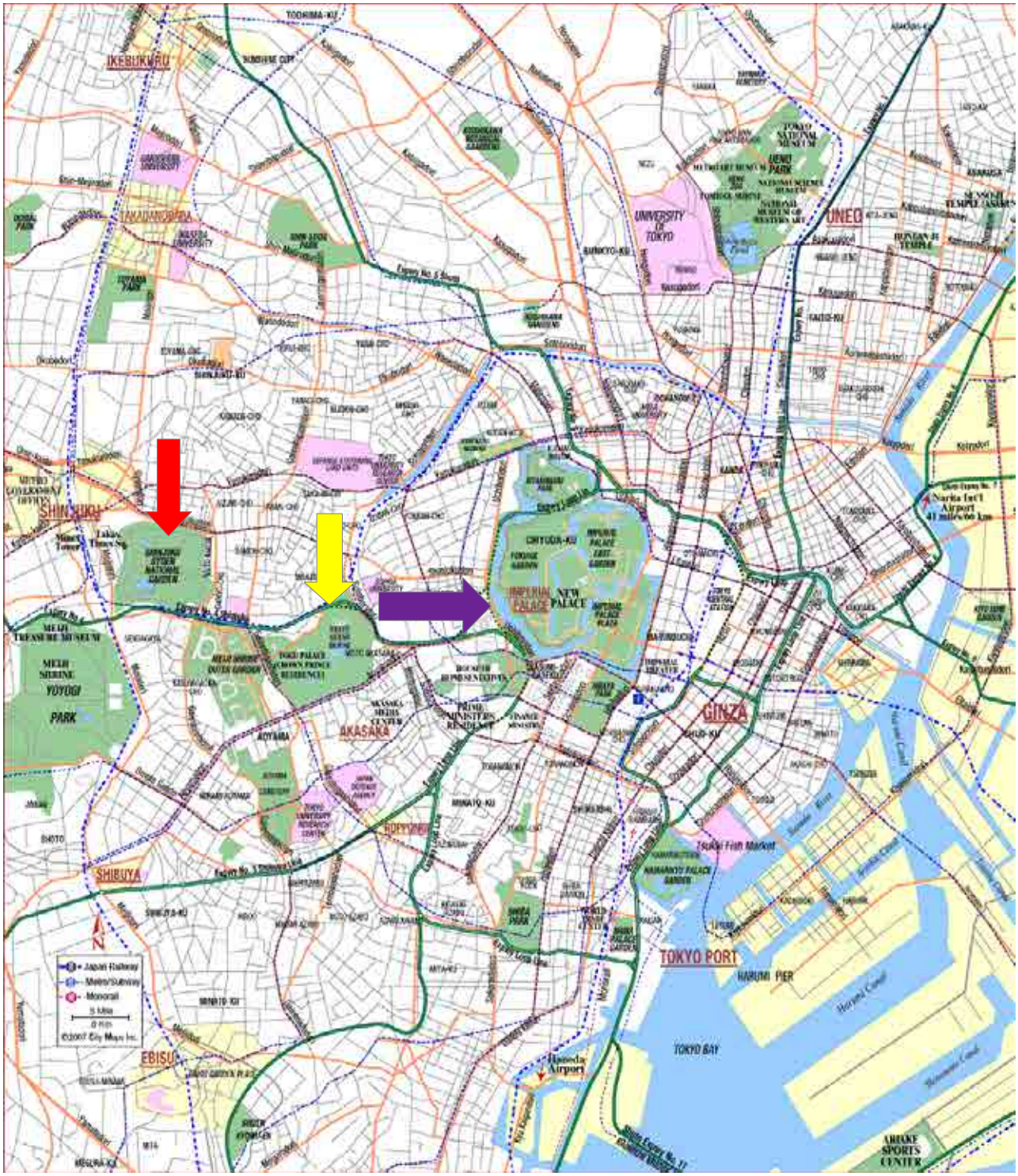
The chrysanthemum has been cultivated almost 3000 years. The great Chinese philosopher Confucius (A.D. 552 - 479) described them in his work Li-Ki. After 1000 years of cultivation in China cultivated chrysanthemums were introduced to Japan in late eighth century, where several wild species already existed. But it was in Japan that this diverse flower reached its culmination. Cultivated varieties from the Far East reached Holland in 1688, France in 1789. Pierre Louis Blanchard introduced three varieties from China in 1790. The National Chrysanthemum Society held its first show in 1846 and all cultivars exhibited were of Chinese origin. The older Chinese type were nearly all incurved and the colour range was limited to white, yellow or pale mauve. Robert Fortune introduced the first seven Japanese varieties of Chrysanthemums in 1861. This introduction of Japanese cultivars is considered to be the most significant event in chrysanthemum history. Japanese varieties had great size, new forms of flower and an extensive range of colours. (Extract from The National Chrysanthemum Society: Chrysanthemum Guide)

3. About Shinjuku Gyoen National Garden

The Garden, 144 acres, is located at the centre of Tokyo with 20,000 trees, includes 1,500 cherry trees (65 varieties), and attracts visitors constantly, over 1 million annually. The busiest season from March to May, cherry blossom season, welcomes 80 % visitors. In November when Chrysanthemum exhibition takes place the garden sees almost 10 % of the total annual visitors. The gardens are roughly divided into four parts; to the top (see plan below) there is **a modern-built glasshouse** which has collection of tropical, subtropical plants and endangered Japanese species, in the middle there is an **English garden**, to the right an elegant **French garden** in symmetric style, and to the top and to the left there are **Japanese stroll gardens** (with blue arrow), in one of which is where the chrysanthemums are grown for the annual displays. These plants have been grown by traditional methods, handed down to the present, since the Meiji period (1868 – 1911). This explains why the Gyoen is often said to be the birthplace of Japanese horticulture.

The location of the Japanese Garden where the Chrysanthemum Exhibion takes place (blue arrow) and the Chrysanthemum Field. (yellow arrow).

The location of Shinjuku Gyoen National Garden in Tokyo.



Shinjuku Gyoen National Garden

Imperial Palace

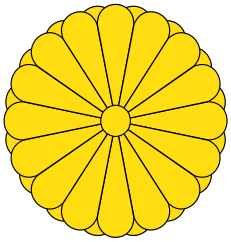
Akasaka Detached Palace

3. 1 The history of Shinjuku Gyoen National Garden

The shogun (the hereditary military governers of Japan from 1192 to 1867) bequeathed the land of the garden to Lord Naito Family who owned it from late 1600 to late 1800, and completed a garden here in 1772. During and after the Meiji Restroration (1867 – 1877), the house and its grounds were converted into two prominent places. One was **Naito Shinjuku Agricultural Research Station (1872)**, where food was produced for the Imperial family, and also extensive works took place for the cultivation of fruit and vegetables under the authority of the Department of Interior. The second was **Shinjuku Imperial Botanical Garden**, belonging to the Ministry of Imperial Household. In 1898 **Hayato Fukuba**, who became the chairman of SGNG, asked **Henri Martine**, the professor in Versailles horticultural school, to remodel Shinjuku Imperial Botanical Garden into the current landscape garden although it remained as a private garden until it became a public garden after World War II when the nation gained democracy.

From 1878 to 1936 the Inperial Household Agency held a Chrysanthemum Garden Party mainly for the Imperial family to view every year blooms. It started originally to celebrate Meiji Emperor's birthday on 3 November. (picture right)

The Chrysanthemum was designated as the Imperial Emblem in 1868 by Meiji Emperor. Since that time, for the Japanese, the chrysanthemum has a direct meaning as representing the Imperial family.



Chrysanthemum symbol of Imperial family (Ichimonji variety)

3.2History of cultivation of chrysanthemum at Shinjuku Gyoen National Garden

Chrysanthemums were grown and were exhibited to the Imperial family at the Akasaka Detached Palace from 1878 until 1928. The Gyoen became gradually annexed to the Akasaka Detached Palace and **the cultivation of chrysanthemum began in 1904 at The Gyoen**. By 1925, all of the chrysanthemums were grown at the Gyoen, and the first exhibition was held at the garden in 1929. In **1949**, after World War II, when the nation gained democracy, **the chrysanthemums were exhibited to the public for the first time at the Gyoen**. Recored show 40,000 people come to see the exhibiton in one day.

The garden has 110 years of the cultivation of the chrysanthemums and it has not changed its display style since originally started in 1878. This is the reason why the garden makes a very

special place for the cultivation of chrysanthemums. It has handed down a typical palace horticulture to the present day.

3. 3 The type of displays

Seven type of beds are displayed in the gardens during 1 November to 15 November every year. Except for the Kengai bed, the way of displaying is unique to the garden.

1. Kengai bed; the training technique to make a small-flowered single chrysanthemums look like wild chrysanthemums flowering on the cliff is called Kengai style (Cascade style) , first created in 1915.

2. Ozukuri bed ; it takes 18 months from one root division to produce hundreds of flowers in a dome shape by the unique technique of pinching and training. This original style was developed in Shinjuku Gyoen National Garden and set a precedent for the style of 'thousand bloom' chrysanthemums that are seen throughout Japan, first created in 1884.

3. Ogiku bed ; Ogiku (Large-flowered chrysanthemum) is a representative variety of the incurved chrysanthemums. A total of 311 plants in 39 cultivars are arranged in diagonal stripes in a traditional order. The arrangement resembles the pattern of the horse bridle used for SHINTO ceremony (Tazuna-ue style). This order of arrangement only happens in this garden and was first created in 1884.

4. Ichimonji and Kudamono-giku bed; two varieties of large-flowered chrysanthemums arranged as the Ogiku bed. (horse bridle style)

- Ichimonji is a single, large-flowered variety and is called Gomonsho-giku (The imperial crest of the crysanthemum.
- Kudamono (spider) variety has thin and straight tubular petals, first created in 1925.

5. Ise, Saga-giku (giku: chrysanthemum) and Choji bed; Three classical varieties of chrysanthemums are displayed. Ise and Saga varieties are trained to make a form of broom and Choji variety is trained to be called Ichiroku-zukuri; one flower in the centre is surrounded by six flowers, first created in 1955.

> Ise variety derived from Mie Prefecture has crinkled and drooping petals

> Saga variety derived from Kyoto has thin and upright petals

> Choji variety has anemone-like flowers

Ise–giku

Saga-giku

Choji-giku

Choji-giku

6. Edo-giku bed; a classical medium-flowered chrysanthemum developed in Edo (Tokyo) during the 18th and 19th centuries. The characteristic of this particular variety is that flower petals change in appearance as the flower opens. Each cultivar is trained to produce 27 flowers. This bed has the longest history in the chrysanthemum beds at the Gyoen, first created in 1878.

7. Higo-giku bed; Higo variety was developed in Higo (Kumamoto Prefecture). This classical single and medium-flowered variety was grown among the samurai (warriors) as part of their disciplines. The techniques of culture and the way of display are based on the strict rules established by the Hideshima school, first created in 1930.

4. Itinerary and work experience

5 June / 6 June: Travel to Japan

1st week (Monday to Friday)
9 June - 13 June Introduction and garden tour by Mr Matsui Manager, Mr Nishizawa who is a member of staff. Joining chrysanthemum garden department in the late morning on 9 June.

2nd week (Monday to Friday)
16 June ~ 20 June working in chrysanthemum garden department.

3rd week (Monday to Friday)
23 June ~ 27 June working Chrysanthemum garden department.

28 June : Visit to Mr Moro (a chrysanthemum expert)

Shinjuku Gyoen National Garden – the Japanese garden

4. 1 The Chrysanthemum Field

The Chrysanthemum Field occupies three acres of the south west area of the garden adjacent to the Japanese garden and the public cannot access the field. The field contains stock plants field, seedling field, nursery, allocated area for planting and training particular forms, greenhouses, a hybridising house, compost area, tractor shed, tool shed and general warehouses.

4. 2 The garden team

The garden team, of ten people, is called 'Chrysanthemum Department' and looks after the plants all year round from hybridisation to final display. Two of the team are belong to The Ministry of the Environment and they make decision about day-to-day work. One of them, Mr Yamada, is the Head-Gardener and his deputy, Mr Nakazawa, who was one of my main tutors at this time. The rest is belong to the Association of National Park, which also looks after the Imperial Palace in Tokyo and the Kyoto Imperial Palace in Kyoto. One of them, Mr Iwashita, was the former Head-Gardener of the Chrysanthemum Department who retired a few years ago. He was also my tutor.

Every Monday, 20 people, over 60 years old, who studied Adult & Community learning in horticulture come to the garden for volunteering. They help with weeding, clearing / washing pots and discarding unwanted plants and do other less skilled jobs. (from lef to right below Mr Nakazawa, Mr Iwashita (with blue shirt) and the volunteers.

Mr Nakazawa

Mr Iwashita

The volunteers

Mr Nakazawa's interested in growing chrysanthemums started exceptionally early at the age of 11. By the time he was a student at Tokyo University of Agriculture, he worked for the Gyoen on a part-time base for three years. The Gyoen had been approached by The New York Botanical Garden to recruit a specialist in chrysanthemums. When he graduated, the Gyoen appointed him to the role in New York on chrysanthemums where worked for seven years. Early this year, 2014, he left the garden as he was recruited by the Gyoen to be the foreman of Chrysanthemum Department. Around the time the Botanical Garden approached the Gyoen, Longwood Gardens, Pennsylvania, also requested the Gyoen to teach their skill to a Japanese woman who workd for Longwood. She joined the chrysanthemum team several times and mastered the technique. Now the both gardens have exhibited spectacular chrysanthemum displays in Autumn.

4. 3 Growing media and composting

Japan has four seasons and, particularly, summer is extremely hot compared to the UK. On the other hand, winter is moderately mild compared to the UK. Typically in August, maximum temperature reaches up to 38 ~39 °C and minium temperature drops rarely below 25°C, with high humidity all the time. When I visited it had just become the rainy season. In order to cope with the amount of rain, they blend a special compost for the plants to improve the drainage. There are mainly eight materials.

1. Compost (very coarse)
2. Charcoaled rice hulls
3. Charcoaled husk of coconut
4. Chipped husk of coconut
5. 'Soft Silica' (Silicic acid 72% plus other minerals)
6. Akadama
7. Perlite (not shown)
8. Vermiculite (not shown)

1

2

3

4

5

6 - a

6 - b

1. Compost

There are windbreak and boundary trees between the Chrysanthemum field and the adjacent garden, Japanese garden, where all the chrysanthemums are exhibited in November. There are mainly three types of evergreens (Fargaceae): *Castanopsis sieboldii, Lithocarpus edulis* (syn. *Pasania edulis*) and *Quercus myrsinifolia.* Every January for two weeks, the gardeners collect leaves, twigs and acorns. These are gathered into the compost bays, 5 m x 5 m built 15 years ago. The reason why only evergreens are being composted is that they are not easy to break down, and hence, they hold coarseness a long time which helps the drainage of the plants.



2. Charcoaled rice husks (pH 8 ~ 9): because of its porosity, this material helps breathability, drainage, water retention, encouraging micro-organism activities and restraining harmful germs to plants.

3. Charcoaled chipped husk of coconut (pH9.1): because of its porosity, helps breathability, drainage, water retention and encourages micro-organism activity.

4. Chipped husk of coconut (pH 6.1): has abilities of expansion and contraction when wet and dry, helps drainage and stabilises soil temperature – cool in summer and warm in winter.

5. Soft Silica (silicic acid 72%, alminium oxide 10%, iron oxide 5%, sodium oxide 5% and some minor nutrients):

There is a similar soft cilica product in the UK, called EM-Lawn care
http://www.effectivemicro-organisms.co.uk/homes-garden/em-lawn_care.html

– extract from the web site -

'EM Lawn Care is Naturally rich in nutrients, trace elements and soluble silicic acids which promotes a stronger grass root, less weeds and elimination of moss.
From the mineralogical point of view EM lawn care prehistoric rock granules has a very high content of zeolites - zeolites are hollow-part minerals with astonishing qualities.
Zeolites are able to store nutrients making them available later.
Reduces the effect of calcium deficiency by it's alkaline effect and stabilises the soil to an optimum pH.':

6. Akadama; a type of granular soil which is sieved out fine soil or dust from the Kanto loam layer. (The Kanto loam layer is made up of heavy clay and does not contain any nutrients) . There are three types 'Akadama' – large, medium, fine.
There is no equivalent product in the UK.

7. Perlite (neutral pH)
http://www.powen.freeserve.co.uk/Guides/perlverm.htm#perlite explains as follows;

'The surface of each particle is covered with tiny cavities, which provide an extremely large surface area. These surfaces hold moisture and nutrients and make them available to plant roots. In addition, because of the physical shape of each particle, air passages are formed which provide optimum aeration and drainage. Because Perlite is sterile, it is free of disease, seeds, and insects.'

8. Vermiculite (neutral pH)
The garden uses vermiculite for sowing seeds and taking cuttings.

http://www.powen.freeserve.co.uk/Guides/perlverm.htm#perlite explains as follows;

*' **Seed Germination**---Use vermiculite alone or mixed with soil or peat, and very little watering will be required. You will notice that not only more seeds will germinate, but also they will germinate faster. When vermiculite is used alone, seedlings should be fed with a weak fertiliser solution when the first true leaves appear. A tablespoon of soluble fertiliser per one gallon of water should be enough. When vermiculite is mixed half-and-half with soil, peat, composted pine bark, or othe properly composted soil materials, no additional feeding normally is required right up to the time of transplanting. Because vermiculite is sterile, the threat of what some professionals call "damping-off" is virtually eliminated. And later, seedlings can be removed from vermiculite with little danger of breaking off hair roots, and the dense root growth enables young plants to take hold immediately.'*

4. 4 Week 1 (Monday, 9 June ~ Friday, 13 June) Temp min 19°C ~ max 33 °C

1. Selection and the first tying Edo Chrysanthemums

Display style; five plants produce 27 flowers, which are in a 66 cm container.

- Select five pots for the final display and three pots for back ups.
- Learn how to cross the first branches to prevent the stems from splitting. This method makes the final stems' position flexible or adjustable later as well as gaining extra length of stem. This technique is unique to the garden and used by no other gardens in the country. By this stage, all plants were pinched out once. The first pinching out is 20 cm from the soil, and has produced 4 ~ 7 lateral shoots.
- Reduce main stems down to three.

Selection by Mr Iwashita

Crossing the first branch (1 ~ 4)

Final adjustment in October

(2)

(3)

(4)

2. Repotting the Anemone Chrysanthemums

Repotting 86 plants in clay pots (15cm) to the final pots (27 cm) ; two plants / pot, 43 pots in total.

- All plants were a paired up by yesterday.
- In order to simplify the work, all materials, such as compost, pots and plants, is brought into the closest area to where the plants grow the rest of the season. Because of the wide space, a lot of people work together. If it is hot weather, a pop-up tent is used for shade.

- Before repotting, the roots of the plants are coated with 'Soft Silica' for sterilisation and prevention of rotten roots.
- The plants are potted deeply in order to encourage extra root-system and will be topped up with fresh compost twice later.
- The compost, particularly for the final potting, is blended coarsely readies for the coming 'rainy' season (generally lasts 40 ~ 45 days).
- After repotting, diluted plant food given.






3.Setting up pots, support systems (props) and potting up

- Firstly, 33 containers (66 cm), are filled with perlite, followed by the compost which is similar quality to that used for the Anemone.
- The centre pole is placed before planting. There are three size poles for the final display depending on the position of the plants in row- front, middle or back row.
- The selected five pots of each variety are placed in the container.
- The pole and the plants have to be in an accurate position.
- After planting, an additional 26 props per pot are placed accurately. Some from outside the pot.
- The 26 props are individually tied up to the centre pole.






4. Taking off the lower leaves of the incurved varieties as well as the other types . (Minimum 5 cm from the soil)

- To avoid pests and disease, splashing water and for the preparation of deep planting next month.
- To gain air circulation.


Before Afterwards

5. Pinching out the leaves (the display plants for the entrance of the garden)

- Pinching out every 7th leaf to encourage new shoots.
- Checking for any sign of pests and disease.
- Tying branches by raffia if needed. Green tape prevents from splitting. (show on the right)

1

Pesticide is used for controlling mite and splashing water to the back of the leaf is another controlling method. (above picture right)

The plant will be displayed like this in November.

Produce flowers from a single plant.

Week 2 (Monday, 16 June ~ Friday, 20 June) Temp min 19 °C ~ max 38 °C

1. To pinch out lateral shoots, and at the same time, to check an unwanted shoot called 'Yanagi-me' (willow shoot).

Finding an unwanted shoot 'Yanagime' as early as possible is crucial during growing season in order to produce good flowers. The shoot looks like a shoot of willow leaves, hence its name. If a plant is under low light level for a few days, it starts producing a flower bud as the chrysanthemum is a short-day plant. If a Yanagime is left to grow, it will not produce any lateral shoots that would needed later. There are a few tendencies that will increase likelihood of Yanagime: (1) if a cutting is taken early, February~April. (2) it depends on cultivars.

These are 'Yanagime's. Left is rather too long to be spotted. Right shows pointy leaves and the bud.

Soon after pinching out.

It is important to fix a support while the shoot is flexible.

A plant which has tubular flower petals is more likely to have a weak growth of roots system, compared to the others. (below left, centre)

During growing season, it is practice to pinch out lateral shoots straightway when they appear. Gyoen leave unwanted lateral shoots, particularly on the Spiders, to help their root system grow vigorously while they are in the 15cm pots.



2. To tie chrysanthemums with faffia temporarily which need to be bent down later. (above right)

This is a quick method of supporting plants to prevent wind and rain damage.

3. Taking off the lowest leaves of 'Ozukuri' up to the first or second pinching point.

Almost all the plants have a patchwork mix of yellow and green leaves on their lowest stems. It is important to take off yellow leaves as they give off ethylene. Some plants need to have leaves 'uncovered' even higher in order to regain from damage. There are some plants that show strong growth at their early stages, but run out of energy in the later season and viceversa. Thorough observation is needed every day and requires adjustment to the sun light level by changing the screen to be either open or closed. In September, the plants are transferred to the final wooden pots.



4. Setting up plastic mulch in the trial field where the plants are grown from seeds hybridised last autumn, to produce and the display plants for the bedding in autum.



5. Watering and holding down the stems of Cascades and miniture Cascades.

These are two type of cascades, the stools from last Nobember and the other from January / February. Both need the lighting system in the night during the early sowing season.
They are pinched out every two leaves to produce a balanced plant. The best time to hold down the stems is the midday onwards as early morning the stems tend to be stiff. The cascade will be continued by pinching out until the end of July.






6. Final repotting Saga and Higo chrysanthemums. Saga is to 23 cm and Higo is t20cm.



7. Final selection of the cascade before going to be planted out at the trial field.

(The plants are from hybridised seed from last year and have been pinched out once.)

Need to check; (1) the stem has grown evenly. (2) longer the better between leaf axils. (3) total plant quality and balanc


Gyoen propagates chrysanthemums vegetatively. These can be used to display for 4 ~ 6 years. However, the vigour of the plant deteriorates gradually with the passage of the years. The garden hybridses every year in order to retain their characteristic quality. They harvest 5,000 ~ 6,000 seeds every year to1,000 ~ 1500 plants after germination. After further selection, only 50 to 100 plants go to the trial field. The observation period is normally after 3 years with the 4th year being the shortest time to go to be displayed (normally takes 5 ~ 7 years). By the time of display, remain only one third of the remaining from the trial period.

8. Feeding, spraying and programme

Feeding; after take cuttings and potting on, a few tablets of 5-5-5 fertilisers are given to 15cm pots, followed by a few tablets of 12-12-12 fertilisers twenty days later.

Spraying; the garden uses mainly two types of chemicals, 8 types of disinfectant (steriliser) and 30 types of insecticide.

9. Growth regulators

The garden use hormone powder. B-NINE is used for Saga chrysanthemums for shortening the plants; Gibberellin is for Ise chrysanthemums for longer stems.

10. Selecting Edo and Anemone chrysanthemums for the propagation (stool) next year.

11. Carry out unfinished job from last week.

Week 3 (Monday, 23 June ~ Friday, 27 June) Temp min 19 °C ~ max 38 °C

1. Setting up props for Ise chrysanthemums and tying the branches.

Ise and Saga chrysanthemums are displayed in a style called 'Bloom-like forms', using the characteristic of the branches to grow upwards - it looks like a form of bloom being turned upside down. Two plants are planted in a pot and the two stems are tied together to the prop. (picture 1) . The branches are pulled together at appropriate intervals so that the leaves do not overlap each other. (picture 2)

1 2

Key point

- The tallest stem is tied to the centre prop.
- At this stage, there are 7 ~ 8 stems, and reduced to 5 stems by the final display.

2. To take cuttings for Ozukuri

The garden takes 300 cuttings in total every year, but only 8 plants are chosen to grow. The final display is further reduced to 3 plants. In June, the garden takes cuttings for the plants which produce new shoots during autumn. The shoots are divided in November and become a potential plant for one of the displays.
It takes three weeks (20 days) from taking a cutting to potting on.

- Method -

1. To choose good cutting materials select plants which have short internodes as only the nodes produce the new shoots. In order to clean the surface of the cutting sections, snap them by hand and strip off lower leaves.
2. Soak them in tonic water for a few hours before they go to the propagation bed.

Cutting materials

Soon after strip off the leaves

unsuitable stems

Suitable stems

The buckets contain tonic water

Propagation room

Hold a stem with two hands, pull to break stem again before dipping in hormone rooting powder.

Putting the stems very deeply into the beds which are made up three parts vermiculite to one of SoftSilica.

Giving tonic water *

Damping down to raise humidity in the room, room temperature 25 °C

*In spring, they raise the water temperature to 22 ~ 23 °C.

3. Potting on cuttings which are for bedding.

1. Before potting on, terracotta pots are well soaked. (a)
2. Leave hessian cloth at the bottom, fill with compost and put in plant. (b) and (b)'
3. Within a week, props are put in postion before plants develop a root system. (c)

(a)

(b)

(b)'

(c)

4. Holding down Edo Chrysanthemums (continue from 1st week)

1. To start hold down strongest stems by tying with raffia.
2. Weak stems are not to be bent.
3. Finish off at even height.
4. To get sunlight evenly.

5. Tying the stems of chrysanthemums (display style; Oozukuri)

To ensure even growth of the branches, the branches that have bent down are lifted up. The branches that have become crowded are spread apart and tied. All the branches are tied at even intervals so that they have good air flow and receive sufficient sunlight.

Setting up props in preparation, if needed.

5. Visit specialist -1- Mr Moro who is a show-grower of my hometown.

In November 2008, I had a chance to visit a local chrysanthemum show at Omiya Shinto shrine in my hometown (above picture). I found his name, by chance, as an organiser of the show. During this current visit I contacted him for the first time and visited him on Saturday 28 June just before finishing my bursary trip. He is a director of the two separate local chrysanthemum associations and is a regular prize-winner. He welcomed me with his two local friends, Mr Tsuchiya and Mr Kuchiki, who also grow chrysanthemums as their hobbies and are also prize-winners a couple of times.

The reason I wanted to see him was to talk about the three-stems style which the Gyoen did not grow in their growing history and to learn some growing tips. The Gyoen thinks the style called 'Three-stems' or 'Bonyo' (picture right) is for commoners'. Instead, The Gyoen grow a single stem which reflects the family history of the Emperor, who has an unbroken line of reign.

Mr Moro in front his work on Cascade

(From left) Mr Tuchiya, Mr Moro and Mr Kuchiki

He kindly showed me how to guide three-stems using wires and plastic packing string and explained the whole process from propagation to exhibition display. Chrysanthemum in Bonsai style is one of his passions. This is much more complicated than three-stems style. The visit was very informative because I had a chance to see techniques and materials which I did not come across at the Gyoen.





Growing tips for 'Three stems' or 'Bonyo'

These tips relate to growing in the Japanese climate which is much milder in winter and hotter than the UK.

1. By the middle of March, giving fertiliser to the stool befor take cutting.
2. Recommended cutting week; **the end of April to the beginning of May**.
3. After 2 weeks to 3 weeks, need to be potting on cuttings. When the plant is **8cm**, needs pinching out.
4. Potting into 15 cm pot.
5. Guiding three stems to props and pinching out the growing tips * is finished **by the end of June.** (* This is for encouraging even height)
6. Potting up to the final pot is between the middle of July and the end of July.
7. **Do not give Nitrogen (N) after September in order to divert the plant's energy for flowering**.
8. Give water in the morning. (Not late afternoon)

Makiko Kuga

Visit specialist -2- Mr Thatcher who is a member of the Southern Group of National Chrysanthemum Society on 23 August 2014.

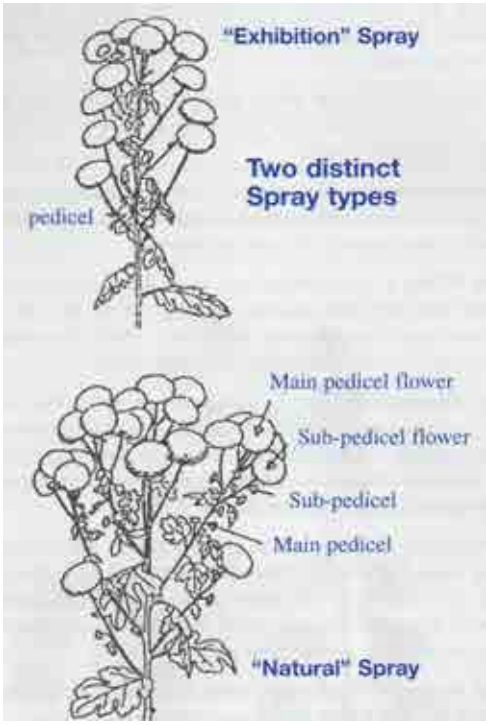
I met him, by chance, when the National Chrysanthemum Society had a plant sale at Hyde Hall in April 2014. I bought a half dozen spray chrysanthemums from him, which are his speciality. He grows them at his allotment in Kent for chrysanthemum shows and sells any surplus cuttings. The plants he grows are called 'natural form'. (*)

* Sprays can be exhibited in two forms, either as a **Natural** or an **Exhibition** spray.

Chrysanthemum Guide (1998) gives a definition of the two form of sprays as follows;

'A NATURAL spray is a lateral with flowers ranging from bud to fully developed and conforming to one of the accepted spray forms. This type of spray should not be disbudded other than maybe the crown bud and any pedicels that would otherwise emerge from below vase top.'

'An EXHIBITION Spray with only one bloom on a pedicel is regarded as the perfect spray form and therefore where classes are provided for these sprays they should be asked for and presented in an exhibition form.'



Mr Thatcher kindly showed me his allotment where most of his plants were under a cover which was set up just before I visited him. The plants need good sunlight during the growing season. They also need good protection from rain and wind before the plants come into flower.

He, by chance, found one of his plants was infested by **chrysanthemum eelworm** and explained the symptoms.

The RHS PEST&DISEASES (1997) p117 explains it as follows;

Symptom: Foliages on chrysanthemums, Japanese anemones, penstemons and many other herbaceous plants progressively turns brown and dries up from the base of the plants upwards.

Causes: Microscopic nematodes or eelworms, *Aphelenchoides ritzemabosi,* which feed within the foliage. The infestation develops most rapidly during damp weather in late summer and autumn as the foliage starts to age.

Control: Destroy badly affected plants. Dormant chrysanthemum stools dipped in hot water will produce shoots for cuttings that are free of eelworm. The old stems are cut down and soil washed from the stool before immersing it for five minutes in water held at 46 °C (115°F) . The amount of heat is critical, as too much will damage the plant, while too little will allow eelworms to survive.

Note: Chrysanthemum Guide recommends (p123) Hot Water Treatment for White Rust.

I gained extra information from this visit such as;

1. different flowering types and how to care for them during growing season
2. types of flowers and colours, which are sometime difficult to judge from catalogues
3. possible pest which I would encounter
4. leaning about the UK growing conditions

6. New display suggestions for the Vinery of the Victorian Kitchen Garden

The vinery was rebuilt in early 1800s on the same site where an orangery used to be. It was restored in 1999. The five bays of the vine house used to be maintained at different temperatures so that the grapes matured at differing rates. The show house is situated at the centre of the vinery, which would have been visited by both the family and guests of Audley End House as part of their tour of the garden.

The show house plays an important role for the kitchen garden, as the vinery is the main feature of the garden and is the main entrance of the vinery in which we exhibit seasonal displays;

1. Hyacinths and daffodils (January ~ March)
2. Schizanthus (April ~ early May)
3. Scented leaf pelargoniums (May ~ September)
4. A variety of pumpkins and squashes (October)
5. **Chrysanthemums (November ~ December)**

Some suggestions

Jennifer Davies describes in her book The Victorian Flower Garden (1991);

A favourite Chrysanthemum in Victorian times was the Pompon, which was particularly useful for cutting as it flowered freely ..... two miniature flowering varieties introduced by Robert Fortune in 1847. One was minimum and the other Fortune called 'the Chusan Daisy' ..... and Japanese Chrysanthemums, which Robert Fortune introduced in 1861. Most of the plants were grown in pots in glasshouses and destined as cut flowers for mansions.

From the above description, I chose mainly Pompon and Japanese Chrysanthemums (incurveds and spiders) , which will be rotated in turn.

The Show Room (for the show bench)

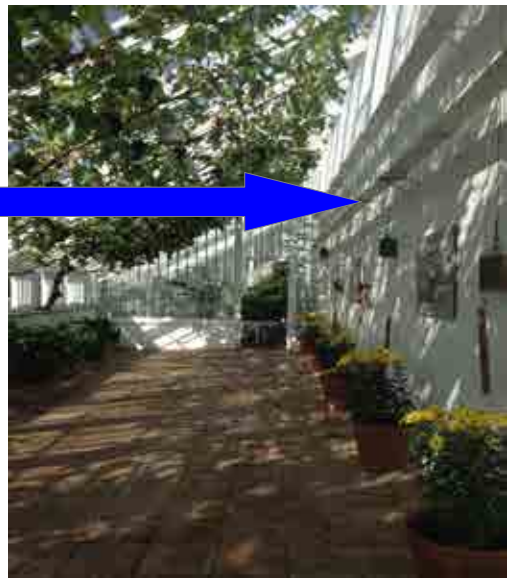
<Year 1>

Spray (23 cm pots or 9") flowers with mixed colours in November. To prevent getting them too tall **they should be clipped hard in early August**, reducing them to 30 cms (12") in height.
(Chrysanthemums Direct or other suppliers – Late Spray series, more than 20 colours)

< Year 2 >
Late Intermediate Varieties / Late Incurved Varieties (Chrysanthemums Direct or other suppliers) (1m ~ 1.3m height)

< Year 3 >
Spider (Chrysanthemums Direct or other suppliers – Fantasy series, more than 20 varieties) 1.2m height

The Strawberry Shelves



There are two strawberry shelves on the wall right next to the show house. These are used from May for early harvest of strawberries. The lower shelf would be a possible display area, if any cascade chrysanthemums are available in future. (There is no cascade variety available in the UK at the moment)

Display flower pots

There are 10 pots (45cm) in total in bays of the Vinery. The displays are started with spring bulbs, followed by pelargoniums in summer.

A possible display would be Late varieties of sprays which have been suggested for the Show House. When they are displayed at the central show bench, Saga Chrysanthemum that the kitchen garden already has, could be displayed in the bay, using the technique I learnt, to avoid duplicate display.

7. Issues and overall summary

There were two issues of growing the chrysanthemums at the Kitchen Garden; **Quality of the stock** and **Propagation**. The issues have been solved by this project.

Quality of the stock

The chrysanthemum display at the kitchen garden started with two packets of chrysanthemum seeds which I obtained from the catalogue of a major seed company of Japan in 2009 and 2010. These seeds were sold as 'cut flowers', containing mixed colours with different types of flowers. The 2009 seeds were predominantly pinks and the 2010 were predominantly yellows. I selected flowers and recorded them individually and propagated by cuttings in spring. Over five years, it has been noticeable that the quality of chrysanthemums deteriorated rapidly. By September 2014, there are only two types of chrysanthemum that can be displayed. I could not understand why.

2010

2013

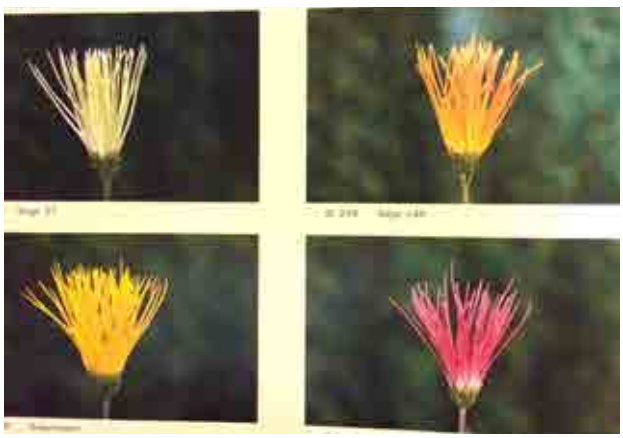
Chrysanthemum Guide (1998) p124 explains as follows;

> 'Every time we take a cutting we are actually taking and fixing a new sport, for although the resultant flowers will be almost certainly identical to the previous season's it is just as possible for your new cutting to be an ever so slightly inferior clone of the plant it was taken from. This is why stock selection is so vital. To the amateur grower who should not only select for flower quality but also for vigour, this selection process is our first and best line of defence against stock deterioration. The more of a cultivar that you grow the better the chance of maintaining quality in your stock. This would explain why cultivars grown in greater mumbers by the amateur stay the course for so much longer. To grow twenty of a cultivar and select two stools for propagation the following year is far better than to grow two or three of cultivar and select down to one stool. The chances of finding an improvement are far greater if you grow cultivars in big numbers.'

This has explained clearly the answer to my question. I suggest that the displays have to start again with new stocks that need to be topped up with more new stocks every several years. The Gyoen is aware of this as 'an aged deterioration'. The Gyoen hybridises themselves in order to keep the true characters of the chrysanthemums, most of which are not available to the public. Regarding hybridisation at the Gyoen, one of the senior members of staff has concerns about it. For more than 100 years, the Gyoen has hybridised themselves. This means that the chance of finding good flowers has been getting slim as the flowers do not produce much pollen as a result of the hybridisation.

When Mr Iwashita, one of my tutors, and I had a discussion about hybridisation, he told me a very interesting story: when he was invited as a guest speaker by a chrysanthemum society in Kyoto where Saga chrysanthemums originated from, he came across a totally different form of saga chrysanthemum there – an almost unrecognisable one. He believed that these were 'sport' chrysanthemums as a result of repeat cutting for a long time. He explained to the members of the society how important hybridisation was and offered them The Gyoen's 'true' Saga chrysanthemums, but they refused as if they had an allergy to hybridisation.

Coincidentally, after I returned from Japan, and I researched to find chrysanthemums for this report, I found an interesting article about Saga Chrysanthemums in RHS The Garden (1998, vol 123 p772) : Saga-giku Chrysanthemums Ancient sagas. (picture left) and Saga Chrysanthemum at The Gyoen. (right) When I heard the story from Mr Iwashita, I could not imagine how different the Sagas were. I could be wrong, but in the picture on the article there were no Saga chrysanthemus I have known.



Propagation – a suitable container

A chrysanthemum, in general, needs to be taken a cutting from **a stool** (*1) or **a sucker (*2)** or on an above ground stem of **a mother plant (*3)** as early as February onwards to produce flowers between September and December. Normally I take cuttings and insert them very close to the rim of a pot which creats easy rooting. But when it comes to growth, particularly, three-stem plants had a tendency of showing uneven growth, one stem being much shorter than the other two. At the Gyoen, one of the volunteers who was a very keen chrysanthemum grower advised me to grow in a different container such as a seed tray or even deeper tray. According to him, a root system has to be evenly distributed otherwise this greatly effects its top growth.

*1 : The basal part of an old plant with stem and main roots attached.
*2 : A shoot originating from the stem below ground.
*3 : A pinched vegetative stock plant with multiple side shoots, the tips of which are used as cuttings.

Overall summary

It was such a very long journey since first I came across the breathtaking display at the Gyoen in 2008, not knowing I had a chance to work with them six years later. Before the bursary, I had focused on horticultural practice such as the techniques of displays and how the plants were looked after, probably what the majority of keen gardeners would be interested in. By the end of the bursary, as well as horticultural practices, I realised how important and crucial it is to retain their characteristic quality, such as flower shape and colour, to fit their displays. Furthermore, the number of varieties at the Gyoen decreases by 3 to 5% each year, because old ones die and one is discarded. But by increasing the new varieties the total number is well balanced. The oldest hybridisation recorded at the Gyoen dates back to 1893, and the unbroken chain of breeding techniques and effort over 120 years has made the spectacular displays of today.
I chose a good time to join the team and it was very sucessful. I was allowed to be involved in a variety of jobs from selecting good plants to taking cuttings, which I had not expected at this time of year.

Finally, I would like to suggest to one of the UK leading gardens, such as RHS Garden Wisley, to display the classical chrysanthemums. I have gained a private collection of a wide range of these varieties as a result of the Bursary and my visit to Japan. I am more than happy to share them, so if someone is interested, please contact me by email. makikokugb@hotmail.co.uk

8. Travel advice to Japan: I recommend two travel companies, you may be able to find cheaper tickets.

Japan Travel Centre; http://www.japantravel.co.uk/
Euro-Japan Holiday; http://www.awlt.com/

9. Budget breakdown

Flights: Heathrow – Tokyo / Narita, via Paris / Holland …..... £581.65

Coach (UK) : Stanstead Airport / London Heathrow …..... £35

Coach (JP) : Tokyo / Narita – Omiya Station ..…..... £33

Travel expences to Shinjuku Gyoen (15 days x £9.76) £146

Subtotal …..... **£795 (A)**

Personal contribution (food and accommodation) £100

Contribution from English Heritage (Travel insurance) £57.76

Bursary awarded …..... **£830 (B)**

*** (B) – (A)** …..... + £35

* Due to acquisiton of cheaper flight ticket, and the balance contributed towards accommodation.

.....

Makiko Kuga

10. Acknowledgements

I would like to exprsess my sincere gratitude to all those who were kind in accepting and supporting my study: Mr. Matsui Manager, Mr. Yamada Manager, Mr Nakazawa and Mr Iwashita at Shinjuku Gyoen National Garden; RHS Osaka Travel Bursary Fund; RHS Bursaries Committee; Mr Moro and Mr Thatcher.

I also wish to thank my employer and my colleagues, Audley End House and Gardens, English Heritage, for giving me the opportunity and their support. Without them it would never have happened.

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http://www.effectivemicro-organisms.co.uk/homes-garden/em-lawn_care.html
http://www.powen.freeserve.co.uk/Guides/perlverm.htm#perlite
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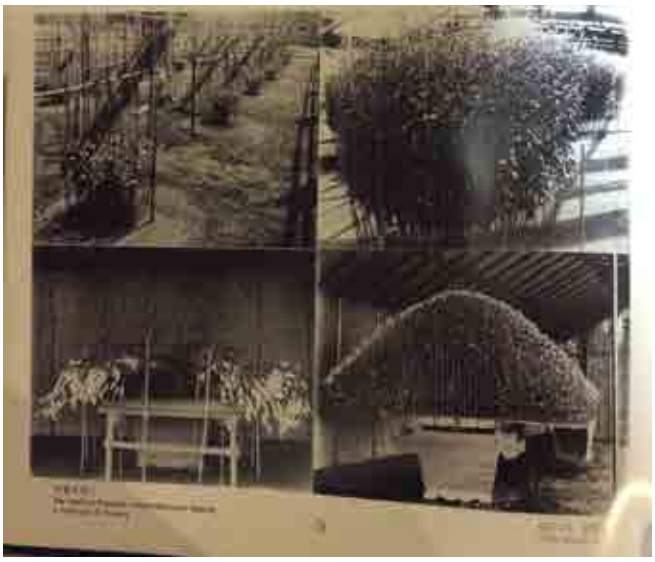
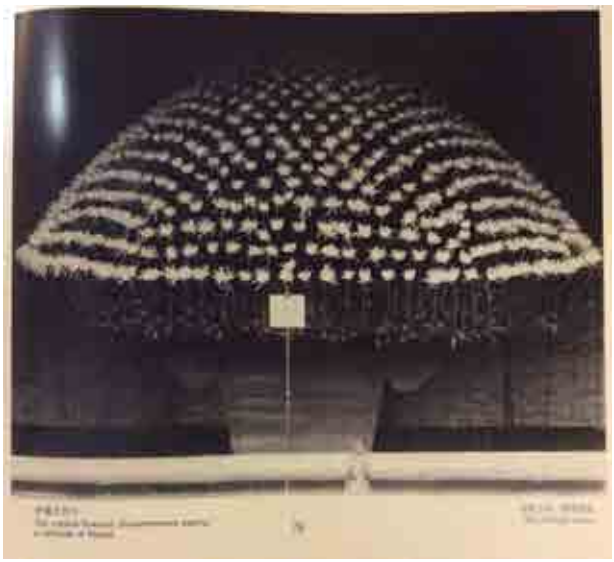
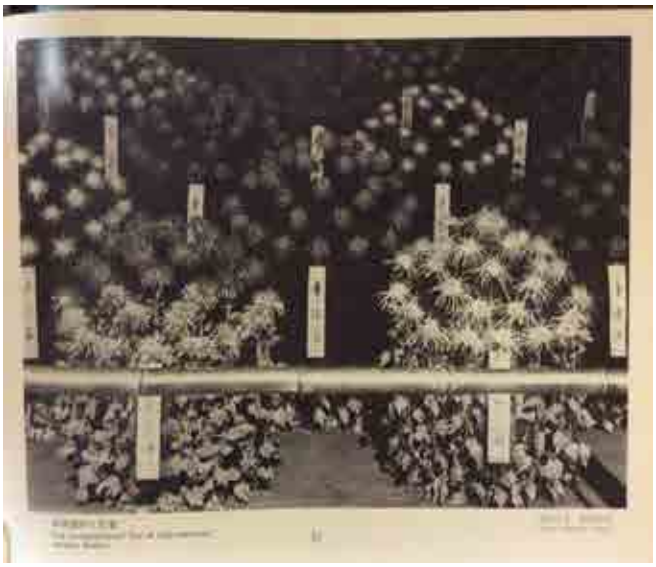
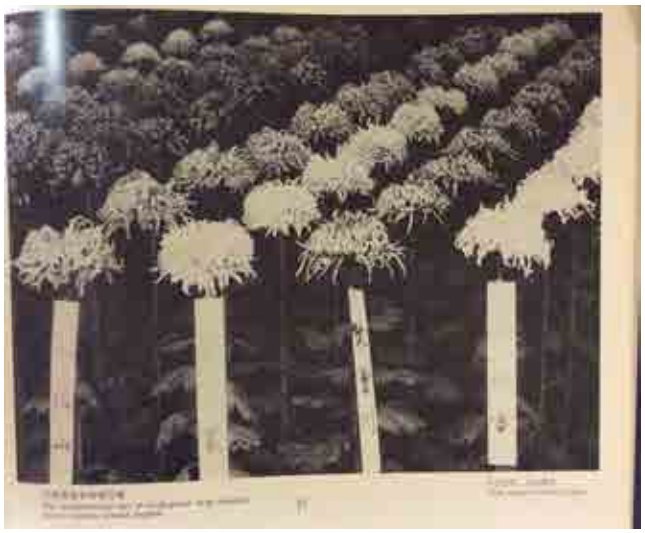
Appendices 1 Photocopy from 'The Shinjuku Gyoen National Garden Vol V The Breeding and History' – early 1900s









Makiko Kuga

Photocopy from 'The Shinjuku Gyoen National Garden Vol V The Breeding and History - 1980s

Appendices 2

Special Variety of Chrysanthemum 菊

Kengai bed

The training technique to make a small-flowered chrysanthemum to look like wild chrysanthemums flowering on the cliff is called *Kengai* style (cascade style). Each pot is placed on old wood pedestals and shows the harmony of color.

(First created in 1915)

Ise, *Choji* and Saga-giku bed

Three classical variation of chrysanthemums are displayed. Ise variety derived from Mie Prefecture has crooked and drooping petals. Choji variety has anemone-like flowers and Saga variety derived from Kyoto has thin and straight petals.

Ise and Saga varieties are trained to make a form of broom (*Hoki-zukuri*), and *Choji* variety is trained to be called *Ichimoku-zukuri*; one flower in the center is surrounded by six flowers.

(First created in 1955)

Ozukuri bed

It takes a year for one root division to produce hundreds of flowers in a dome shape by unique technique of pinching and training.

This original style was developed in Shinjuku Gyoen and set a precedent for the style of "thousand bloom" chrysanthemums that are seen throughout Japan.

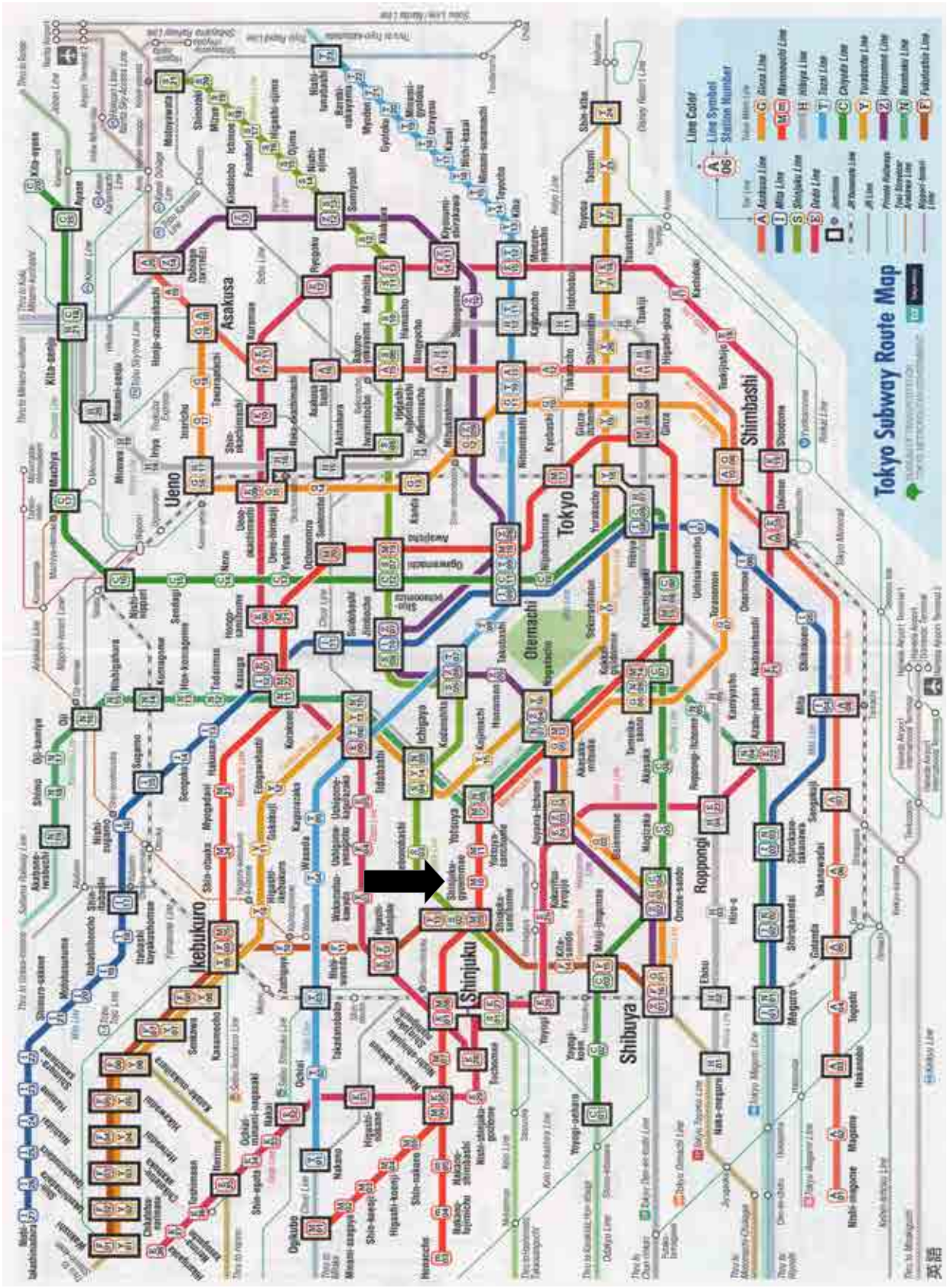
(First created in 1884).

These chrysanthemum beds within the Japanese stroll garden show different varieties of flowers in the unique method of display under the hut called *Uwaya*.

We suggest you follow the path to fully enjoy the beauty of each flower bed.

Please use the Main Entrance to the Japanese Garden to see the chrysanthemum exhibition.

Appendices 3 Tokyo subway route map



Appendices 4 Chrysanthemum suppliers in the UK

PLANT SUPPLIERS

Frank Charlton
3 Ashleigh Gardens
Cleadon
South Tyneside SR6 7QA
Tel. 07876 782087
Website www.frankcharlton.co.uk

Ivor Mace (Large & Medium Exhibition
Send s.a.e. to:
2 Mace Lane
Ynyswen, Treorci
Rhondda Mid Glamorgan CF42 6DS
Tel: 01443 775531
Website: www.ivormace.com

Halls of Heddon
Send 3 x 2nd class stamps for list
West Heddon Nursery Centre
Heddon on the Wall
Newcastle upon Tyne NE15 0JS
Tel: 01661 852445
Website: www.hallsof heddon.co.uk

Harold Walker
Oakfield Nurseries
Huntington
Chester CH3 6EA
Tel: 01244 320731

Beechwood Chrysanthemums
(Medium Exhibition Chrysanthemums)
Please note -no catalogue for 2010,
Hopefully back for 2011
Please send stamp for catalogue to
Ian Moss
18 Beechwood Grove , Prescott
Merseyside L35 5AX
Tel: 0151 4263164

Vin Aldred—Spray Specialist
41 Shakespeare Crescent
Dronfield
Derbyshire S18 1NB
Tel: 01246 415675

Chrysanthemums Direct
Holmes Chapel Road
Over Peover
Knutsford
Cheshire WA16 9RA
Tel: 0800 0467443
Email: sales@chrysanthemumsdirect.co.uk
Website: chrysanthemumsdirect.co.uk

John Peace Chrysanthemums
Send sae to:
9 Briardene Way, Easington
Co Durham
SR8 3NR
Email: johnpeace2007uk@aol.com
Website www.johnpeace.co.uk

W.R. Fulton
24 Woodwaye
Woodley
Reading
RG5 3HA

Woolmans Chrysanthemums
Rookery Farm
Joys Bank
Holbeach St John, Spalding
Lincs.
PE12 8SG
Website www. Woolmans.com
Email: customerservice@woolmans.com
Tel: 0845 6589137
Fax: 0845 6589141

Richard E Coles
Send sae to:
52 Twyford Avenue
Raunds
Northants
NN9 6HD
Email: coles_chrysanths@btinternet.com
Website: coleschrysanthemums.co.uk

John Nevill
11 North Street
Boney Hay, Burntwood
Staffs
WS7 2PB

Brookside Nurseries
129 Cropston Road
Anstay
Leicester
LE7 7BR
Tel: 01162 364564
Email; contact@brooksidenurseries.co.uk
Websitewww.brooksidenurseries.co.uk

Dargem Carnations
167 Doncaster Lane, Woodlands,
Doncaster, South Yorks,
DN6 7LH
Email: dargemcarnations1@gmail.com
Website: www.dargemcarnations.co.uk