

## GLASS IN JAPAN

It is clear that the Japanese knew how to manufacture glass very early, and could make both coloured and colourless glass.<sup>1</sup> Blair describes how glass was found, and possibly made, in Japan in the Yayoi period (c.300 B.C. to 300 A.D.) consisting of beads and glass discs. 'Increasing use of glass and expanding technology' mark the Kofun Period (c.300-710) Most of the glass was used in beads and there were various technical innovations. Several glass vessels, 'probably imports' also date from this time. After the introduction of Buddhism to Japan in 538, glass reliquaries were made. Later, relics were placed in small glass jars. The most superb example is at the Nara temple of Yoryuji. New techniques for bead making were developed and possibly for making transparent green glass urns.

In the Nara Period (710-794) glass making advanced even further. 'Many temples had construction bureaus of their own'. Large stores of beads and chests of broken fragments have been found; there are also 'fish-form tallies', 'four small glass measuring scales, and a handsome silver mirror ornamented on the reverse with brilliant cloisonne...' 'Bead techniques included casting, coiling, and blowing to produce a variety of forms'. This reference to blowing is important, for it is the first I have found to prove that Japan had glass-blowing very early. An indication of the quantity of glass is shown by the 'Shoso-in, a monument to the emperor Shomu (d.756)', which 'housed tens of thousands of glass beads, glass pieces, insets, sash accessories and rods for scrolls , as well as **cloisonne** work.'<sup>2</sup> In the Heian period (794-1185) we are told that 'Glassmaking declined after the demise of imperial and temple construction bureaus, and extant examples from this period are rare.' Yet there were some exquisite and complex examples of beads and inlaid glass.

If we pause at this point, we can see that the glass recorded here was for beads, decorations and religious uses. It seems clear that in the early period 'glass was not just a material to the Japanese, but was of a spiritual significance which it was to hold for many centuries.'<sup>3</sup> For these purposes the technology looks sophisticated, perhaps at a comparable level to that in China, Islam and Western Europe at that time. But the range of uses was small: there is no mention of windows, drinking vessels or looking glasses (mirrors). Already there is a divergence from the West, for all these other uses of glass had been developed by the Romans or their successors in the west by the twelfth century. Secondly, we can already begin to see a decline in the use of glass occurring in Japan, from about the ninth or tenth

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<sup>1</sup> The following account is based on Dorothy Blair's article in the **Kodansha**. See also her book.

<sup>2</sup> Klein and Lloyd, *Glass*, 65

<sup>3</sup> Klein and Lloyd, *Glass*, 65

century onwards. This will become more pronounced when we turn to the next period up to the arrival of the Portuguese.

In the medieval period (1185-1600) we are told that while glass beads were 'still cherished', 'local glassmaking clearly declined by the Kamakura period (1185-1333)'. Some glass was still used in images and inlays, but glass vessels were probably imports from China.' 'The decline continued through the Muromachi period (1333-1568), almost to the point of extinction; even bead usage shrank under the influence of Zen Buddhism, which eschewed image worship.' The situation was such that 'By the period's end, the use of glass, except in a few symbolic beads, was apparently unknown.' Although cloisonne was used as a decorative feature with small items, 'glass was not being made in the Azuchi-Momoyama period' (1568-1600). Indeed, 'So forgotten was glass that the first blown-glass vessels brought by traders and Jesuit missionaries in the latter part of the 16th century were greeted as an entirely new, exotic substance.'

This is indeed an extraordinary story, though not dissimilar to that of her giant neighbour China. Between about the tenth and sixteenth centuries, the great period of glass expansion in Europe, glass making practically disappeared in Japan. It will be worthwhile, if possible, documenting this period of the Portuguese arrival. At present the only references I have are from the early seventeenth century, as follows. Purchas, quoting XX, writes 'Glass-windows they have none, but great windows of board, opening in leaves, well set out with painting, as in Holland.' (Purchas, Pilgrims, 153)

The next period (1600-1868) is summarized in the Kodansha. The Portuguese and the Dutch brought soda-lime and lead glass to Japan. 'These glass objects were utensils for everyday use or ornament and did not have the symbolic power that had been associated with glass earlier.' Curiosity, however, led to people attempting to imitate them, but isolation made this difficult. Yet through trial and error some success arose so that 'Techniques spread to Osaka and Edo [Tokyo] ..., where glassmaking techniques developed and advanced. The first quarter of the 19th century was noted for its fine glass products.' Various feudal lords, in particular Satsuma, were experimenting with glass manufacture. The disruption caused by foreign pressure from the middle of the century led to the virtual disappearance of glass manufacture, but 'in Edo private glass shops continued as usual'. The account ends by noting that 'Numerous Edo-period glass items survived manifesting skill and often a fascinating ingenuity.'

The impression from this account is of a gradual rediscovery of glass-making. But again the range of objects was limited, almost entirely restricted to luxury objects, particularly toys and decorative glass. The major uses in the West - windows, ordinary drinking glasses, spectacles, mirrors, are not mentioned. Certainly there is no hint at all at its possible use (in lens, mirror or flat glass) in science before the C17 Dutch and Portuguese influence.

One thing which was evident to visitors to Japan from the seventeenth century was that the superb technical craftsmanship of the Japanese, when applied to glass, produced wonderful objects. Kaempfer at the end of the seventeenth century had recorded the expansion of glass manufacture, and that the Japanese were blowing glass by that date. Speaking of Tokyo, he wrote that 'On both sides of the streets are multitudes of well furnish'd shops of merchants and tradesmen, drapers, silk-merchants,

druggists, Idol-Sellers, booksellers, glass-blowers, apothecaries and others'.<sup>4</sup> Towards the end of the eighteenth century, Thunberg also noted their ability. 'They are likewise acquainted with the art of making Glass and can manufacture it for any purpose, both coloured and uncoloured.'<sup>5</sup>

In the middle of the nineteenth century during Elgin's mission there was the same double theme. The Japanese could make wonderful glass, but only used it in a restricted way. The writer (Oliphant) noted that while ornaments were usually plain 'Those, however, in which the ladies indulge most freely are made of glass, in the fabrication of which into quaint devices the manufacturers are peculiarly expert. A favourite trick is to fill glass tubes of various shapes and patterns with coloured fluids. These are frequently used as hair-pins. Sometimes there is a globe at the end, in which the liquid may be detected by the air-bubbles as it glances in the rare tresses of a Japanese belle.'<sup>6</sup> Yet again, with all their ability, they used the substance almost entirely for ornamental purposes, harking back in a way to the eighth century peak of Japanese glass-making. The point was made emphatically as follows. 'It is singular that while the Japanese have brought the manufacture of glass to such perfection in certain forms - as, for instance, the most exquisitely-shaped bottles, so light and fragile that they seem as though they were mere bubbles, of every shade of colour, and beautifully enamelled with devices - plate-glass is unknown among them. Their looking-glasses are circular pieces of steel, polished so highly as to answer all the purposes of a mirror, and usually elaborately ornamented on the back.'<sup>7</sup> Thus two of the major uses of glass in the West, windows and mirrors, were not developed, even by the 1850's.

After the Meiji restoration (1868), there were a flood of new technologies and new uses. The development is again summarized in the Kodansha where the multiple uses of glass for windows, lamps, and many other purposes is described. Foreign experts were brought in and industrial glass production soon developed.<sup>8</sup> The result is that Japan is today one of the world's largest producers of glass, probably ranking second after the United State, producing, among other things, a vast amount of plate glass of very high quality.

The puzzle is this. The Japanese had all the knowledge to make high quality glass from at least the eighth century, and probably before. They did make wonderful glass objects, out of coloured and plain

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<sup>4</sup> Kaempfer, 3, 72

<sup>5</sup> Thunberg, Travels, iv, 59

<sup>6</sup> Elgin, Mission, 189

<sup>7</sup> Elgin, Mission, 189

<sup>8</sup> See also Rein, Industries, no systematic account of glass; see also Keizo, Japanese Life, 3 vols, 85ff.

glass, but almost entirely for religious or decorative purposes. After about the twelfth century glass-making died out. After the Portuguese re-introduced glass objects, for about three hundred years it was used for a narrow range of decorative purposes. We have to explain a set of absences.

## **Mirrors**

As we saw in the chapter on mirrors and the concepts of the individual, Japanese mirrors were traditionally made of brass or steel. They were not made of glass. Mirrors were widespread and very important sacred symbols. But glass mirrors were not developed, probably because they were not needed. Thus a whole dimension of perception, the mirror worlds so important in art and science, was more or less absent in Japan.<sup>9</sup> The mirror was used not to see oneself in, but to look through into the soul. The development of good flat glass for mirrors did not occur before the later nineteenth century.

## **Window glass.**

One of the things that particularly struck Europeans about Japan was the absence of glass windows. In the later seventeenth century Kaempfer was impressed by this. 'I must not forget to mention, that it is very healthful to live in these houses, and that in this particular they are far beyond ours in Europe.... because of the windows being generally contrived so, that upon opening of them, and upon removing the skreens, which separate the rooms, a free passage is left for the air to strike through the whole house.'<sup>10</sup> A century later Thunberg noted the absence of glass. He noted that 'window-glass which is flat, they could not fabricate formerly. This art they have lately learned from the Europeans...'<sup>11</sup> Thus 'There are no glass windows here; nor have I observed mother-of-pearl or Muscovy talc [mica] used for this purpose.'<sup>12</sup> Instead, there were wood and paper screens, which he described as follows. 'In each room there are two or more windows, which reach from the ceiling to within two feet of the floor. They consist of light frames, which may be taken out, put in, and slid behind each other at pleasure, in two grooves, made for this purpose, in the beams above and below them.'<sup>13</sup> He further adds that the windows 'are divided by slender rods into panes of a parallelogramic form, sometimes to the number of forty, and pasted over on the outside with fine white paper, which is seldom or ever oiled, and admits a

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<sup>9</sup> See Richard Gregory, J. Miller et al.

<sup>10</sup> Kaempfer, *History*, 2, 306

<sup>11</sup> Thunberg, *Travels*, iv, 59

<sup>12</sup> Thunberg, *Travels*, iii, 279

<sup>13</sup> Thunberg, *Travels*, iii, 279

great deal of light, but prevents any one from seeing through it.<sup>14</sup> Likewise in the 1870's Morse noted '...no doors or windows such as he had been familiar with...'<sup>15</sup> In general, as one recent historical survey put it, 'even the ordinary farmhouses of early Tokugawa had no windows save a few barred spaces for light and air...'<sup>16</sup>

There are several possible reasons for this absence. Firstly, the Japanese climate, on the whole, makes glass windows undesirable. For the very hot and humid half of the year they would have made the tiny house interiors very oppressive. Nowadays, it is only air-conditioning that makes many offices bearable. Secondly, the geology makes glass windows very dangerous, unless made of tough glass. There are almost daily earth tremors and frequent quakes in many parts of Japan which would have shattered early glass windows. Then there are the building materials; the flimsy bamboo structures are not suited for glass windows, unlike the brick work of Europe. Then there is the question of alternatives. Movable screens, made of the superior (mulberry) paper of Japan which lets through light but not wind is an excellent alternative to glass.

As Tanizaki wrote, '...the softness and warmth of paper, qualities which for a time we had forgotten; it stands as evidence of our recognition that this material is far better suited than glass to the Japanese house'.<sup>17</sup> Again, the anthropologist Maraini writes that Japan is 'a civilization of wood and paper - houses, temples, objects of everyday use, boats, umbrellas, windows, handkerchiefs, books, and newspapers, even clothes; wood and paper are intricately bound up with Japanese civilization in innumerable ways'.<sup>18</sup> The effects, or circularities, changed housing in their turn, which again Tanizaki notes. 'The fact that we did not use glass, concrete, and bricks, for instance, made a low roof necessary to keep off the driving wind and rain'.<sup>19</sup> Another factor was probably cost. Glass is expensive; only a wealthy middle class family can at first afford glass. The majority of the population in Japan until recently could not have afforded glass windows.

The other widespread use for window glass, which had such an influence in Europe, is for stained

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<sup>14</sup> Thunberg, *Travels*, iii, 279

<sup>15</sup> Ref XXX

<sup>16</sup> Hall (ed.), *Cambridge Hist.*, iv, 678

<sup>17</sup> Tanizaki, *Shadows*, 6

<sup>18</sup> Maraini, *Meeting*, 108

<sup>19</sup> Tanizaki, *Shadows*, 18

glass for public buildings, especially churches. [It would be interesting again to know how temples in Japan deal with the problem of letting in light but not cold. Is it just a difference of climate, of building techniques and geology, or are there also religious reasons for the development of stained glass decoration in Europe and (perhaps?) its omission, or even banning, in other civilizations.]

Further work is needed, in particular on the psychological or other effects of glass windows as they began to penetrate China and Japan. This is a subject interestingly touched on by Timon Screech. Screech notes that 'it was not until the second half of the nineteenth century that windows were commonly glazed' and quotes Thunberg to the effect that in 1775 'there are no glass windows here' and that 'the semi-transparent paper windows... spoil the look of the houses'.<sup>20</sup> Commenting on the Dutch manuals on housing with their emphasis on glass, Screech writes that 'Glass was relentless in its bisecting of inner and outer spaces, but it also allowed the healthy and unimpeded flow of sunshine, or, when opened, wind.'<sup>21</sup> He quotes a castaway who was recounting in 1791 what windows in St Petersburg were like. "'The **shoji** are made from sheets or **kira** or **bidoro** so that the wind is completely shut out, while you can gaze through exactly as if they were open.'<sup>22</sup> When these comments were made, the interrogator was reminded of the anthology of poetry by the Chinese Qing ruler, Qianlong, who in 1758 'versified on glass windows that Jesuit priests had recently fitted in his Summer Palace:

In Europe, they lack for nothing in amazing goods!  
My glass windows are bright and shining, clean and thick.  
Whereas most around our little courtyard gape,  
So that wind blows in, piercing the gauze drapes.  
I can see both outside and in,  
And how happy I am!..."

Screech continues, 'Qianlong went on to outline the sense of distancing that the material had on him, as it both opened up, and also closed off the outside:

Though bright in themselves, they are neutral substances,  
And show things through.<sup>23</sup>

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<sup>20</sup> Screech, *Western Gaze*, 134

<sup>21</sup> Screech, *Western*, 134

<sup>22</sup> Screech, *Western*, 134

<sup>23</sup> [note by Screech - Literally "the reflect things," the poet appears to liken the window showing what ever is behind it to a mirror which shows whatever is in front; he could, however, be referring to reflections in the glass. p.274]

Wind, clouds of dust, and the sun's rays may fall on them,  
But they remain impenetrable,  
So that the tables and seats within stay free from specks of dirt...'

The poet then commented how he could always see the streams and birds, people and flowers outside. Screech comments 'The glass did not falsify, and interposed nothing of its own, revealing the properties of things exactly as they were and as they transformed over time:

All things enter my field of vision, becoming clear and distinct;  
All phenomena display themselves to me in their beauty and ugliness.'<sup>24</sup>

### **Drinking glasses.**

In the Japanese numbering system, which classifies objects into various strange (to us) categories, one class consists, we are told, of 'liquids drunk with a glass, as water, wine, tea etc.'<sup>25</sup> The ordinal ending is **hai** 'for glasses or cups of any liquid'.<sup>26</sup> In fact, what is very striking is the absence of drinking glasses in Japan. Much of the most important development of European glass (in Venice and elsewhere) was in the making of drinking glasses, a continuation of its use in Roman times. Yet in Japan, drinking with glass seems, until the middle of the nineteenth century, to be more or less totally absent. Why? There are again several obvious reasons.

One concerns the nature of the drink. The Venetian glass was developed for the highest-status and ubiquitous cold drink - wine. In northern countries, where beer was the main drink, it was not drunk from glass, but pewter and pottery. Wine and glass seem to go closely together. One drinks with the eyes, as well as with the lips, and the glass enhances the effect. Certainly, if one is drinking very large quantities of hot drinks, hot tea, hot water, hot sake, then glass, unless very good, is a hopeless container. It will crack and the situation is made worse by the fact that thick glass (as in early glass) cracks more easily than thin glass (which would be developed later).

A second, and obviously related fact, is the development of ceramics. The Japanese, like the Chinese, did in fact drink from a vessel coated with glass, that is to say glazed. In other words, glass was everywhere, but not see-through glass. In this form it was beautiful and utilitarian, and the envy of Europe for many centuries. With such fine wares and wonderful pottery, who needs glass for drinking vessels? Indeed, glass is hardly needed for any other utensils; bottles could be replaced with pots,

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<sup>24</sup> Screech, *Western*, 135-6

<sup>25</sup> Alcock, *Tycoon*, I, 179

<sup>26</sup> Scidmore, *Jinriksha*, 294

bowls made with clay and so on. So, apart from the copying of precious stones and a little very fine cut, Satsuma ware., glass was not developed for drinking or other utensils.

As to the question of the development of glass as an aid to sight, that is lenses, prisms, spectacles and so on, there was no noticeable progress in this direction until the eighteenth century. The case of spectacles will be dealt with in chapter XXX below. The story of the impact of western scientific glass in Japan is best told alongside a broader discussion of glass as a tool of thought in the west and China and will be found in the next chapter. There we see how quickly the Japanese developed the craft skills to make excellent glass and how rapidly glass instruments changed Japanese vision and particularly their attitude to the value of precise knowledge.

### **Conclusion.**

Much more can be said on all these subjects. But there is enough to show that the 'substance' which we call glass with all its functional associations faded away in Japan. It was of little use, except for toys, pretty things, and holy things: aesthetics and ritual yes, practical functions no. Earlier we argued that the unintended consequences of this, on art, personality, science and so on are immense. We suggest that at the two ends of Eurasia two different cosmologies and ideologies built up, partly reflecting in one case the development of a glass civilization and in the other a pottery and paper one. The same story, with some added twists and on a larger scale is true of China, as we have seen.