CHINESE GLASS OF THE MING AND QING DYNASTIES

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This paper attempts to combine Yang Boda's "Brief Account of Qing Glass" (Yang, 1983), the report of the excavation of the Ming glass-house at Zibo (Zibo, 1985), and my own work based on a survey of Chinese glass collections in Britain and the Eastern States of U.S.A. (Hardie, 1983).

It comprises four sections: First, the situation of glass in China in the Ming Dynasty; second, the finds at Zibo; third, the historical data, principally relating to the Zaoban Chu (Imperial Factory); and finally an examination of the surviving material. I omit separate mention of the back-painted mirrors commissioned by Europeans between about 1740 and 1820, as irrelevant to vessel-making, and of snuff-bottles, which may be attributed to the various groupings outlined below, except for the interior-painted bottles in fashion from the 1850s to 1920s which again are a separate subject.

MING GLASS: THE BACKGROUND

Glass-making came relatively late to China, perhaps not before 500 B.C.: and was therefore overshadowed by pre-existent traditions of vessel-making in metals, jade and other hardstones, lacquer and porcelain. Essentially a luxury material, associated with diplomatic gifts to the Imperial Court and Buddhist reliquaries, glass had little chance to compete as everyday tableware but found its place alongside rare natural substances worked into ornaments. Even when, from Ming times, glass was more widely used in vessel-making, the traditions of other materials conditioned its form and decoration: metalware and porcelain determined that there should be a foot-ring, unnatural in glass, jade, that its substance be translucent, perhaps irregularly mottled, and its surface carved in relief, exploiting any local variegations in colour. The often gaudy colours of Chinese glass may represent an exploitation of possibilities not open in natural hardstones.

From a very early date, at least about 930 B.C., China received first "Egyptian blue faïence", then glass, from the Near and Middle East through trade and diplomacy. There is ample documentary evidence of this, substantiated by some archaeological data, from the 9th Century A.D. to the 14th, the period when Arab and Persian glass-making was the finest and most prolific in the world. About one dozen pieces of Syrian and Egyptian Mamluk enamelled glass are said to have come to light in China, the best documented being the 13th-Century Syrian bottles and stem-bowl from the mosque at Jiangzhou, Shanxi, now in the Royal Ontario Museum, Toronto. Such importation must have severely inhibited Chinese production.

That situation was reversed with the decline of glass-making in the Islamic world, so that Wang Dayuan, writing on China's overseas trade in 1349, lists the export of glass beads to the Ryuku Islands, Vietnam, Cambodia, Java, Sumatra and Southern India; these were of Chinese make, itemised with silk and porcelain as goods for exchange. Colours listed are red, green, blue *(qing)*, yellow, white or colourless *(bai)* and purple; perhaps also multi-coloured (the Chinese phrase is ambiguous). There is no doubt that they were glass, the words being either *shao zhu* ('baked beads') or *xiao zhu* ('nitre beads'); but there is no reference to Chinese glass vessels. In 1618, Zhang Xie's *Dong Xi Yang Kao* [An Examination of the Eastern and Western Oceans] mentions the glassware of the Dutch, but says nothing of Chinese, thus marking the phase of European domination in this medium.

Between Wang Dayuan's time and the arrival of the Portuguese in Far Eastern waters (1511), Chinese glassmakers would have had a secure home market and the opportunity to export glassware with limited competition only from India.

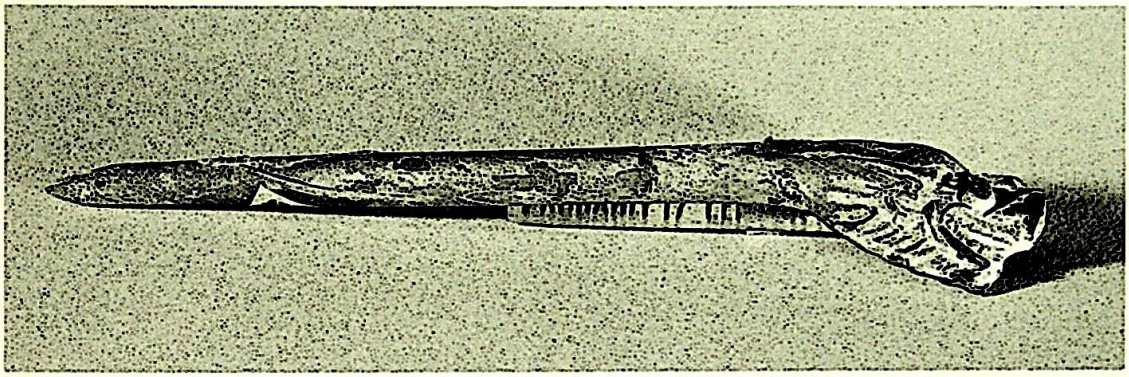
The production of glass in Ming China is proved by Cao Zhao's *Ge Gu Yao Lun* ['The Essential Criteria of Antiquities'], (1388), pp. 28a and 29b (trans. pp. 121 and 123) where we find that "snow white" jade was imitated in the North of China by heating chemicals in a jar; and that rock crystal was also imitated with chemicals, in blue *(qing)* as well as "white" (or colourless). Adjacent passages refer to the imitation of wax opals and of imported glass (*boli*, mistranslated as lapis lazuli). But there is no specific mention of glass vessels.

At the end of the Ming Dynasty glass-making is referred to by Li Shizhen in his pharmacopoeia *"Ben Cao Gang Mu"*, (1590): the *liuli* made by Chinese commoners from stone and chemicals was "fragile and factitious", but the *boli* of the countries to the South and West was brilliant as rock crystal, that made from chemicals by foreign alchemists being recognisable by its bubbles and lighter weight. Song Yingxing, in *Tian Gong Kai Wu*, (1637), is the first to mention vessel-making (bottles, containers and lanterns) as well as beads, and he locates the industry in Shandong. He specifies the use of nitre *(xiao)* and lead in their composition.

THE EXCAVATION OF THE ZIBO GLASS HOUSE

The existence of a Ming glass industry has been confirmed by the excavation in 1982 of part of a glass house in Zibo, Shandong province (Zibo Municipal

Museum, 1985), on a site some ten by forty metres. Beneath thirty to fifty centimetres of recent refuse with traces of burning lay Stratum Two, a double layer of yellow-brown earth with red clods, forty to fifty and thirty to seventy centimetres thick. It contained the foundations of 21 furnaces, round or square with a protruding fire-pit, their sizes going up to about a metre on the long axis and 60 cm. deep. These were arranged regularly in rows running North-South along three parallel trenches up to 2.7 metres wide, linked to form a rectangle 14.2 by 42 metres. A larger central furnace produced glass from raw materials, to be worked up in the smaller ones. From similar glass houses still in use in the region, it would seem that the hot glass was ladled out of crucibles in the large furnace onto an iron plate where it was cut into strips about a metre long; the strips were distributed to the minor furnaces, each worked by a two-man "chair", one either side of a curved tile marver at the glory hole. From the scraps left in them, it appeared that the furnaces excavated tended to specialise in pins or beads of a particular colour or colours.



1 Hairpin, turquoise glass press-moulded to form dragon's head; length 11 cm.; perhaps from Shandong, Ming Dynasty. City of Bristol Art Gallery.

The glass found included hairpins (plate 1), beads and rings, but no vessels. The hairpins were of opaque turquoise or white glass, threads drawn from the pot and press-moulded. There were beads in a transparent lime green glass as well, and some black and yellow. With them were raw materials, earthenware crucibles and a mould of finer clay. Analyses of the glass excavated show that it was essentially a potassium-soda-lime mixture with only traces of lead, using iron, copper, manganese and titanium as colorants.

The dating to Yuan and early Ming is suggested by the presence in the upper layer of Stratum Two of typically Yuan Cizhou stoneware and a Hongwu (1368-1398) cash; Stratum Three, below it, contained Yuan ceramics and Yuan and earlier cash, while the top stratum contained blue-and-white. The same issue of *'Kaogu'* illustrates (plate VI, 2, 3 and 4) jade hairpins of very similar design from the tombs of the Lu family at Shanghai (probably before 1544 but possibly as late as 1575).

DOCUMENTARY EVIDENCE OF THE GLASS INDUSTRY

Yang Boda's work is important in bringing to light primary documents of the Zaoban Chu and other contemporary sources, and in outlining the nature of the Former Palace Museum's collection, but misleading where he relies solely on a very late source, Zhao Zhiqian's *"Yonglu Xianjie"* (1881). Further, he is inclined to overlook ambiguities in the source documents, and to accept reign-marks on glasswares in his collection without apparent question. He frankly admits inability to subdivide the sixty years of Qianlong, or to differentiate Qianlong enamelled glass from later imitations.

Here I present the contemporary documentary evidence from his article and elsewhere relating to types of glass made, in chronological sequence.

1635 Chen Hongshou's painting of a clear glass bottle, apparently of Chinese make.

1637 Song Yingxing's reference to glass-making in Shandong.

1640 Drought and subsequent famine caused severe mortality among Shandong glass workers, causing a twenty-year hiatus in production.

After 1640 Sun Tingquan, who received the *jinshi* degree in 1640, gives formulae for coloured glasses in *"Yanshan Za Ji"* ('Miscellaneous Notes on Yanshan' i.e. Boshan, Shandong): colours named are crystal, true white *(zheng bai)*, red, indigo, autumn yellow, evening blue *(qing)*, ivory, true black, green and goose yellow. Yang's identification of the minerals should be regarded as tentative.

1696 Establishment of the glass house of the Zaoban Chu in the Yang Xin Dian Palace, Peking, eight years after the death of Verbiest, to whom it has previously been attributed. The Zaoban Chu glass house was staffed by workers enlisted from Shandong and Canton, and intermittently foreign missionaries were associated

with it, so that local traditions would from now on tend to merge.

1702 Wang Shizhen records (p. 131) that tobacco from Luzon is kept in glass bottles of various shapes and colours: red, purple, yellow, clear, black and green, the clear like rock crystal, red like *huoqi* (Note: Huoqi were bright red beads from South Asia; the word has been mistranslated as "fire"), extremely delectable . . . all made in the Imperial Palace *(Nei Fu)*, but there are also some popular imitations, not as good.

1705 Kangxi Emperor's gift from the Imperial Manufactory to Song Luo, Governor of Suzhou, of blue, decorated blue, white/clear, blue with gold flecks (aventurine) and yellow vessels.

1708 Cantonese workers in the Zaoban Chu making sky-clearing blue overlay (cased) glass, according to record of 1725.

1723-1735 Records of the Yongzheng reign name a wider range of forms, some with legs, spouts or handles; first mention of carved decoration, on amber cups; imitation of Ming lacquer, including chrysanthemum-petal bowls; colours include mauve, red, imitation carnelian, amber, opaque yellow, white (some with enamel), jade green with enamels, and white with red overlay.

1730 Mandarins substituting glass for precious stones as cap-buttons in official uniform: colours include clear, opaque white and opaque blue.

1732 Foreman reports failure to match Kangxi enamelled and gilded vessels.

1736 Accession of the Qianlong Emperor. While the Former Palace collection holds one piece of glass with the Kangxi mark and twelve with the Yongzheng, there are "several hundred" with the Qianlong, in a great variety of colours and decorative techniques.

1741 Aventurine glass made by the Jesuits de Brossard *(sic)* and d'Incarville. The Zaoban Chu expanded production, producing large chandeliers, etc., to match imported ones, until their deaths in 1758 and 1757 respectively.

1755 Imperial order for 500 snuff bottles and 3,000 other glass objects, typical of later two-thirds of Qianlong reign.

1770 Zaoban Chu unable to replace chandeliers. Missionary sources suggest less high-level interest in glass; the Jesuit Cipolla is unable to deploy his skills in glass-making.

1820 Cut-back in imperial orders under Jiaqing.

1858 Xianfeng Emperor orders glasswares to be undecorated, but to have accurate *(zhen)* reign-marks.

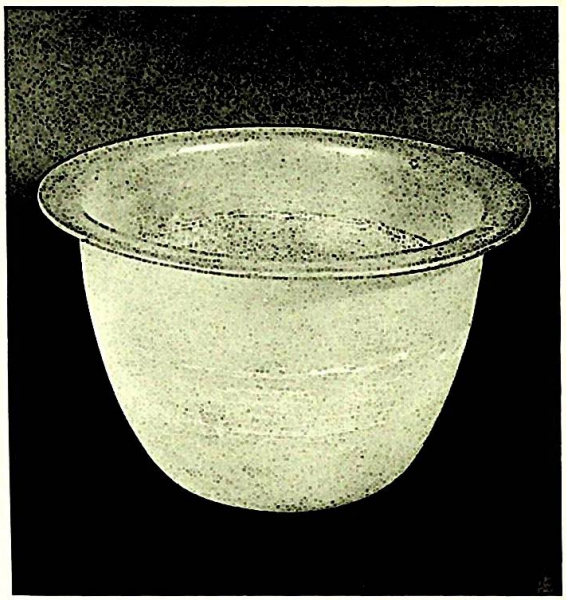
1903 Establishment of factory with German assistance at Boshan, superseding Zaoban Chu.

The foregoing data need much further amplification, but can to some extent be co-ordinated with groupings first outlined in my article of 1983, here updated:

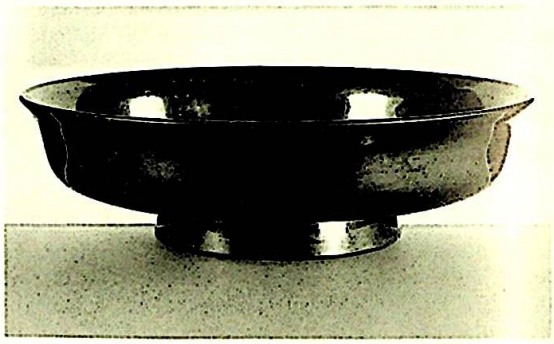
MING AND QING GLASSWARES

Wares with smooth profile and almost flat base in clear colourless glass, or cobalt-blue with backed-on foot:

The British Museum's painting by Chen Hongshou (Hulton and Smith, 1979, pl. 32) dated 1635 shows a sizeable colourless, transparent bottle of ovoid form with a slightly concave base. There are several jars and vases of approximately similar type (plate 2) in the major collections of the West: the glass has a somewhat horny appearance and the profiles are generally smooth.



2 Basin, with slightly concave base, clear colourless glass; diameter 21.5 cm.; Ming Dynasty, probably about 1635. City of Bristol Art Gallery.



3 Bowl, with backed-on foot-ring, clear cobalt blue glass somewhat crizzled; diameter 18 cm.; Ming Dynasty. City of Bristol Art Gallery.

Possibly associated with them are two conical and two flared-lipped bowls (plate 3) of blue glass, now crizzled, with feet formed by backing on a smaller bowl; all four are in the City of Bristol Museum and Art Gallery. This line of development seems to have been rather limited, so possibly it ends with the drought of 1640; however, some pieces in the next group, and some wares arguably datable to late Kangxi or Yongzheng, are of large size.

Wares with radial striation and fluting, sometimes spirally twisted, and a trailed-on foot-ring or kicked-in base, in clear metal, sometimes engraved:

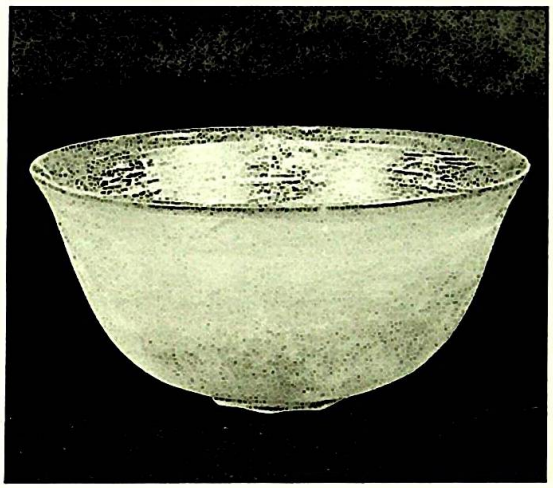
Smaller vessels, shallow bowls and some *gu* (biconical beakers), seem to have been given a wavy outline by rolling over a corrugated surface and are also characterised by the thread of glass trailed onto the base to form a foot-ring. These are found in turquoise, amber, cobalt blue, lime green, dark green, lemon yellow and colourless glass, all crizzling. Most have the mark of the pontil on the base, but the National Museum of Scotland's 1921. 1681 has had this replaced with a well-written Yongzheng *nianhao* (regnal appellation) incised within a roughened square. This must be a Zaoban Chu mark: it shows that glass of this type was made as late as 1723, perhaps even 1735. A few free-blown vessels of crizzled glass bear diamond-point engraving and traces of gilding. Their forms are more sophisticated and they lack trailed-on foot-rings. Clear crimson glass was occasionally made within this grouping, as evidenced by a *gu* in Bristol.

4 *Patara* (monk's alms-bowl), concave base with incised and gilded six-character Kangxi nianhao, opaque celadon glass; height 5.6 cm; Qing Dynasty, early 18th Century. City of Bristol Art Gallery.

These wares fit reasonably well the verbal descriptions of Kangxi glass, but leave us in doubt as to how far back their tradition goes. The two pieces with Kangxi nianhao, in Bristol (plate 4) and Peking (Yang, 1983, p. 8, Fig.s 1, 2), may possibly be accepted as forerunners of the developments of the next reign.

Carved Monochrome Glass:

Monochrome glass, both plain and carved, continued to be made until the end of the Dynasty, but after the period (or outside the School) of striated wares the material is of a wider range of colours, mostly opaque. Yang's documents confirm the view derived from observation of glass bearing the Yongzheng nianhao, four *kaishu* (regular script) characters neatly written in a square cartouche, that this was the period of transition from free-blown wares in transparent glass of a limited range of colours, to massive, mould-blown wares in opaque material appropriate for carving in relief; and from manipulating hot glass to working it on the jade-carver's treadle-lathe described by Hansford *(Chinese jade carving,* 1950).



5 Bowl, foot-ring carved into octagon, exterior deliberately roughened, clear colourless glass; diameter 10.1 cm.; Qing, early 18th Century. City of Bristol Art Gallery.

A transitional piece (plate 5) is in the City of Bristol Museum and Art Gallery, a flared lip bowl of smooth profile but denser material than seen previously; clear and colourless, its trailed-on foot-ring has been cut to form an octagon, and the exterior has been deliberately ground to produce a translucent effect. This despite the fact that some centres of glass-making in China had been able to produce white glass for centuries.

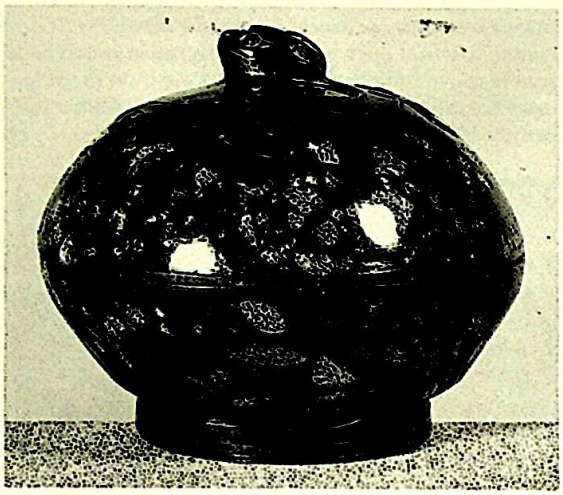
A Yongzheng marked bottle of crizzled blue glass in Bristol of the form that was to become standard (cylindrical neck, spheroid body, cylindrical foot-ring) has its body lobed by a combination of moulding and carving: two others, undated, have these lobes carved into the form of the petals of a lotus bud; the foot-rings have bevelled edges, finished with the lapidary wheel rather than in the furnace.

These bottles can be associated with the pear-shaped flasks in crizzled blue, clear crimson and a range of

opaque colours, mould-blown with feet and cut with eight or more facets, and found with Qianlong as well as Yongzheng nianhao.

Variegated Glass:

The references to blue-and-aventurine (gold-spangled: a by-product of the turquoise derived from copper, it was discovered accidentally in Venice before the 1640s) glass (plate 6) in 1705 and to various cap-buttons in 1730 confirm that the early 18th Century was a time of active experimentation in colour and in form, with attempts to substitute glass for rare hardstones.



6 Box, lid carved with dragon in cloud-scrolls, rebated lip and foot-ring with four-character Qianlong nianhao in double square; diameter 7.5 cm. City of Bristol Art Gallery.

The technique of marvering-in chips of glass of different colours would appear to have led to the development of patterned overlay, sometimes carved, on mould-blown wares, of light opaque metal, with shallow kicked-in foot, their pontil-mark ground off, presumably early in the Qianlong reign.

The key piece is the bowl Sloane 1695 in the British Museum's foundation collection (1753). It is of opaque orange glass with randomly distributed crimson mottles distributed over the surface; these might have been set in a mould, or laid on the marver where the heated bowl would have been rolled over them. Other pieces in a similar colour-scheme, presumably later, have patterns formed in the crimson material which must have been arranged in the mould into which a bubble of orange glass was blown; occasionally the crimson material is carved. The effect resembles tortoiseshell.

"Sandwiched Wares":

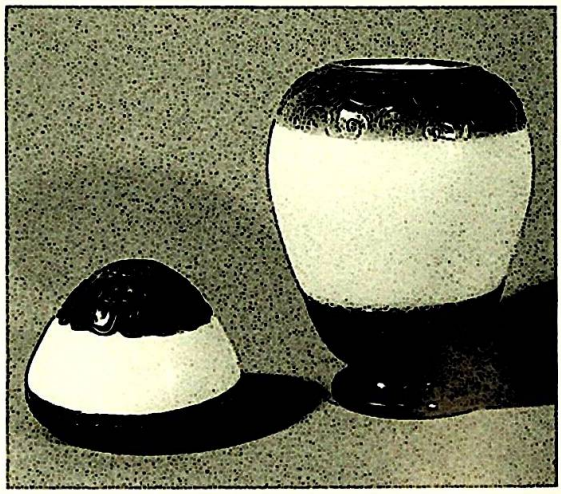
A few documentary pieces enable us to establish that diamond-point engraving and the carving of overlay glass were practised by the middle Qianlong reign. Among the finest is the yellow vase in the Corning Museum of Glass (69.6.1) with an inscription including the date 1772 set in foliate scroll borders. The Metropolitan Museum of Art, New York, has a plainer vase with the date 1755 (Qianlong yi hai). These and a few other pieces bearing landscapes are constructed of two layers of yellow glass sandwiching one which seems to be brown. There are also pink and green glass pieces of this sort. These must be among the forerunners of the carved polychrome overlay glass, the "sandwich" adopted from lacquer carving to prevent the carver cutting through the workpiece. This was necessitated by the rather thin, light body which links these pieces with the orange-and-crimson wares.

Overlay ("Cased") Glass:

Yang's documents contain references to various forms of overlay glass by the Yongzheng reign, possibly as early as 1708.

There are a few glass vessels with a layer of transparent, dark glass overlying a pale, opaque version of the same colour; and bright blue was a popular hue within the group; they, too, seem to be designed to avoid cutting through the body, for some bear diamond-point engraving, others relief carving.

The main reference, however, is to the much commoner red-on-white colour scheme, to which it would appear more than one line of development may lead.



7 Vase on splayed foot, and conical bowl; opaque off-white glass with local dark red overlay and turquoise foot; four-character Yong zheng and Qian long nianhao; mouth diameter 5.5 cm., height 9.2 cm. City of Bristol Art Gallery.

A small group of pieces has localised overlay, not cut through but carved in relief on the overlay, which is a dull opaque liver colour over a creamy off-white. If Bristol's (plate 7) is of the period of its mark (Yongzheng), they must belong to a separate scheme of development; their colour-scheme links them to the lotus-shape bottles and a group of wares carved in the form of lotus-leaves and other vegetal forms, the stem of the plant forming a low foot-ring.

Opaque Colours on White Glass:

The rather finely executed pieces with coral red or royal blue overlay on opaque white are typified by the Bristol altar set whose overlay is carved after 15th Century blue-and-white porcelain. Vases of this style have a flat base of the overlay bearing the six-character Qianlong nianhao written horizontally and accompanied by one of the characters of the "Qian Zi Wen" ('Thousand character classic'). A related group of vessels has several colours (sage green, ochre, aubergine and the two mentioned) carved to represent flowers, fruit, etc.; the base, if marked, will have the Qianlong nianhao arranged as on a cash, at the four points of the compass. Neither of these formats is typical of the earlier workshops and the second is to be seen on what appears to be a piece of Murano glass (Yang, 1983, plate I, figs. 1 and 2, accepted by Yang as Qianlong). There are snuff-bottles of this type, which confirms a dating to the second half of the 19th Century. They seem most likely to have developed out of the group with localised overlay, which may have extended over a long period.

Enamelled Glass:

The documents show that by 1732 a belief in Kangxi enamelled glass, which, however, could no longer be replicated, was established.

There are indeed vessels of pure white glass, many of them snuff-bottles, standing on a flat base, and bearing the red enamel mark Gu Yue Xuan in various scripts or the six-character Qianlong nianhao often in seal script. Gu Yue Xuan may have been a glass atelier: its mark is incised on a crizzled blue vase in the Boston Museum of Fine Arts (11.9713) but there is nothing to link that with enamelled glass. I have yet to see enamelled glass which looks convincingly earlier than late Qianlong; Yang admits that it is difficult to distinguish between Qianlong originals and Tongzhi imitations.

8 *Patara* (monk's alms-bowl), crimson glass overlay on snowstorm, carved with egrets and lotuses; hollowed-out foot with four-character Qian long nianhao in double square; mouth diameter 7.5 cm. City of Bristol Art Gallery.

Crimson Overlay on Snowstorm:

There are two main groupings, both being of clear crimson over "snowstorm", a colourless glass rendered opaque by tiny flakes which may be of undissolved silica. One group has bird-and-flower subjects (plate 8) which may be set in panels, do not employ slant-cut shading and have the overlay cut through to form a foot-ring; the other has figural subjects, e.g. scenes of the Chinese theatre, cut at a slant to give a tonal gradation; these have a low foot-ring carved into the overlay, with the Qianlong nianhao. This seems a less common material for snuff-bottles and some, at least, of the Qianlong marks look convincing. They must have developed out of the orange-and-crimson, two-tone monochrome, and localised overlay groups, and I would hold to a middle-to-late Qianlong dating for their appearance, with their run continuing into the 19th Century.

DYNASTIES AND *NIAN HAO* (REGNAL APELLATIONS)

Yüan Dynasty	1235/1280- 1368
Ming Dynasty	1368-1644
Hongwu Dynasty	1368-1399
Qing Dynasty	1644-1911
Kangxi	1622-1722
Yong zheng	1723-1735
Qianlong	1736-1795
Jiaqing	1796-1820
Daoguang	1821-1850
Xianfeng	1851-1861
Tongzhi	1862-1875

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