

A Participatory Virtual Museum About the Cultural Ecology of Ceramics

[A Production of the Hyperbox Club](#)

"But beyond leisure and entertainment, our perception of a museum, and its moral value, still has to do with our desire for sacred space, even if we are reluctant to put it that way. Museums exist to offer us something that we can't find anywhere else: an encounter, whether with an object or idea (or even with something on the Internet if we consider virtual museums) — an encounter we deem true and authentic in a place respectful of this private transaction. Otherwise, museums are just fancy storage facilities and gift stores?" (Kimmelman 2001)

1 Affiliations with social objects

Fig 1 Welsh dresser: Carmarthenshire County Museum

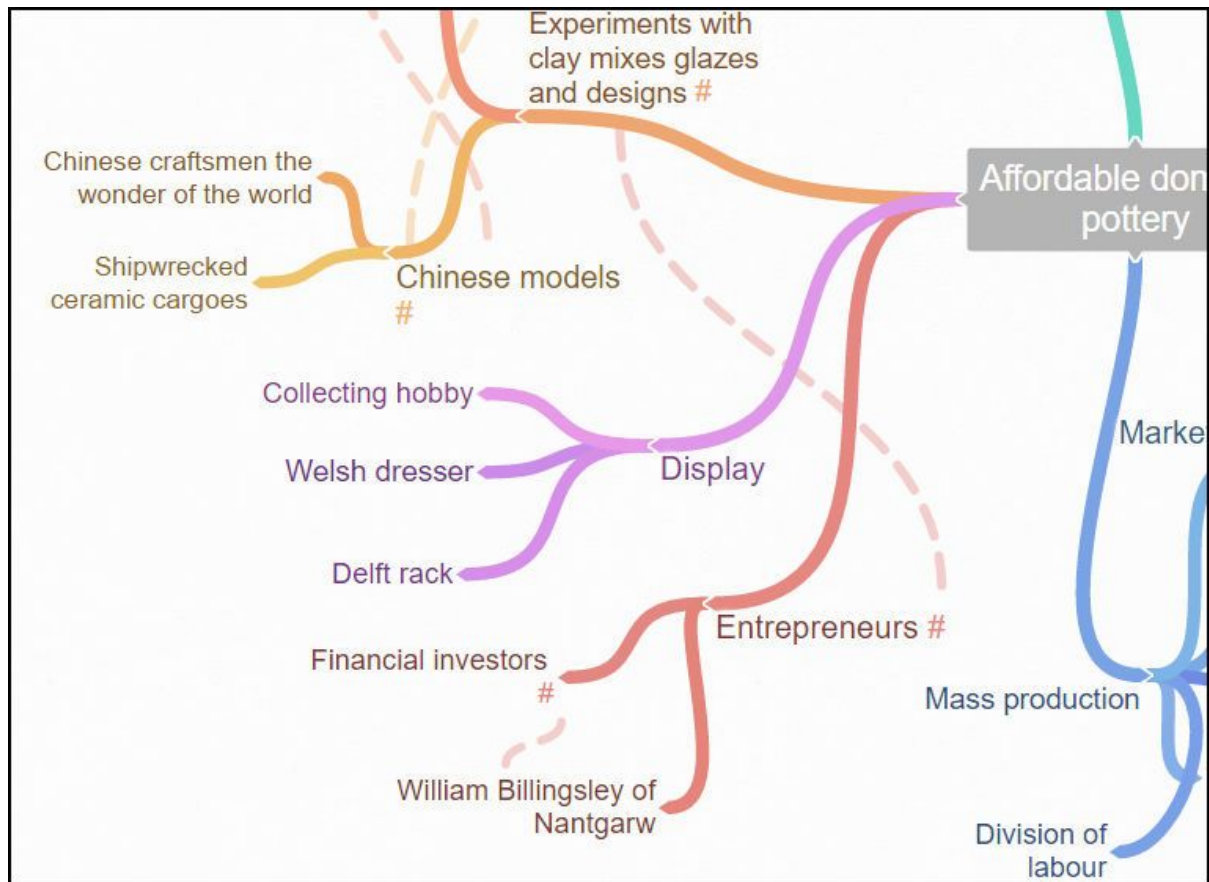


The industrial revolution marked a major turning point in Earth's ecology and humankind's relationship with the environment. There was a cultural transition from a society primarily dependent on hand tools produced by individual craftsmen to one with machine and power tools driving large-scale mass production. In Western society this began to occur during the last half of the 18th century. It resulted in increased individual wealth, progressive urbanisation, and globalisation of the economy. One indicator of this great cultural change was the mass production in Britain of blue and white patterned pottery. The most famous style is the 'willow pattern', which was designed by Thomas Minton of Stoke-on-Trent in about 1790. The most popular pattern features a willow tree, a bridge with three figures crossing, a boat, a pagoda or two, a garden and a fence. Mass production of pottery featuring this pictorial pattern made items more affordable to middle and working class households, and established a demand for furniture to mount decorative crockery displays in homes. The Welsh dresser, which had basically originated as a 17th century upper class kitchen unit for preparing food, was adapted for this purpose (Fig 1).

The upsurge in the market for affordable domestic pottery required the juxtaposition of technical, chemical and social innovations. However, the understanding of how it all happened followed the dominant method of scientific inquiry into an organised system, which was to reduce it into separate elements, and to study each element individually. Underlying this reductionist approach was the notion that the whole is no more than the total sum of its parts. However, during the 1930s and 1940s, it was gradually realised that a complete understanding of a such a system not only required holistic study of the individual constituents of the system but also their inter- linkages and the relationships with the wider system. Underlying this systemic approach is the idea that additional characteristics emanate from the whole which are not attributable to any particular part of the system; in other words, the system is more than just the total sum of its parts. Systems thinking then is 'the scientific exploration of "wholes" and "wholeness" which, not so long ago, were considered metaphysical notions transcending the boundaries of science. The truth is we can only meaningfully understand ourselves by contemplating the whole of which we are an integral part.'

This kind of systems thinking is behind the development of cultural ecology as an educational framework for humanity to learn to live, year on year, within the limits of Earth's ecological productivity. In particular, the educational framework supports the cross curricular delineation of resource flows starting from any point in an industrial production system. Such an approach was first demonstrated in the 1980s by students and teachers working with the Natural Economy Research Unit in the National Museum of Wales, where they modelled the system of porcelain production brought to Wales at the start of the industrial revolution by William Billingsley (Fig 2)..

Fig 2 Part of a mind map of that explains origins of affordable domestic pottery



It was In 1813 that William Billingsley with his two daughters and a son-in-law, Samuel Walker, leased an isolated cottage and outbuildings by the side of the Glamorganshire Canal at Nantgarw in the heart of the South Wales Coalfield. The canal had been completed two decades earlier to carry coal and ironware from Merthyr Tydfil to the port of Cardiff for global distribution. Nantgarw and the canal presented Billingsley with opportunities to import the raw materials for making ceramics and export the finished products to the wider world. His aim was to start his own pottery business from scratch and make beautiful porcelain that would stand comparison with the best then being made in Europe and China. William Billingsley's story is significant in that it is a landmark in the history of the early entrepreneurs of the industrial revolution and the increased domestic wealth that allowed ordinary people to purchase beautiful, affordable manufactured items as social objects to furnish their homes. They became points of interest to display a family's wealth and hold conversations about the collection of goods and materials in excess of their basic needs.

The term "social objects" and the related phrase "object-centred sociality" were used by Jiry Engeström in 2005 to address the distinct role of objects in online social networks. He argued that discrete objects, not general content or interpersonal relationships, form the basis for the most successful social networks. For example, on the picture-sharing site, Flickr, you don't socialise generally about photography or pictures, as you might on a photography-focused website. Instead, you socialize around specific shared images, discussing discrete photographic objects. Each photo is a node in the social network that triangulates the users who create, critique, and consume it. Just as the website

'LibraryThing' connects people via books instead of reading, 'Flickr' connects people via photos instead of art-making.

The objects don't have to be physical, but they do have to be distinct entities. Engeström explained object-centred participatory learning networks in this way:

Think about the object as the reason why people affiliate with each specific other and not just anyone. For instance, if the object is a job, it will connect me to one set of people whereas a date will link me to a radically different group. This is common sense but unfortunately it's not included in the image of the network diagram that most people imagine when they hear the term 'social network.' The fallacy is to think that social networks are just made up of people. They're not; social networks consist of people who are connected by a shared object.

Imagine looking at an object not for its artistic or historical significance but for its ability to spark conversation. Imagine a space that is wholly participatory, one that uses participatory engagement as the vehicle for responding to the experience of collecting and seeing a social object;

- where visitors and experts share their personal interests and skills with each other;
- where each person's actions are networked with those of others into cumulative and shifting content for display, sharing, and remix;
- where people discuss the objects on display with friends and strangers, sharing diverse stories and interpretations;
- where people are invited on an ongoing basis to contribute, to collaborate, to co-create, and to co-opt the experiences and content in a designed, intention environment;
- where communities and experts measure impact together;
- where a place gets better the more people use it..

The understanding and control of nature was the goal of the early collecting practice that led to the birth of museology. This is an important consideration in that it makes clear the fact that the collections resulting from this process were founded on an organizational principle, which, although foreign to the modern collector, was dependent on philosophical considerations relevant at the time. In line with this principle, collectors of the sixteenth and seventeenth centuries devised strategies which included the systematic categorization of the objects in their possession. In most cases, these objects were recorded and displayed privately in an organised manner in what were called 'cabinets of curiosities'. The criteria for organisation were at times subjective; differing slightly from one collection to the next. No matter what the criteria, the purpose of each exhibit was explained verbally to the viewer within the context of a social intercourse with the owner (Fig 3). These items were social objects to think with. The cabinet remained consistent in its role as a site of collection and display. It was an item of interior decoration where the whole of nature could be brought together in microcosm for the benefit of closer and more detailed analysis. Within the structural parameters of the cabinet space, the collector set out to comprehend nature

through the control of its various parts. The collecting hobby is a modern descendant of the "cabinet of curiosities" and every collector builds a personal body of knowledge to guide the assembly of his/her personal collection.

Fig 3 A domestic cabinet of curiosities



2 China clay: an ecosystem service

In the 1740s, William Cookworthy, a Plymouth apothecary, happened to read a description of Chinese porcelain manufacture written by a Jesuit missionary.. This accidental find aroused his curiosity, which was further enhanced when he was visited by businessmen from Virginia with samples of potting clay in 1745. The Virginians wanted him to import their clay and make porcelain in England. Cookworthy decided to look for these minerals locally, and he found them at Tregonning Hill in Cornwall in 1746. However, it took him until 1768 to file a patent specification for "Making porcelain from Moorstone, Growan and Growan clay."

Tregonning Hill stands some 6km West of Helston, and rises to 194 metres, overlooking Mounts Bay to the SW. The hill is a Site of Special Scientific Interest and the biological importance of the site is the occurrence of an extremely rare liverwort, Western Rustwort (*Marsupella profunda*), which is found growing on bare outcrops of weathered granite within and around the old china clay workings. Tregonning Hill is the only known British location for this liverwort and it is restricted to this site in Cornwall and a few locations in Portugal and

Madeira The Hill is part of an extensive granite landscape. Granite is exposed as moorstone and rocky tors and where it has decayed the granite forms pockets of china clay which can be mined at the surface (Fig 4)

Fig 4 Mining of china clay at Hensbarrow, Cornwall.



Humans have always depended on nature for environmental assets like clean water, nutrient cycling and soil formation. These natural resources have been called by different names through human history, but are presently gaining global attention as 'ecosystem services'. The concept of ecosystem services has been instrumental in establishing humankind as part of nature in all that we do. Ecosystem services may be defined as the conditions and processes through which natural ecosystems, and their species, sustain and fulfil human life. The clay provided by Tregonning Hill for porcelain production is therefore part of a much broader [mind map](#) that integrates the whole of nature, including biodiversity, into society. Making ceramics is an example of cultural ecology, relating raw materials and technologies available for potters to the functions of the products that are fashioned.

The use of clay by societies to make ceramics has taken many forms. 'Earthenware' is glazed or unglazed, non vitreous pottery, which has normally been fired below 1200°C. 'Stoneware' is generally defined by how it differs from earthenware and porcelain. Stoneware is more vitreous than earthenware, but less than porcelain. Stoneware is a very heavy duty ceramic that is named because of the stone-like appearance after firing. Stoneware, which, though dense, impermeable and hard enough to resist scratching by a steel point, differs from porcelain because it is more opaque, and normally only partially vitrified. Historically, across the world, stoneware has usually been developed after earthenware and before porcelain, and has often been used for high-quality as well as utilitarian wares.

Porcelain is made with kaolin clay. Kaolin is white clay that retains its white colour when fired. It is fired at temperatures in excess of 1300 C and is more fully vitrified than

stoneware. It is usually covered with a clear glaze, which allows the white body to show. The fired color tends to be more of a "cool" white as opposed to China ware that is usually a warmer white color. Porcelain becomes vitrified during the second firing of a two fire process. The second firing of porcelain typically is hotter than that used for China ware. This finish tends to be harder, but more brittle. This higher firing, hard surface can make decorating more difficult than stoneware or china. The composition of the porcelain clays is usually more malleable than the clays used for china ware. This allows for forming of more intricate and detailed shapes.

China ware differs from porcelain not only in colour shade, but also in the way it is fired. Where Porcelain becomes vitrified during the second firing (second firing is hotter than first firing), china ware is vitrified during a single firing. With the china, there is only a single firing. Generally, the temperature of this firing of china is a little less than that used for porcelain. The resulting finish is more warm in color than porcelain. This lower firing temperature finish may make china slightly more easy to decorate than porcelain. China ware can be decorated using Under-Glaze, On-Glaze, or In-Glaze techniques. Under-Glaze decorating is most commonly the preferred method of decoration used for china.

Bone China is made using a translucent white ceramic clay containing at least 25% bone ash. In England, the percentage of bone ash must be at least 50% for a piece to be considered Bone China. Bone China tends to be slightly translucent in nature and is often used in thin display pieces, exhibiting a delicate, refined look. Billingsley's formula for required the addition of bone which was ground at a nearby flour mill.

3 Democratization of Luxury and Beauty:

In the late eighteenth-sixties and early 'seventies a new style of interior decoration arrived which tapped into taxophilia of the newly rich. It was within the Aesthetic Movement and was given the name 'art' to indicate that its exponents were opposed to the crude commercial colours and vulgar display of High Victorian decoration. Starting with the expression of this new aesthetic for the upper class buyer (Fig 5) the conception filtered down the socio-economic scale and was applied to all forms of household equipment. As far as can be judged from the surviving evidence and from first-hand descriptions 'art furnishing' by the prosperous in the first part of Queen Victoria's reign continued until the end of the century in many middle-class homes. Manufacturers in the latter part of the nineteenth century began to compete in selling ornamental domestic paraphernalia of all kinds to the humbler householders whose early Victorian forebears had only rudimentary furniture and had eaten from wooden trenchers or pewter plates. The term 'art' furniture seems traceable to C. L. Eastlake's 'Hints on Household Taste' first published in England in 1867. For different reasons both the furnishing trade and the buying public were conservative in their tastes and understandably preoccupied with increasing domestic comfort. With regards the former, furniture designed primarily for the display of ceramics as furnishings was a conservative feature which continues to the present day (Fig 6).

Fig 5 The dining room at 18 Stafford Terrace, Kensington (1874)



The most notorious promoter of this new aesthetic in the 1880s was Oscar Wilde, who became in his early twenties the butt of most of the fun poked at aesthetes and he was lampooned as one of the central figures in Gilbert and Sullivan's comic opera 'Patience'. This notoriety was remarkable in that Wilde was not the originator of any of the ideas then current; though he did claim some responsibility for initiating an artistic movement. He designed nothing and painted no pictures. His involvement with interior decoration as art began in his Oxford undergraduate rooms where he displayed a collection of blue and white porcelain. On this basis he became an effective apostle of aestheticism, writing and lecturing on all aspects of the decorative arts and on dress reform..

The Art or Aesthetic Movement of the eighteen-seventies and 'eighties was an age when it could be said that 'there has assuredly never been since the world began an age in which people thought, talked, wrote and spent such inordinate sums of money and hours of time in cultivating and indulging their tastes'. The movement, beginning with the work of a few architects and designers in the 'sixties, gathered force until, in the 'eighties, it embraced every art form from the greetings card to domestic architecture. It introduced Japanese art to children's story books and red brick Queen Anne architecture to the streets of London; it led to changes in fashionable dress, to the first garden suburb and to the vogue for painted dark green or Venetian red front doors and railings which lasted for half a century in England. By the mid 'seventies the London Trades Directory lists 'Art Furniture Manufacturers' quite

separately from ordinary cabinet-makers and furnishers. The tone of the whole movement is recorded in a conversation which William Morris had with a lady who said, 'You know I wouldn't mind a lad being a cabinet-maker if he only made Art Furniture'. In terms of architecture and the applied arts the movement was confined to the British Isles and the United States.

Fig 6 Modern marketing "Ways with Plates" (2016)



William Billingsley's arrival in Nantgarw marked the beginning of the democratisation of porcelain to become an important element of 'Art Furnishing' through its mass production in the factory system.

4 The search for perfection

Billingsley had several years experience managing English porcelain factories and had at least one abortive attempt to set up a business on his own account. He had started his working life as an outstanding apprentice flower painter at the Derby pottery. His latest venture before moving to Wales had been an association with the Worcester factory, where his son-in-law had installed the latest type of enamelling furnace. Over several years the family had accumulated sufficient skills and know how to run a pottery: from using state of the art kilns to the formulation of the ingredients necessary to make high quality hard paste porcelain and decorate the final product to a very high standard.

Fig 7 Nantgarw Pottery and Canal circa 1900



Once he had built the kilns at Nantgarw (Fig 7) the major limiting factor of production was matching the composition of the clay body to the firing process. This was a general issue across the industry because British porcelain production was still an empirical process, and there was much secrecy regarding formulating the clay and operating the kilns. Large losses during firing could make or break a small scale enterprise. Indeed break rather than make seems to have happened at Nantgarw, where up to 90% of the ceramics could be lost in a single firing.

The small amount of family capital with which Billingsley and Walker had established their Nantgarw enterprise ran out in a few months but they managed to persuade a local entrepreneur William Weston Young, who was associated with the Cambrian Pottery at Swansea, to provide the necessary financial backing to continue the Nantgarw operation. However, Walker's injection of finance proved inadequate to compensate for the continuing large losses during firing. A year later, in 1814-15, in an effort to make a fresh start and eliminate firing problems, Billingsley and Walker entered into a partnership with L W Dillwyn then owner of the Cambrian Works. He financed them to begin making porcelain at Swansea.

The Cambrian Pottery was founded in 1764 by William Coles. In 1790, John Coles, son of the founder, went into partnership with George Haynes, who introduced new business strategies based on the ideas of Josiah Wedgwood. The company employed Thomas Rothwell to engrave copper plates for transfer printing, George Bentley as a modeller, and Thomas Pardoe, who painted landscapes, birds and animals. William Weston Young was a part time painter at Swansea.

Billingsley and Walker constructed two new kilns at the Cambrian site. However, production problems continued to plague profitability and in this respect the Swansea operations were regarded as being experiments to improve the stability of the clay body. In 1817 Billingsley and Walker were back at Nantgarw with new investors.

During this time, much of the plain white stock that survived firing at Nantgarw was sent to London for decorating and sold to the top end of the market while the rest was decorated in Wales by Billingsley himself, as well as William Weston Young and Thomas Pardoe.

Despite making beautiful products (Fig 8)), “superior to anything of the kind ever made before or since”, the Nantgarw factory was still unprofitable and the money provided by the new investors eventually ran out. In 1822 the works and its stock was put up for sale, an event that marked the end of large-scale porcelain production in Wales.

Fig 8 Swansea cabinet cup and saucer, attributed to William Billingsley



Swansea Museum Collection

The next investors to take up a lease at Nantgarw began making clay pipes for smoking tobacco, which had once again become fashionable. The population of smokers was increasing with a decrease in the price of tobacco. This was but one example of the spread of former luxurious behaviours from the rich to a steadily increasing wage-earning population engaged in industrial mass production. The middle income sector of this population was itself driving a demand for beautiful home furnishings: an increased market for cheap mass produced ceramics was an example. The invention of the Welsh dresser is a marker of this remarkable upsurge in the purchase of ceramics for domestic display.

The dresser defines the home as a personalised feature of the human ecological niche. Along with the purchase of mass produced porcelain came the need for a glass-fronted

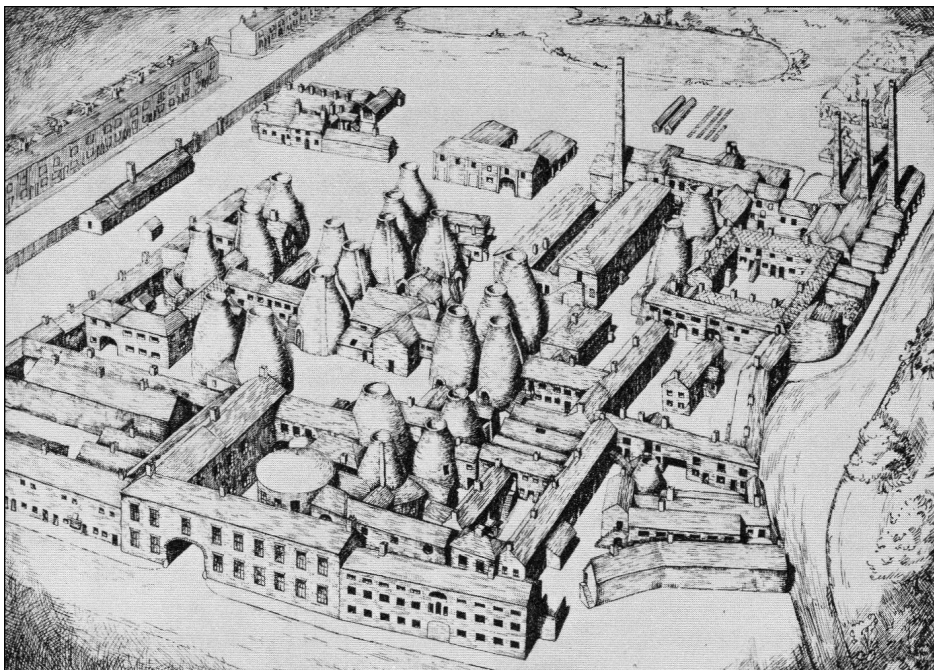
cabinet to display it. These collections reigned supreme in the parlour or front room, the social spaces reserved for special family gatherings.

This brings up a focus on human ecology to highlight the bridge between the impact of the industrial revolution on the home and the wider environment, emphasising that we are part of nature in everything we do. For example Gaston Bachelard in 'The Poetics of Space' calls the home 'our first universe, a real cosmos in every sense of the word'.

'Home, Akiko Busch writes in 'Geography of Home', comprises a host of 'interior systems' - a 'network' of 'habits, beliefs, and values.'. To Mary Douglas, 'The Idea of a Home,' characterises the home as a moral economy designed to ensure the perpetuation of the family. Similarly Daniel Miller argues in 'The Comfort of Things', that home is in fact a 'little cosmology,' an 'order of things, values and relationships' expressed by the household material culture.

Such statements define the cultural ecology of the home as an ethical system, a moral economy, and a miniature world. These ideas about the home as a small world consider objects and spaces of a domestic interior as the core of the human ecological niche. In particular, the decorative arts within the home are to be seen as part of an integrated environment of people, things, and spaces linked together by social objects and processes binding people to place. Furnishing the home is thus defined as an evolved pattern of human behaviour. A good Welsh example of domestic decoration as raw settlement behaviour is the way Irish immigrant families who settled at the Blaenavon ironworks in East Wales sought comfort in an alien land by papering the bare walls of their cramped cottages with copies of the Irish Times.

Fig 9 The Spode factory Stoke-upon-Trent (1820-35)



Harold Holdway, from an earthenware model in the Spode Museum

It is ironic that when Nantgarw bowed out of porcelain production the Staffordshire potteries were gearing up to supply the worldwide demand for cheap porcelain to decorate homes in Britain and its Empire (Fig 9). The aim of porcelain mass producers was to make affordable, thin-walled shiny colourful items that were mass produced facsimiles of hand-crafted 18th century originals. This reflects the value system of the 19th century European middle class

Today it is interesting that in China, the centre for production of cheap facsimiles of Western luxury goods, demand for luxury items has now to be satisfied by the purchase of originals. In Mainland China, one may see a person carrying an authentic Louis Vuitton bag while riding a crowded, public bus somewhere in the rural countryside. Luxury goods are consumed on a mass level, and are not confined to a select few.

The cause for an increased Chinese consumption of luxury products results from the country's socialist value system. During the transitional period from a pure planned system to a market-driven economy, consumers inherently retained the idea of equality. Socialist government authorities also try to maintain and communicate that equality in Mainland China because it is crucial to national identity. Based on steady economic development and a newfound consumer confidence towards the future, mainland Chinese consumers believe that they are, in essence, the same as each other. Even if they cannot afford a luxury brand item today, they will save up several months of savings to eventually have it. The cultural ecology of the home is always in complex state of equilibrium with the political economy.

5 Collecting behaviours: the bigger picture

School children can often be heard complaining about the vast quantities of seemingly useless information they are forced to memorise as part of their education. Had they been the children of Stone Age hunters, they would have learned their lessons first hand, where the practical value in everyday life would have been obvious. Prehistoric people had to become masters of observation, with an acute knowledge of every plant and animal shape, colour, pattern, movement, sound and smell in so far as knowledge of these aspects of their environment enabled them to survive in a hostile world. This urge to find memorable pattern and harmony in the environment is called taxophilia. The human prehistoric taxophilic imperative was so important that it evolved to become as basic and distinct as the need to feed, mate or sleep. Originally our ancestors may have classified berries or antelopes as part of their food-finding activities. In the abstract world of the modern classroom, botany can seem remote, geology boring, and entomology meaningless. Yet despite these complaints, the taxophilic instinct remains as an urge to voluntarily commit to memory huge assemblages of facts on topics that will hardly ever encounter a need in the future. Information is not just simply accumulated; it is classified, particularly where there is a current social context, such as the latest football statistics, scores and titles of pop music, and the makes and dates of manufacture of motorcars. Taxophila is the driver of what we call the collecting instinct.

In a pre-human world the top systematic collector has to be the Bower Bird. The following account records an encounter between a male Bower Bird and the Rev.J.G. Wood rambling through the Australian Outback in the 1860s. (Fig 10).

“..... I saw a very glossy bird, of a deep purple hue, running about, and occasionally uttering the sound which had attracted me. Soon, it was evident that this was a Bower Bird engaged in building the assembly-room, and after a little while he became reconciled to my presence, and went on with his work. He went about it in a leisurely and reflective manner, taking plenty of time over his work, and disdaining to hurry himself. First he would go off to the further end of the compartment, and there inspect a quantity of twigs which had been put there for his use. After contemplating them for some time, he would take up a twig and then drop it as if it were too hot to hold. Perhaps he would repeat this process six or seven times with the same twig, and then suddenly pounce on another, weigh it once or twice in his beak, and then carry it off. When he reached the bower he still kept up his leisurely character, for he would perambulate the floor for some minutes, with the twig still in his beak and then perhaps would lay it down, turn in another direction, and look as if he had forgotten about it. Sooner or later, however, the twig was fixed, and then he would run through the bower several times, utter his loud cry, and start off for another twig. Why these birds should trouble themselves to make this bower is a problem as yet unsolved. Had the structure served in any way as a protection from the weather, there would have been a self-evident reason for its existence, but the arching twigs are put together so loosely that they cannot protect the birds from wind or rain. Whatever may be the object of the bower, the birds are so fond of it that they resort to it during many hours of the day, and a good bower is seldom left without a temporary occupant.”

Fig 10 A bower bird with its bower



Ornament is also employed by the Bower Bird, both entrances of the bower being decorated with bright and shining objects. The bird is not in the least fastidious about the articles with which it decorates its bower, provided only that they shine and are conspicuous. Scraps of coloured ribbon, shells, bits of paper, teeth, bones, broken glass and china, feathers, and similar articles, are in great request, and such objects as a lady's thimble, a tobacco-pipe, and a tomahawk have been found near one of their bowers. Indeed, whenever the natives lose any small and tolerably portable object, they always search the bowers of the neighbourhood and frequently find that the missing article is doing duty as decoration to the edifice".

We now believe the decorated bower is an essential device to attract a mate, but we appreciate the bird's keen sense of balancing mass against variety of shape and colour. The outcomes chime with our instinctive attention to placement that we associate with our own artistic creativity, particularly when we position plates on a dresser and stand back, being fond of the achievement.

The human brain functions as a magnificent classifying machine, and every time we walk through a landscape it is busy feeding in new experiences and comparing them with the old. The brain classifies everything we see, and the survival value of this procedure is obvious. It is also the case with other mammals. A monkey, for instance, has to know many different kinds of trees and bushes in its forest home, and needs to be able to tell which one has ripening fruit at any particular season, which is poisonous, and which is thorny. If it is to survive, a monkey has to become a good botanist. In the same way a lion has to become a first-rate zoologist, able to tell at a glance, which prey species it is, how fast it can run, and which escape pattern it is likely to use.

Taxophilia is the basic behaviour of scientists. In biology it is dignified by the subject of taxonomy. Taxonomists have outstanding skills in observation and depiction to describe and communicate anatomical features that are of significance in placing individuals and their body parts in unambiguous categories. Their illustrations often have pleasing aesthetic qualities, and it is ironic that their early engravings of assemblages are now collected as works of art

As an aspect of human social evolution the pathway may be defined by processual analysis which begins with its legacy of social objects. Processual means relating to or involving the study of processes rather than discrete events. Most of the processual studies related to systems theory, particularly those focused on archaeological remains can be broadly included in a theoretical trend known as 'Ceramic Ecology'. Processual analysis in ceramics starts with the overall shape of a pot, together with the character of component parts such as rims and handles, and also the technique and style of decoration. This can indicate when and how a pot was made and used, as well as serving to define cultural affinities. The term originated in archeology where the aim is to understand the progress of technology, methods and patterns of distribution, modes of consumption and processes of deposition. Those conclusions will go on to inform an understanding of the people who occupied an archaeological site, including their social, economic and cultural circumstances and the ways

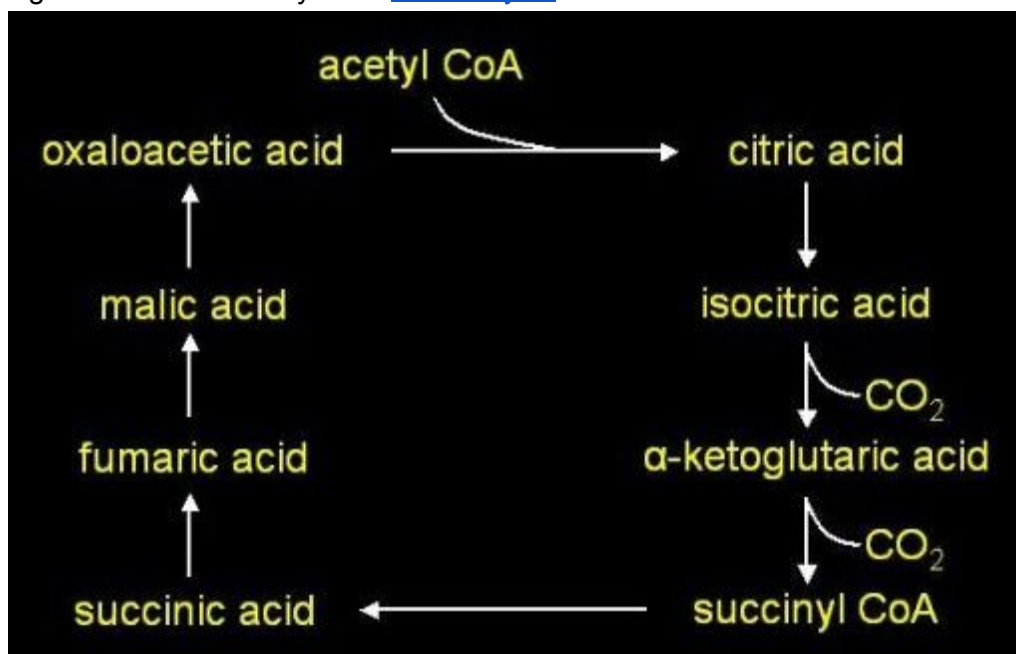
in which they interacted with material culture, as well as the chronology of the activities represented by the surviving evidence.

The term 'processual' means relating to or involving the study of processes rather than discrete events. Most of the processual studies are concerned with the application of systems theory to archaeological collections (Fig 11), but processual analysis can be applied to any research project where the aim is to speculate on the way individual artifacts or events can be assembled theoretically to become part of a process.

Fig 11 Archaeological finds in and around Williamsburg, Virginia



Fig 12 The citric acid cycle or [Kreb's Cycle](#)



For example, the universal biochemical process by which energy is produced in living organisms emerged as a cyclic process by Hans Krebs who connecting up eight individual chemical reactions to make a cycle.. Two molecules of carbon dioxide derived from dietary glucose are released at each turn of the cycle (Fig 12).

6 Postscript

The following statement was made in 2016 by Tristram Hunt M.P. to the House of Commons regarding the economic state of the ceramics industry in his constituency, Stoke-on-Trent Central. He was acknowledging the Government's financial support of the potteries and it sums up a story of the British ceramics industry as cultural process, which had stalled in the beginning of the 21st century.

“The history of pottery in Stoke-on-Trent is long, stretching back a good 500 years. Out of the brown and yellow north Staffordshire clay came butter pots and flower pots. In the sun kilns of Bagnall and Penkhull, local artisans started to glaze their wares and develop a reputation for craftsmanship. But Europe’s ceramicists remained in the shadow of China, which had long mastered the magic of porcelain, the famous white ceramic formed by kaolin, named after the hill just outside Jingdezhen. Only in 1768 did the Plymouth apothecary William Cookworthy crack the recipe. With the help of Cornish clay, Britain joined Meissen and Sèvres in porcelain production. China—Britain’s new word for pottery and porcelain—became the eighteenth century rage. No one exploited the new era of industrial production, design and innovation more than Josiah Wedgwood. From his Etruria factory, he unleashed a volley of fashionable new designs that caught the attention of Queen Charlotte and Britain’s expanding middle class. His trademark jasper and basalt production followed.

In 1934, J.B. Priestley visited Stoke-on-Trent on his celebrated English journey. He, too, fell for the elemental, timeless attraction of ceramics. He celebrated the fettlers, the mould-makers, the dippers and the master potters for:

“doing something that they can do better than anybody else...Here is the supreme triumph of man’s creative thumb.”

Priestley caught the industry at its peak. The decline of the British ceramics industry arguably began with the Clean Air Act 1956 and the dismantling of some 2,000 coal-fired bottle kilns. For all the benefits of open skies and modernised plant, the law imposed sudden and significant costs on the manufacturing process. In an attempt to offset those costs, the industry embarked on a round of mergers and acquisitions, resulting in an over-concentrated ceramics sector. The high interest rates and exchange rates of the 1980s hammered exports. The rise of takeaways and the end of wedding lists undermined demand. Most damaging of all was the growing threat of the far east. Labour and energy costs in China put British production at a marked disadvantage.

Wedgwood went bust and Spode went into receivership, and between the early 1980s and 2010, some 40,000 jobs were lost in the ceramics industry. With them went Stoke’s cityscape and parts of its culture. The Minton factory, where Pugin’s tiles were fired for the

Houses of Parliament, was turned into a Sainsbury's. Then the final insult: in 2010, the entire collection of the Wedgwood Museum was threatened with disposal.

Six years on, the Wedgwood Museum has been saved and the industry is making profits, creating jobs, finding export markets and coming up with new designs. There is excitement and enthusiasm about British ceramic design. There is a new competitiveness in great companies such as Steelite, Churchill and Portmeirion. There is a new culture of partnership”.

7 Internet references

[Ceramic ecology](#)

[Processual archeology](#)

[Nature of American Archeology](#)

[Cultural anthropology terms](#)

[Material resonance and site specificity](#)

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