



Ruth Duckworth.
Untitled. 2005.
Porcelain, 23 x 10 x 3.5 in.
Archival Inventory # 877505
Photo by Guy Nicol.

Porcelain

A Diverse Medium for Modern Times

Antoinette Badenhorst traces the lineage of porcelain and its uses

DISCUSSIONS ABOUT THE QUALITIES AND AUTHENTICITY of porcelain are often times raised by potters while at the same time the general public has limited knowledge and information about handmade porcelain. The purists among us in the clay society believe that the term porcelain should not be borrowed in the use of alternative firing methods or by those that adjust the traditional porcelain clay composition to meet some, but not all of the porcelain characteristics. Some go so far as to believe that only porcelain from ancient Eastern countries is true porcelain and that any other composed white clay bodies are considered white ware.

Potters who have worked with porcelain and exhibited objects from high fire to pit fire believe that the term porcelain has moved beyond its traditional definition. There are those who believe that porcelain clay became as easy to get as any stoneware or earthenware clay body and that it does not deserve any elite tag to it. These discussions of what is considered porcelain keep coming back: Is 'true porcelain' a specific product with limited and traditional ingredients, firing methods, shapes and forms or is it open for experimentation? To understand and decide where one's sentiments lie requires a review of porcelain's intriguing history, stretching from China to Europe.

In 1500 BC, Chinese potters referred to porcelain as *Tz'u'*. They fired and glazed ceramics successfully at high temperatures and were using porcelain clay to create cups, bowls and dishes for every day use. This was how Marco Polo, the Venetian traveller in the late 1200s, found Chinese potters working in the city of Tin-gui. In the book *Il Milione* in which Polo told about his world travels, he described how he found heaps of a certain kind of earth, mined and left out in wind, rain and sun to mature over periods of 30 to 40 years. Often it was the next generation that worked and transformed these heaps of clay into fine, delicate works of art.

Polo named it *porcellane* which referred to the cowrie shell, used as currency in the Orient in those days. This small pig shaped shell was smooth and translucent just as the ceramic objects that he found in Tin-gui. The objects were brilliant white and translucent when thin. It was hard, durable and emitted a ringing tone when tapped. Chinese potters and later, Japanese and Korean potters, used weathered *petuntse*, a feldspathic rock that contained very small traces of iron and titanium. As *petuntse* ran out, they found new ways to keep the workability of *Tz'u'*, by composing a mixture of kaolin and *petuntse*.

While defining this white earth came naturally for ancient Chinese potters, it was complicated for Europeans. Porcelain was unknown in Europe in the 13th century, when a few pieces found its way to Europe and landed in the hands of royalists. As more of these porcelain objects were introduced to Europeans it became a new, sought after collector's item. Rare and expensive, it quickly became a symbol of prestige.

The search for porcelain recipes in alchemies in Venice, Prussia and France led to the discovery



of different types of porcelain-like materials including soft paste porcelain which is translucent and very fine in particle size but is lacking whiteness. In those days it was made up mainly of glass, clay and other melting agents such as lime and chalk. It could not withstand the high temperatures at which true porcelain was fired but started collapsing after 1976°F (1080°C).

Left: Mary Rogers: Bowl. Pinched porcelain. With gratitude from the Ceramics Collection, Aberystwyth University, UK.

Right: Catharine Hiersoux. Rock vessel. Woodfired porcelain. 14 x 7 in.

Johann Böttger was an alchemist and a captive of Augustus 'the Strong' in Saxony in 1708. In his constant hunger for prestige and power, Augustus betrayed, kidnapped people and pushed forward in his striving to discover the making of gold. Pressured by the king to create gold, Böttger got involved in the research of porcelain, hoping to regain his freedom if he could succeed. After mixing alabaster (a type of calcium carbonate), kaolin and aluminium silicate (a refractory material high in alumina and silica) in different combinations with each other and firing it to extreme temperatures, he composed the first European hard-paste porcelain clay body. Alabaster acted as a flux at 2642°F (1450°C) that filtered in the pores between the particles of the refractory ingredients. When the materials fused together, a kind of porcelain object was created. Conditions, however, were unsatisfactory. Kilns were unsafe, particularly when they were pushed to the limits that were needed to bring out the character of this porcelain. Somewhat yellowish in comparison with its bluish white Chinese counterpart, the resulting porcelain did not satisfy this young inventor but it was nonetheless a good start.

He created a glaze recipe from alabaster that was interactive with his porcelain clay body. Some references mention glaze recipes mixed with other raw materials such as borax and silica but, whatever the material used, Böttger understood enough about porcelain and its character to invent a glaze and clay body that fused together at high temperatures and became porcelain. Tragically, before he could perfect his original invention of porcelain, Johann Frederick Böttger died at age 27. His health could not withstand the cruel captivity, exhaustion and the extreme heat from the kilns.

By 1724 it was just a matter of time before the secret recipes of the Court of Saxony leaked across Europe. Kaolin sources, other than Colditz kaolin (named after the city where it was mined) were found and alabaster was replaced with feldspar and quartz. Limoges is one of these sources; still in use in Europe by artists as well as industries. The basic combination of silica, feldspar and kaolin to this day form the basis of porcelain clay.

Bone ash, the white residue that results from the calcination of cattle bones, is a flux that was originally used by Josiah Spode, an Englishman in the late 18th century, to improve soft-paste porcelain. This resulted in the first invention of bone china. Composed from kaolin, china stone and bone ash, it became popular and was an instant competitor with Chinese porcelain. Known for its strength, whiteness and translucency, it is non-plastic and difficult to control and is, therefore, often used as a casting slip. Today a basic recipe is made of the following: 50 percent bone ash, 25 percent kaolin and 25 percent feldspar. Although bone china is mainly used in industrial circumstances,



Left: Martha Zettler. *From Tree Series.*
Bone China, slipcast.

Centre: Matt Hoogland. *Vessel.* Naked raku fired porcelain. Wheel thrown with resist design.

Right: Ruth Duckworth. *Untitled.* 2007. Porcelain.
18.25 x 5.5 x 6 in. Archival Inventory #916107.
Photo by Guy Nicol.



a few studio potters work with it. Those who are determined enough to develop the skill required to control bone china, deliver breathtaking objects.

Martha Zettler, who lives in South Africa, is internationally recognized for her refined and tactile vessels made from bone china. She creates moulds in which she casts basic forms. After bisque-firing, she masks and sandblasts them and then drills fine holes into the vessels. Another firing to about 1,230°C follows after which she paints the pieces with a transparent glaze. This is followed by a third firing to a temperature of about 1,100°C and results in delicate, translucent bowls.

Traditionally, hard paste porcelain clay has a fine particle size and has the ability to become very hard and glass-like. When fired high enough, it has the ability to be translucent and when uncontaminated feldspar, silica and kaolin are used, it will fire to a bright white. (The addition of ball clay or bentonite will improve plasticity but will also affect the whiteness.) These qualities made porcelain popular in Europe but as it made its way through the 18th and 19th centuries into the industrialized era, studio pottery vanished into an unimportant position where handmade objects had little or no value. It would take almost a full century before ceramic artists would be recognized in the social and arts hierarchy again.

In the late 19th century Bernard Leach was born. He became a potter in Japan in around 1909. He returned to England 11 years later and with the help of his friend, Shoji Hamada, he founded Leach Pottery in St. Ives. His pioneering role in creating an identity for ceramic artists in Britain and around the world soon earned him the title of 'The Father of British studio pottery'. Potters regained their status as studio artists and were freed from the grip of industrialization. In the midst of controversial debates about art and craft, design and technique; self expression in clay became once again an essential part of the creative process.

It took much longer for porcelain to be included in the clay evolution. Irregular availability of reliable porcelain clay bodies was partially the reason but, although a difficult, unforgiving and demanding material, there were potters who used porcelain in their drive to offer their visual artistic voice. Bernard Leach was one of the first in the 20th century to make a fairly reliable porcelain clay body and he created simple forms on the wheel. But it was Lucy Rie who used the basic clay recipe created by Leach, changed the fluxes and, thus, the outcome of her glazes. Her experimentation with glazes also led her to be the first potter to fire porcelain successfully in electric kilns.

Mary Rogers was one of the early potters to break away from the traditional forms and processes of porcelain clay. She used porcelain clay around 1970 to create small sculptural bowls; pinched, slab built and coiled by hand. Her sensuous pieces of art were primarily inspired by nature and she



developed a pallet of colouring oxides to enhance those effects. She often referred to seashells in her work and particularly the cowrie shell as mentioned in her book *On Pottery and Porcelain* (page 100). When observing her beautiful and artful objects, the origin of the word 'porcelain' comes to mind (remember how Marco Polo was inspired by this shell).

Left: Curtis Benzle. **Blaze Benzle**. 43 x 19 x 18 cm.

Right: Curtis Benzle. **After You're Gone**. 20 x 20 x 10 cm.

Ruth Duckworth's work often referred to life touching experiences and observations. She started her artistic career in 1936, aiming towards a ceramics career some 15 years later. Living in Chicago, US, for the greater part of her life, her sculptures bear witness to a fearless artistic expression that pushed the classical concept of porcelain to the background. She investigated space in unusual ways and revealed fresh form beyond the utilitarian purposes to which ceramics had traditionally been tied. She offered porcelain as a diverse medium, suitable for a modern and post modern genre.

More artists saw opportunities in these diverse characteristics of porcelain in the last quarter of the 20th century and the exploitation of more forming methods and firing techniques followed. Although it created more controversial debates about the nature and character of porcelain, it did not stop artists from creating soft smoke-fired vessels or dramatic *Raku* pots from porcelain clay as seen in the work of Matt Hoogland. When the temperature at which the clay is fired is subjective to the outburst of colour and effect, subtle salt or woodfired pieces formed in nontraditional ways, become objects of great admiration.

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Catharine Hiersoux became internationally known for her use of ancient woodfiring kilns. Her knowledge of the character of porcelain becomes evident when she acknowledges the utilitarian uses of porcelain in strong but sensuous vessels and plates and then breaks away to create bold rock-like vessels.

The process of wheel thrown porcelain by itself is difficult enough but potters also started to push its limits by using varied ceramic techniques. Curtis Benzle uses a porcelain composition with only 20 percent clay to construct soft slab vessels. On these slabs he uses different artistic techniques, including *nerikomi*, slip painting and printing, before he shapes vessels and fires them inside refractory moulds. The challenges involved often cause cracks that he has had to learn to live with but the translucency of these pieces offers great rewards.

I use paper thin slabs of clay which I press down in to moulds to create open shell-like forms. When they become leather hard, I attach them together as an envelope, alter the shape, engrave the walls and place them on wheel thrown pedestals. The glass forming materials in the clay composition, needed for translucency, get pyro plastic at 1280°C. To prevent deformation, I use support systems during the final firing. Many times the clay, rather than the glaze, becomes the carrier of colour.

Chris Campbell mixes oxides and stains into her clay body to create strong outbursts of colour. To add strength during the green phase and to help with the bonding process between the different colours, she adds paper to her clay.

While the fundamental recipe for porcelain has lasted for centuries, the uses are expanding as proven by modern industries and science. New sources for raw materials became accessible and new combinations of recipes are continually mixed. Potters need technical information to solve problems in the creative process and are on the lookout for new and more materials. They benefit from industrial leadership in the discovery of plastic and more manageable porcelain clay bodies, not necessarily meeting all of the traditional characteristics. The need to conserve energy stimulates the need for lower firing porcelain clay bodies with the same characteristics as their high fire counterparts.



Left: Chris Campbell. *Vessel*. Paper clay and coloured porcelain.
Centre: Antoinette Badenhorst. Porcelain, electric fired to 1280°C. Press moulded and altered, with glazed interior, polished exterior. 16.75 x 7 x 2 in. x 6.5 oz.
Top right: Antoinette Badenhorst. Porcelain, electric fired to 1280°C. Wheel thrown and altered, with glazed interior and polished exterior.
Right: Antoinette Badenhorst. Lower fired porcelain 1200°C. Wheel thrown and altered.

New blends between porcelain and stoneware clay (semi porcelain) stand up against the smoothness, fine texture, hardness and whiteness of porcelain and sneak their way into the concept of 'porcelain'.

In 2009 I had an opportunity to work and test several lower firing porcelain clay bodies from different US clay companies. I had always worked with higher firing porcelains and was surprised when all of the tested clay bodies matured at 1200°C. Even more surprising was that each porcelain clay body exposed a strong porcelain character while they had different grades of workability. Although I treated them all in the same way for the sake of comparison, they were clearly composed for different uses.

Will porcelain break out of the traditional and moulded concept of previous centuries or is it possible that there are new categories on the rise? Mostly self taught in South Africa and later in the United States I had to sort through all kinds of clay ideologies and philosophies for my own expression. Volumes of books, Internet discussions and personal experience, along with traditionalists and modern idealists shaped my personal thoughts. My earlier work was made from a fairly plastic clay body that I mixed from English grolleg, kaolin, potash feldspar, silica and 2 percent bentonite. This porcelain was easy to pit fire as well as high fire at 1280°C in my electric kiln. It offered everything I needed at the time but then one day a new inspiration hit and I was on the lookout for a new porcelain clay body. I found Southern Ice porcelain and was instantly confronted with a new vocabulary of challenges. The clay took me into a new direction in which translucency, whiteness and brightness became the focus of my creation.

Porcelain is an exceptionally strong clay medium that has a strong history, defined by composition, firing results and by the name that describes it. No ceramics artists can misjudge its character and qualities, whether they use those qualities partially or in full. Ceramics as an overall artistic and domestic medium, however, also has a strong history that includes porcelain; its entire characteristics and definitions. It is wise to embrace and value it in all of the contexts that are available to us. Restricting porcelain for specific uses and firing methods is a step back to the early days of industrialization in which the artistic, creative processes were on the back burner. It should be the potter's option to find and hear the voice of the clay in his or her hands and stay true to personal expression.

Antoinette Badenhorst, a potter for almost 29 years, emigrated from South Africa to the United States where she obtained international recognition with her porcelain work. Although her native tongue is Afrikaans, she writes and teaches in English. (porcelainbyAntoinette21@comcast.net)