



Ceramics Workshop

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I. Basic Terms Used in the Study of Ceramics

Ceramics (or Pottery) is a generic term used to refer to the product of the potter. In the Western sense, the three basic types are: earthenware, stoneware and porcelain. The Chinese use two basic terms: *y'ao* – which refers to low-fired wares or earthenware; and *ci* (*tz'u*), which refers to high-fired wares; including both stoneware and porcelain. According to Margaret Medley, the Europeans do not distinguish between these two terms when they say “ceramics” or “pottery”.

Body refers to the clay material or any added “temper”. It refers to the pot itself as distinct from the glaze.

Earthenware bodies can have a wide variation in color and texture but is usually malleable or exhibit a high degree of plasticity. Earthenware fires at 800 to 1,000 degrees Celsius. If fired above this, it will probably slump, collapse or melt. In its fired states, earthenware can be dark gray (when fired in a reducing atmosphere) or reddish brown or pinkish (when fired in an oxidizing atmosphere).

Earthenware clay, also called terra cotta may be fired without modification but normally potters use what is called “temper” (crushed quartz or flint) to improve the plasticity of the clay and increase the silica content. Temper also opens the pores of the body and helps the gasses to escape thereby preventing excessive contraction and warping.

Earthenware bodies are usually porous. The degree of porosity varies according to the grain size of the clay and temper as well as the firing temperature. The more coarse the body, the more porous it is.

Philippine earthenware is fired in the “open” or placed in a bonfire of dried grass or dung. It is believed that ancient Filipinos did not develop kilns. According to Prof. H. Otley Beyer, the remains of a kiln have been found at San Pedro, Makati. There are also old photographs of a kiln at Guadalupe in Makati. But these kilns were probably active during the late Spanish Colonial period. Ancient Filipinos sometimes painted (as “slip”) earthenware bodies with a type of plant resin.

The Chinese before the Tang (618 –907) dynasty, lead-glazed earthenware figures for burial purposes (pottery houses, tomb guardians, etc.) as well as architectural ceramics to make it non-porous and improve their appearance. These glazes needed to be a low-fired type such as lead glazes. Lead glazes on earthenware bodies were made during the 13th and 14th centuries as well as during the early Ming period (14th to 15th c).

Loess is composed of less than 15% clay consisting mainly of quartz, feldspar and mica. Loess is produced by the alternate freezing and thawing of igneous rocks in the Tibetan plateau. Pulverized by glaciers, the dust is carried by wind all over China but mainly in the

north China plains where it may lie as deep of 300 meters. The low clay content of loess prevented shrinkage during firing thus allowing the construction of elaborate and intricate forms. This material was used for the terracotta army of Emperor Qin Shihuangdi as well as for the lead glazed earthenware burial vessels of the Han dynasty (206BC to 220 AD).

Stoneware bodies are harder than earthenware but not quite as hard as porcelain. They vary in color and texture depending on the type of clay used and the firing conditions. Stoneware is normally fired at 1,200 degrees C to 1,300 degrees C. It is usually necessary to add temper to improve the body (increase plasticity). The material sinters and fuses during firing to form an impermeable body. Usually stoneware is glazed to improve its appearance.

Qingbai, a bluish-white glazed ceramic made at Jingdezhen and other kilns in China, was fired at 1280 degrees Celcius and higher.

Chinese glazes are of an alkaline type that is high in feldspar and therefore called felspathic glazes.

Porcelain in the West is always pure white or pale gray, completely vitrified and translucent. When struck, porcelain bodies make a ringing sound. In modern times, it is made from 2 kinds of materials: Kaolin and Porcelain Stone.

In Jingdezhen, primary kaolin was added to porcelain stone in the Yuan Dynasty onwards. The proportion of kaolin to porcelain stone reached 50:50 in the 18th century. In Fujian province porcelain stone could be used alone in making porcelain.

Kaolin is a pure white iron-poor plastic type of clay. It is associated with igneous rocks that have been subjected to alteration by high-temperature solutions. There are massive deposits of kaolin all over China. The term "kaolin" is the anglicized form of the Chinese name *gaoling* which means "high ridge" given to a mountain range in Jiangxi province from which the Chinese derive high quality porcelain-making material.

Porcelain stone is the result of the alteration of quartz and feldspar rocks due to high temperature fluids occurring during late-stage volcanic processes. Porcelain stone when mixed with kaolin makes the material easier to work as well as increases the firing temperature range. It produces a smoother, whiter ground on which decoration can be painted.

Like Kaolin, there are porcelain stone deposits across China from Zhejiang in the east to Yunnan in the west continuing on to North Vietnam. The highest quality of porcelain stone can be found in Jiangxi province around Jingdezhen. Porcelains from southern China generally have a bluish tinge in their glazes caused by reduction firing, except for the blanc de Chine porcelains made at De Hua which have a warm ivory tinge from oxidizing firings.

Porcelain vitrifies at around 1,280 Celcius and upwards. In the later periods of production, temperatures in the region of 1,400 Celcius were achieved by the Chinese.

Bai tunzi or petuntse may be translated literally as "little white bricks". This term refers to kaolin and porcelain stone that were transported to Jingdezhen from other regions in Jiangxi province in the form of little white bricks. The word tun as analyzed by Berthold Laufer, Curator of Anthropology at the Field Museum of Natural History in Chicago, refers to "a square block of stone".

The term bai tunzu simply signifies “white briquette”. It is one of a purely commercial and not mineralogical character. These blocks were brought or traded from their places of production to the centers of porcelain manufacture. It is therefore erroneous to apply the term “petuntse to the material. It has no mineralogical significance. It is therefore not synonymous with porcelain stone or china stone. The error was chiefly perpetuated by A.J. C. Geerts and thereafter carried by subsequent writers on ceramics.

Note: The Chinese sometimes call celadon which has been high fired and emits a resonant sound when struck, “porcelain” (*qing ci*). In some accounts it is referred to as “porcellaneous stoneware”. In the Western sense, porcelain is always white.

II. Firing Conditions or Kiln Atmosphere

Kiln atmosphere during firing may be of two kinds: Oxidizing and Reducing

Oxidation occurs when the atmosphere inside a kiln is rich in oxygen and the air is clean and bright. Reduction refers to the exclusion of oxygen from a kiln atmosphere making it dark and smoky. It is created by damping down the firing usually by closing the doors of the kiln so that the amount of oxygen is drastically reduced. Such firings reduce the quantity of oxygen atoms in iron or copper oxides present in the clays and glazes, thereby changing their color.

All Greenware glazes are the result of iron fired in a reducing atmosphere. Earthenware fired in reduction is gray and much tougher than the red body produced by oxidized firing. Oxidized firings produce warm-looking glaze colors. Reduction firings produce cool-toned glaze colors.

III. Kilns

There are many types of kilns but the major type of kiln used in south China where most of ceramics found in the Philippines emanated is known as the **Dragon Kiln**. It is so called because it reminded the Chinese of a recumbent dragon, long and sinuous stretching up a hillside. These sloping brick tunnels can reach up to 60 meters in length (some 3 meters wide) rising up a hillside at an angle of between ten and sixteen degrees. It has a wood-burning firebox at the lower end and fire holes for stoking at intervals along the sides. This type of kiln could fire tens of thousands of ceramics in a single firing. In some cases, the kilns were divided into a succession of firing chambers. In some areas, they were called stepped kilns.

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