

Experimental Lustre Tiles of Rafael Guastavino, Jr.

Michael Padwee

When I first heard that there were some boxes of Guastavino tiles in the Avery Architectural Archives at Columbia University, I had a vision of a few boxes of the R. Guastavino Company's main products--the vault- and Acoustalith tiles used for the wonderful domes and vaulting systems seen in buildings throughout the world.



Salesman samples showing the range of colors developed by the Guastavino Company for their vault tiles.¹

When I was brought a box of tiles at random to examine--I was allowed to examine and photograph three boxes of tiles during two visits to the Archives--I was astounded to see a selection of small rectangular, circular and square sample tiles of iridescent glazes, various-sized Near Eastern and Persian-style tiles, and small tile or pottery fragments. I believe there may be 40+ boxes of tiles in the Avery Archives. I do not think there is a visual record of them, nor are they cataloged.

¹ From: "Palaces for the People: Guastavino and the Art of Structural Tile", an exhibit at The Museum of the City of New York, March 26- September 7, 2014; borrowed from the Guastavino/Collins archive, Drawings and Archives, Avery Architectural and Fine Arts Library, Columbia University; http://findingaids.cul.columbia.edu/ead/nnc-a/ldpd_3463538/summary

When I was brought a box of tiles at random to examine--I was allowed to photograph the contents of three boxes of tiles during two visits to the Archives--I was astounded to see a selection of small rectangular, circular and square sample tiles with iridescent glazes, various-sized Near Eastern and Persian-style, luster-glazed tiles, and small tile or pottery fragments. I believe there are 40+ boxes of tiles in the Avery Archives, and I do not think there is either a visual or written record of them.



Rafael Guastavino, Jr.²

There are only four public mentions of Rafael Guastavino, Jr.'s experiments with lustre glazes. The most notable is a very brief article in *The Clay-Worker* in 1920 authored by Rafael, Jr. The others are a real estate brochure used to sell Rafael Jr.'s house in Bay Shore, Long Island in 2009; a 2009 article in the *Wall Street Journal*; and a recent article in *The New York Times* about the current owners of the Guastavino residence, the "Tile House."

² <http://guastavino.net/>



Rafael Guastavino, Sr.³

When Rafael, Sr. emigrated to the United States in 1881, he “brought with him...a 500-year-old building system created by the Moors, who conquered and held most of the Iberian Peninsula for hundreds of years. [...] The] process involved interlocking thin terracotta tiles secured in mortar and set in a herringbone pattern to form a thin skin that followed the curve of a roof. His tiled vaults are typically a mere 4 inches thick but extraordinarily strong and fireproof.”⁴

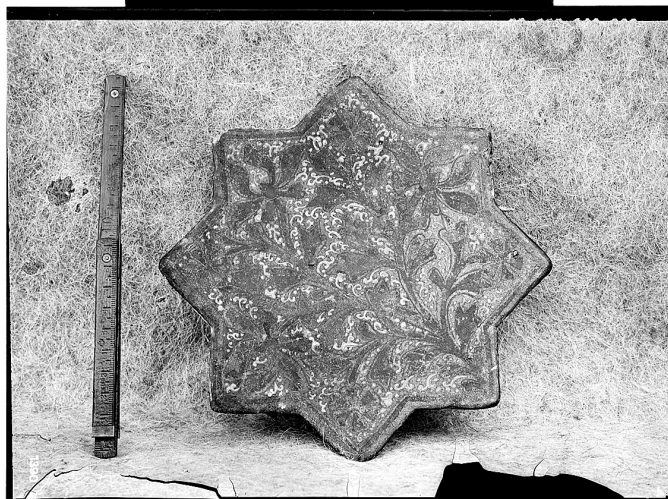
³ <http://guastavino.net/>

⁴ Sam Allis, “The greatest architect you've never heard of”, *The Boston Globe*, Feb. 26, 2011; http://www.boston.com/lifestyle/articles/2011/02/26/rafael_guastavino_the_greatest_architect_you_ve_never_heard_of/



The Guastavino Company's tiled vaults under the Queensboro Bridge. (Photo courtesy of Michael Padwee)

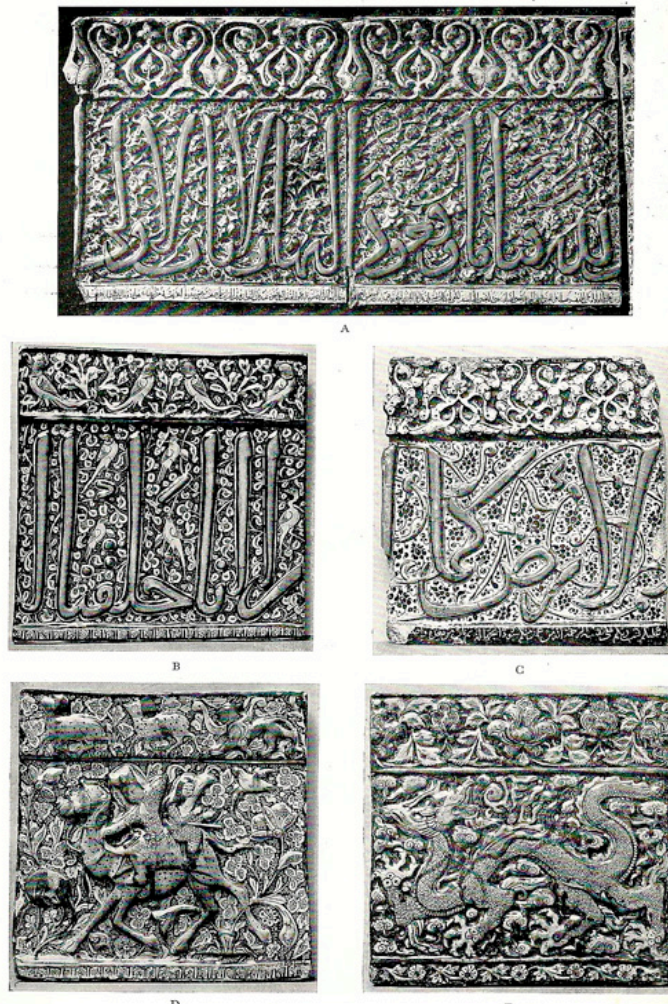
Although the Guastavinos--father (1842-1908) and son (1872-1950)--held twenty-four United States patents relating to their tiles and tiling system, structural architecture and Acoustalith tiles, apparently, there were no patents that referred to Rafael, Jr's lustre-glazed tiles. Rafael, Jr. experimented with glazes and clays and tried to reproduce the lustre-glazed Islamic tiles of the 15th-18th centuries.



Iranian lustre-glazed tile photographed by Ernst Herzfeld (1879-1948).⁵

⁵ The Ernst Herzfeld papers. Freer Gallery of Art and Arthur M. Sackler Gallery Archives. Smithsonian Institution, Washington, D.C. Photo File 13, vol. 2, image No. 185.

PLATE 2



PERSIAN (KASHAN) TILES PAINTED IN LUSTRE. 13th-14th century

Persian lustre-glazed tiles, 13th-14th centuries.⁶

This interest in lustre glazes and Islamic tiles by Rafael, Jr. is a continuation of his father's interest in Middle Eastern motifs and pottery, their Spanish heritage and the influence of Moorish decorative arts. For instance, in the 1880s Rafael, Sr. drew a series of studies of "Ancient Coloring and Styles of Decoration Applied to Modern Uses", which were reproduced in *The Decorator and Furnisher* magazine. These included Celtic, Arabian, Egyptian and Moresque designs.

⁶ Arthur Lane, *A Guide to the Collection of Tiles*, Victoria and Albert Museum, Department of Ceramics, London, 1939, Plate 2.



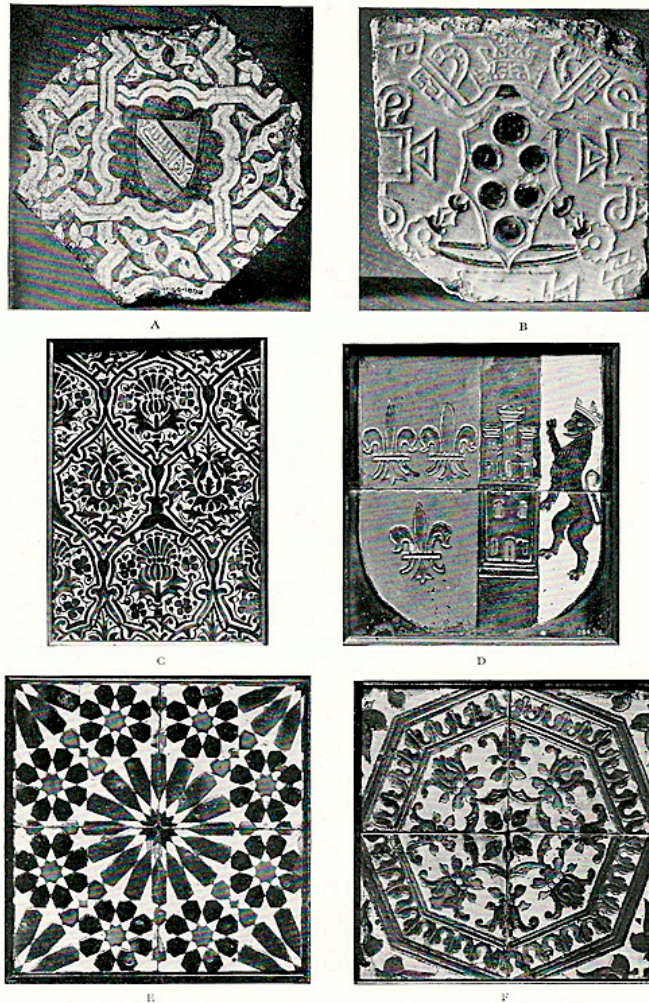
ANCIENT COLORING AND STYLES OF DECORATION APPLIED TO MODERN USES.

Egyptian decoration.⁷

In addition, Rafael Guastavino, Jr. was aware of the lustre pigments used by Islamic potters in the Near East and Moorish Spain, and the influence of Near Eastern pottery decoration on European wares. From the last quarter of the nineteenth century and into the early twentieth century there were many discussions in archeological and art journals about the ceramics of Persia, Egypt and the Moor-settled Mediterranean region, as well as about lustre glazes. Also, at this time many museums were starting collections of lustre-glazed pottery and tiles from these areas.

⁷ Rafael Guastavino, Sr., "Our Colored Plate", *The Decorator and Furnisher*, Vol. 2, No. 1 (Apr., 1883), pp. 16-17.

PLATE 44



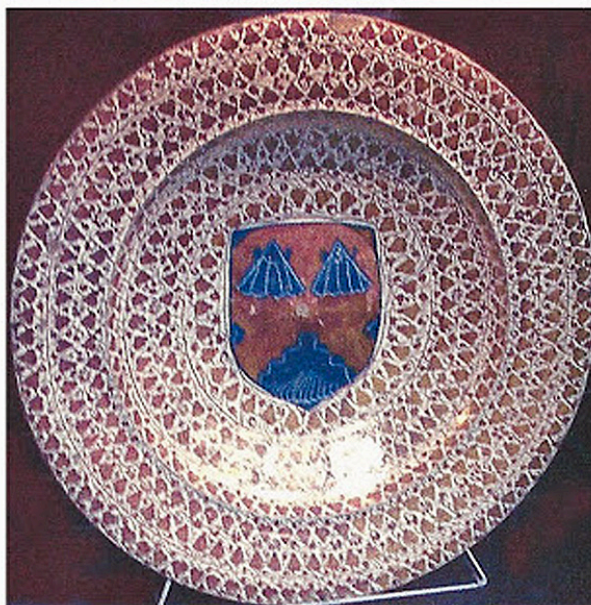
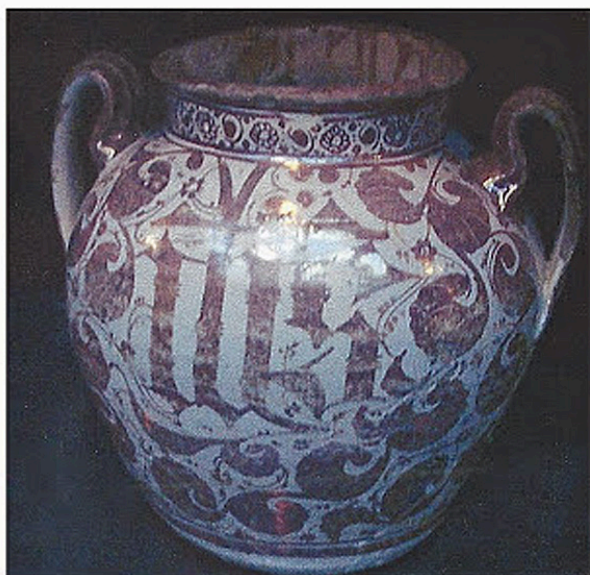
SPANISH LUSTRE-PAINTED AND cuerda seca TILES. 14th-16th century

Spanish lustre and cuerda seca tiles.⁸

There were a number of different processes used in the Near East to produce lustre glazes, but the ones used to best effect were to paint a pigment formed of metallic salts on a glazed surface and fire them in a special kiln at a low temperature. A thin film of metal is deposited on the glaze, and if it is thin enough to allow light to penetrate it, the lustre can glow with rainbow reflections.⁹

⁸ Arthur Lane, *A Guide to the Collection of Tiles*, Victoria and Albert Museum, Department of Ceramics, London, 1939, Plate 44.

⁹ R.L. Hobson, *A Guide to the Islamic Pottery of the Near East*, The British Museum, 1932, pp. 3-4.



Hispano-Moresque lustre pottery in the collection of the Museum of the Hispanic Society, New York City. Hispano-Moresque lustre wares were held in high esteem in both Spain and Italy. So much so that the Moors were not expelled from Spain by the Catholic Church and Spanish nobility until 1609-16, and Hispano-Moresque wares were imported duty free into Sienna and Venice.¹⁰ (Photos taken in 2003 by Michael Padwee)

It is also possible that Guastavino was aware of a technical treatise on pottery written in 1301 by Abulqasim Abdullah ibn Ali ibn Mohammed ibn Abi Tahir* which described a number of ceramic decorating techniques including lustre painting. Abu'l-Qasim wrote of using lustre enamels to decorate pots which had already been fired twice. These would then be fired a third time to bind the metallic lustre glazes to the pottery. Abu'l-Qasim also discussed the various metals used to create certain colors.¹¹

*"Abu'l Qasim...was a historian to the Mongol Court and a member of the Abu Tahir family of potters, one of a handful of Islamic families who controlled the manufacturing process of lusterware in the 12th and 13th centuries AD."¹²

¹⁰ "Hispano-Moresque Ware", *Museum of Fine Arts Bulletin*, Vol. 4, No. 22, Oct. 1906, pp. 37-38 and "Hispano-Moresque Collections in the Museum", *Bulletin of the Metropolitan Museum of Art*, Vol. II, No. 8, Aug. 1907, pp. 133-137.

¹¹ See Arthur Lane, *A Guide to the Collection of Tiles*, Victoria and Albert Museum, Department of Ceramics, London, 1939, pp. 3-6 and J.W. Allan's translation and commentary, "Abu'l-Qasim's Treatise on Ceramics", in *Iran* 11 (1973) pp. 111-20; <http://islamicceramics.ashmolean.org/Glossary/abulqasim.htm>. The earliest complete edition of this work was published in Tehran in 1345 as *Arayis al-jawahir wa nafayis al-atayib*.

¹² K. Kris Hirst, "The Islamic Historian Abu'l Qasim"; <http://archaeology.about.com/od/islamicarchaeology/ig/Islamic-Lustreware-/Islamic-Historian.htm>.



The Persians developed an over-glaze lustre technique by using mixtures of gold, silver, copper dust and metal oxide known as perdah on a matt-white glaze, and firing the ceramics at a low temperature. The Kashan tiles above from Kashan, a city two hundred miles south of Teheran, are in Istanbul's Tiled Pavilion Museum--Çinili Köşk--and were made from the second half of the 13th century to the early 14th century Ilkhanid Period. The first tile of the second row shows two concentric eight-pointed stars and is decorated with underglaze cobalt blue and lustre (perdah) on an opaque white ground. The middle tile is decorated with lustre and monochrome cobalt blue glaze on an opaque white ground.¹³ (Photo courtesy of Michael Padwee)

In 1920 the Metropolitan Museum of Art invited Rafael Guastavino, Jr. to exhibit his lustre-glazed tiles at the Museum's Fourth Annual Industrial Arts Exhibition.* Guastavino explains his interest in lustre glazes as "an uncontrollable desire...to reproduce, or better, say, 'rediscover,' the secrets of the metallic lustre process of decoration on pottery or tiles similar to that used in ancient ceramic products in Spain. ...I began the experiments some fifteen years ago...making hundreds of trials during the first year, without

¹³ Alpay Pasinli and Saliha Balaman, *Turkish Tiles and Ceramics Çinili Köşk*, A Turizm Yayınları Ltd. Şti., 1991, pp. 22-23.

any promising results...[that] could be duplicated the second time. However, later, several experiments indicated...the development of a lustre glaze... . Many lustre colors were then later produced with this glaze in experimental form, and later, when finally under control, applied on tiles and pottery."¹⁴

*Partially as a result of the popularity of these exhibitions and a belief that World War I would usher an era of progress into the world, the Metropolitan Museum of Art "...established a department devoted specifically to the requirements of producers and dealers in industrial art objects, a department which will make every effort to render accessible the invaluable resources of the collections for the betterment of American design and craftsmanship."¹⁵



These Lancastrian Lustre Ware vases from Pilkingtons have similar motifs as some Islamic pottery and tiles.¹⁶

¹⁴ Rafael Guastavino, "Lustre Pottery: Some Notes on the Pottery Exhibits Shown in the Metropolitan Museum of Arts in New York City, in Connection with the Fourth Industrial Arts Exhibition", *The Clay-Worker*, Vol. 74, No. 3, September 1920, p. 215.

¹⁵ "Ceramic Art Treasures", *The Clay-Worker*, Vol. LXXII, No. 1, July 1919

¹⁶ *The Studio Yearbook of Decorative Art 1914*, "The Studio", Ltd., London, 1914, p. 74.

When Guastavino began his experiments in earnest, he was not doing so in a vacuum. Guastavino had a collection of Islamic pottery, and there had been a number of ceramists who had created lustre glazes since the mid to late 1800s with differing rates of success in Europe, and later, in the United States. In 1909 one writer stated: "Ever since the last Paris Exhibition (and for some little time before it) experiments have been made all over Europe in the direction of crystalline glazes, and within comparatively recent years at home we have seen both the wonderful re-discovery...of painted lustre first attempted by Mr. de Morgan, and brought to such perfection by Mr. Burton of the Pilkington Tile and Pottery Company, and also Mr. Bernard Moore's admirable flambé."¹⁷



Pilkingtons Tile and Pottery Company, Lustre Vase decorated in relief with stylised trees, 7.25" high, dated 1908. (Courtesy of [AD Antiques](#))

Pilkingtons was established "in 1892 under the stewardship of William Burton who had previously worked as the chemist to Wedgwoods. [...The] factory was initially known for its tile output [...however,] in 1906...they began their experiments with their lustre glazes and it is this work that has become the most prized of the factories output; this was a

¹⁷ "Arts and Crafts", *Journal of the Royal Society of Arts*, Vol. 57, No. 2954, July 2, 1909, p. 692.

technically complex process using reduction lustre techniques and was overseen by the in house chemist Abraham Lomax."¹⁸

In 1907 William Burton presented a paper about "Lustre Pottery" to the Royal Society for the Encouragement of Arts Manufactures and Commerce. Mr. Burton said "the one feature which all the 'Lustres' have in common is a shining metallic quality of surface... The metallic quality of surface is, however, only one feature of the finest lustre effects... . If we examine examples of the fine lustres of the Persian, Spanish or Italian potters, we shall find that the decoration...is softened and beautified by a wonderful play of iridescent colour, so that it assumes something of the changing quality of the inside of a pearl shell, or is diversified by a play of brilliant colour like a soap bubble... . [...These] brilliant interference colours--soap-bubble colours...--of true lustres, are due to the presence of thin [iridescent] films..." He continues that gold and platinum cannot produce iridescent films, but iridescent films "...are most easily produced from other metals such as bismuth, silver and copper; precisely because these metals are capable of being tarnished or oxidized in air, while gold and platinum are not. ...Silver and copper are capable of forming volatile compounds at a comparatively low temperature, especially in the presence of reducing gases...; and these volatile compounds will penetrate or stain into any ordinary pottery glaze... . Moreover, if the firing and the action of the reducing gas be continued long enough, [...the stains] finally develop an iridescent film on their surfaces..."¹⁹

Burton goes on to discuss what is known of the Persian, Spanish/Moorish and Italian lustre glazes. He writes that "silver appears to have predominated in the lustreing material [of the Persian glazes], for the films are generally yellowish or brown. ...What is so noticeable, however, in the Persian lustre, is the brilliant iridescence and the effect of the metallic *réflet* [i.e., luster or iridescence] with its predominance of green and rosy tints that are less noticeable in the mediaeval lustres made in Europe. In the Spanish lustres, on the other hand, copper was much more...used... . Silver lustre was [also] used to a considerable extent in Spain, especially in conjunction with patterns painted in underglaze blue."²⁰

¹⁸ <http://www.adantiques.com/factories>

¹⁹ William Burton, "Lustre Pottery", *The Journal of the Society of Arts*, Vol. 55, No. 2846, June 7, 1907, pp. 756, 758.

²⁰ *Ibid.*, p. 759.



Pilkingtons Tile and Pottery Company, Lancastrian Lustre Ware. Vase with two handles (1910). Earthenware, yellow and gold lustre glaze painted on each side with lion rampants and scroll pattern. Artist/Designer: Gordon Forsyth (1879-1952). (Collection of the Victoria and Albert Museum, Number: CIRC.309-1953)

Burton concludes that "...it would seem...all these different varieties of lustre, the Persian, the Hispano-Moresque, and the Italian, must be due to some essential difference in the methods or materials used in the different countries, but the experience gained at our own works [Pilkingtons] convinces me that the...greatest factors in determining the results were the nature of the glaze and the intensity and duration of the firing."²¹

Burton cites two treatises on lustre glazes that were found in the library of the Victoria and Albert Museum, and which may also have been known to Guastavino: Piccolpasso's 1548 treatise on Italian lustre glazes, and Count Florida Blanca's 1785 report on Spanish metallic-lustre ware. In addition, Louis Franchet, a French ceramic chemist, had been working on lustre glazes concurrently, but independent from, the Burton brothers. In a series of articles in *Keramic Studio* in 1908, which would have been available to Guastavino, Franchet writes of his experiments.²²

²¹ **Ibid.**, p. 760.

²² **Louis Franchet, "Metallic Deposits on Glazes", *Keramic Studio*, Vol. IX, Nos. 11, 12, March and April 1908; Vol. X, Nos. 1, 4, May and August, 1908.**



A William De Morgan Plaque decorated with an Eagle in a Golden Lustre Glaze by Charles Passenger, 9.25" wide, 2" deep, c. 1890.²³ (Courtesy of AD Antiques)

"[William de] Morgan worked closely with some of the other historical figures of the Arts and Crafts movement such as William Morris and Burne-Jones and was a founder member of the Arts and Crafts Exhibition Society. De Morgan's glazes were principally divided in two, the Persian ware in a middle-eastern palate and lustre glazes in single, double and triple colour ways. Designs were typically arts and crafts: animals, galleons, stylized floral motifs and mythical beasts and these were transposed to chargers, bowls, vases and tiles."²⁴

²³ <http://www.adantiques.com/stock/de-morgan>

²⁴ <http://www.adantiques.com/factories>



A De Morgan vase with cover, 1888–98. Manufacturer: Sand's End Pottery (British). Lustered earthenware; H. 13 3/4 in. (34.9 cm). "Beasts and dogs among stylized foliate motifs in a ruby luster on an ivory ground decorate this vase by William De Morgan (1839-1917). ...His inspiration came primarily from Iznik (Turkey) and Persian ceramics as well as Italian Renaissance maiolica and sixteenth-century Hispano-Moresque wares."²⁵
(In the collection of the Metropolitan Museum of Art, New York, NY)

According to the decorative arts critic and historian, Lewis F. Day, De Morgan was the first of the modern English ceramists to revive the old Persian colors and pottery arts: "Look at the pottery of Persia or Damascus. ...The potter simply took the hint his materials offered. Cobalt gave him, on his ground of siliceous slip (or later of tin enamel), that deep rich blue, copper that delicate turquoise, copper again his emerald-like green, manganese his peculiar madder-like purple, iron and antimony his yellow; and the Rhodian workman added...[an opaque] coral color... . De Morgan adopted the old method, so far as it was discovered, [while] his imitators have clung to the [use of] lead glaze." Day continues that Doulton & Co. and Maw & Co. are also experimenting with the old Persian method of luster coloring.²⁶

²⁵ <http://www.metmuseum.org/toah/works-of-art/23.163.2ab>

²⁶ Lewis F. Day, "Tiles", *Brick*, Vol. VII, No. 5, November 1897, p. 176.

Of his contribution to the rediscovery of lustre glazes, De Morgan said, "The artistic work which I carried on for so many years was what is now known as the De Morgan Lustre and Persian ware. In its own way it was, I may say, quite original. But I have no right to claim invention or reinvention of lustre. The method of doing this had been re-discovered in Italy in 1856; and many pieces of this ware were exhibited in the Exhibition in Kensington in 1862."²⁷



De Morgan earthenware vase painted in lustre, 1888-1898, from the Victoria and Albert Museum collection.²⁸

As early as 1875, De Morgan began to work in earnest with a "Persian" palette: dark blue, turquoise, manganese purple, green, Indian red, and lemon yellow. Study of the motifs of what he refers to as "Persian" ware (and we know today as fifteenth-and-sixteenth century Iznik ware), profoundly influenced his unmistakable style, in which fantastic creatures entwined with rhythmic geometric motifs float under luminous glazes.²⁹

²⁷ Bram Stoker, "Mr. De Morgan's Habits of Work", *The World's Work*, Vol. XVI, No. 2, June 1908, p. 10340.

²⁸ <http://www.veniceclayartists.com/ceramics/page/2/>

²⁹ <http://www.victorianweb.org/art/design/demorgan/intro.html>



"Solid clay six inch hand-made tile that is moulded with a raised design and hand-painted in enamels. The tile design is known as 'Raised Lion'. The design is heraldic and consists of a background field that is divided into four squares that are alternately coloured blue and cane, with a red line dividing them. The top two squares have the raised motif of a lion passant, in buff and silver lustre, walking to the right and the lower two squares have the raised motif of a lioness passant, in buff and silver lustre, walking to the left. The reverse of the tile is marked with the impressed circular maker's mark for the Fulham Sand's End Pottery."³⁰

In 1892 De Morgan gave a lecture in which he described the process of making lustre-glazed pottery and tiles. The De Morgan Foundation in London summarized this process as follows: "Reduced pigment lustre is technically difficult to produce; the kiln temperatures are critical. The process (very much simplified) involves a third firing. The first firing hardens the basic clay pot or tile; the second firing adds the glazes or decoration. Before the lustre firing the areas to receive the metal coating are brushed over with a metallic oxide mixed with carbon (enabling the brush strokes to be seen) and gum arabic for a better flow from the brushes. At the critical moment in the temperature of the kiln wood shavings or brushwood are introduced at the bottom. Because of the heat, the wood has to catch fire but can only do so if there is oxygen present. The metallic oxide is reduced as hot oxygen is released leaving the fine metallic deposit that the design requires."³¹

³⁰ <http://www.hullcc.gov.uk/museumcollections/collections/>

³¹ http://www.demorgan.org.uk/sites/default/files/william_-_techniques_and_materials.pdf

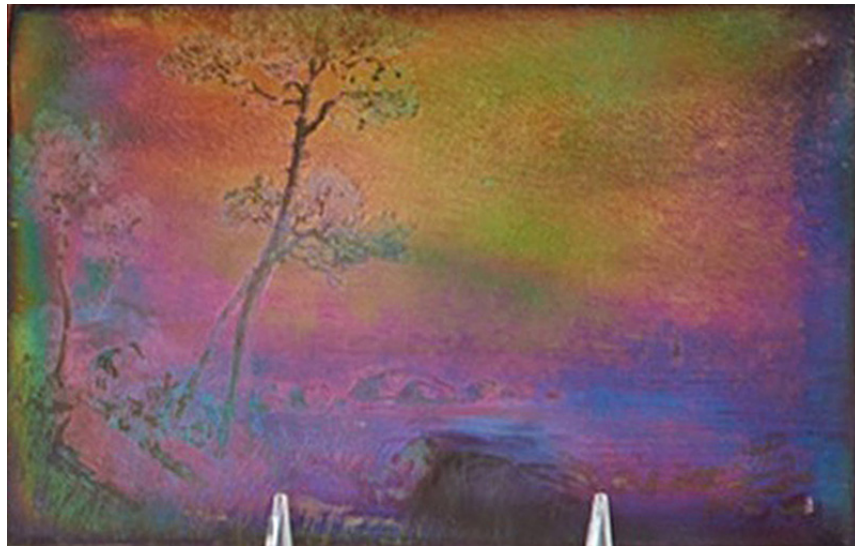


Left: "A miniature flambé vase with gilding and enameling at the top and to the bottom on two sides. Approximately 10cm high."³² Right: A Chinese-style, "Sang de Boeuf"-glazed vase. "The glaze, technically a high temperature reduction fired process using copper oxide on a hard paste porcelain body...results in a highly attractive scratch resistant, rich red glaze with purple streaks or spotting."³³ (Photos courtesy of Nick Cashin.)

Bernard Moore was an artist and chemist, who specialized in glaze effects and became renowned for his researches into the glazes of the Far East, producing stunning examples of flambé, sang de boeuf and luster effects.

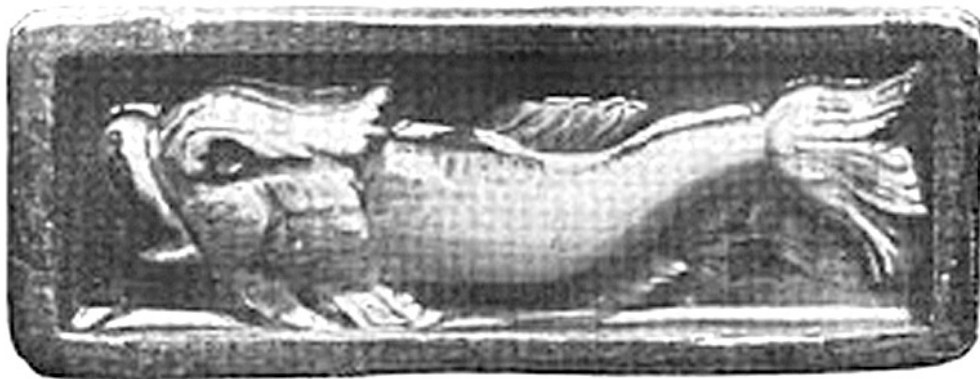
³² <http://ukpotheads.blogspot.co.uk/2012/06/bernard-moore-miniature-flambe-vase.html>

³³ <http://ukpotheads.blogspot.co.uk/2012/10/bernard-moore-and-development-of-copper.html>



An iridescent landscape plaque (in a plastic stand) produced by the Clement Massier Pottery and Massier's protégé decorator/designer, Jean Baptiste Gaziello, in the early 20th century.³⁴

"Jean-Baptiste Gaziello (1871-1957) was employed by Clement Massier, the principal art pottery on the Cote d Azur, as a decorator [from 1895-1905]. Gaziello also had an independent ceramic studio at the nearby establishment of L'Hospied. He perfected the technique of decorating ware with shimmering metallic lustres... ."35



A 4" long dolphintail paperweight made by Edward Lycett. This is glazed with iridescent colors and is Lycett's reproduction of Persian Murrhine glazes.³⁶

³⁴ Photo from "Rago Unreserved Auction", Lot 46, January 18, 2014;
<http://shop.ragoarts.com/discovery/jan18?l=88948>

³⁵ <http://www.collectorsweekly.com/stories/66786-jean-baptiste-gaziello-iridescent-symbol>

³⁶ Randolph I. Geare, "Ceramic and Other Arts of the Persians", *Keramic Studio*, Vol. X, No. 8, December 1908, p. 169.

In the United States Edward Lycett, the Artistic Director of the Faience Manufacturing Company of Brooklyn, New York, had been experimenting with lustre glazes since before 1890, trying to replicate the ancient Persian lustered glazes. Lycett had some success, and some of his work was exhibited.

Edwin Atlee Barber reported favorably on Lycett's experiments, and various museums, such as the National Museum, accepted Lycett's donations of his tiles.



A Modern Imitation of an Ancient Persian Tile.
Showing the Re-discovered Iridescent Glaze.

Tile panel³⁷ "in three colored divisions... . The upper design comprises three palm leaves with stems in a fawn color shaded with light blue. The middle division, eight inches square, is an iridescent design with scrolls. The lower division contains three indented discs, held together by bands and buttons, in the center intertwined with leaves."³⁸

³⁷ Illustration from *The Architectural Record*, Vol. XX, No.2, August 1906, p. 150.

³⁸ "Clay Products in the National Museum", *The Clay-Worker*, Vol. XXXIII, No. 4, October 1900, p. 278.

The Rookwood Pottery in Cincinnati also experimented with lustre glazes. One such glaze was the "Nacreous" glaze line "introduced in 1915 and...discontinued shortly thereafter, probably due to poor sales. Since the glaze obscures any decoration underneath, it is generally found on undecorated, commercial, or slip cast vessels. ...The glaze colors vary, but are generally a light to very dark blue lustre or more commonly, a light to dark yellow-green lustre."³⁹ Rookwood also produced lustre-glazed tiles, which may have been experimental.



A 3.25" wide, mottled-green, Rookwood lustre tile.

In 1901 Samuel Weller, the owner of the Weller Pottery in Zanesville, Ohio hired Jacques Sicard and his assistant, Henri Gellie, from Clement Massier's pottery in France and brought them to the United States to develop a metallic lustre ware for Weller. "These men made a metallic lustre ware with floral and conventional designs on an iridescent dark green, brown or purple background. [Sicardo ware...] was made in figures, large and small vases, large plaques, ...dishes, ...jewel boxes, candle sticks, umbrella stands, and lamp bases.

³⁹ Anita J. Ellis, *Rookwood Pottery: The Glaze Lines*, Schiffer Publishing Ltd., Atglen, PA, 1995, p. 95.



A Weller “Sicardo” vase.⁴⁰ (Photo courtesy of Michael Padwee)

“Sicard’s process required a firing atmosphere in which the oxygen was greatly reduced. Because of the impossibility of controlling this reduction, the result was uncertain and failure was frequent. [It has been said that the failure rate was near 70%. (MP)]” Sicard was very secretive about his process, and he returned to France in 1907.⁴¹

⁴⁰ American Wing collection, Metropolitan Museum of Art, New York

⁴¹ Norris F. Schneider, *Zanesville Art Pottery*, Self-published, Zanesville, Ohio, 1963, p. 8.



Jacques Sicard made this 9" x 13" metallic lustre plaque for the S. A. Weller pottery in Zanesville.

A metallic lustre plaque made by Jacques Sicard.⁴²

The J. B. Owens Pottery Company, also in Zanesville, Ohio introduced a metallic lustre ware with iridescent effects, called "Feroza", in 1901, and the "Opalesce" line in 1905, which was "coated with gold and other metallic colors overglazed' with floral decoration inlaid on one side of each piece."⁴³

Weller's chief competitor in Zanesville, was the Roseville Pottery Company, founded by George F. Young in 1892. Young hired an English ceramist, Harry Rhead, the brother of ceramic designer Frederick Hurten Rhead, to design a pottery line that would compete with Weller's "Sicardo" line. Rhead developed Roseville's Rozane "Mara" line, consisting of "odd reds, varying from pale rose tints to the deepest magenta, the soft tones of gray and opal suggesting the pearly surface of a shell."⁴⁴ This metallic lustre line was

⁴² E. Stanley Wires, Norris F. Schneider, and Moses Mesre, *Zanesville Decorative Tiles*, Self-published, Zanesville, Ohio, 1972, p. 28.

⁴³ Norris F. Schneider, *Zanesville Art Pottery*, Self-published, Zanesville, Ohio, 1963, p. 18.

⁴⁴ Norris F. Schneider, *Zanesville Art Pottery*, Self-published, Zanesville, Ohio, 1963, p. 21.

“introduced by Roseville Pottery in 1905. The Mara pattern was decorated with exquisite rainbow tints that resemble the lining of seashells.”⁴⁵



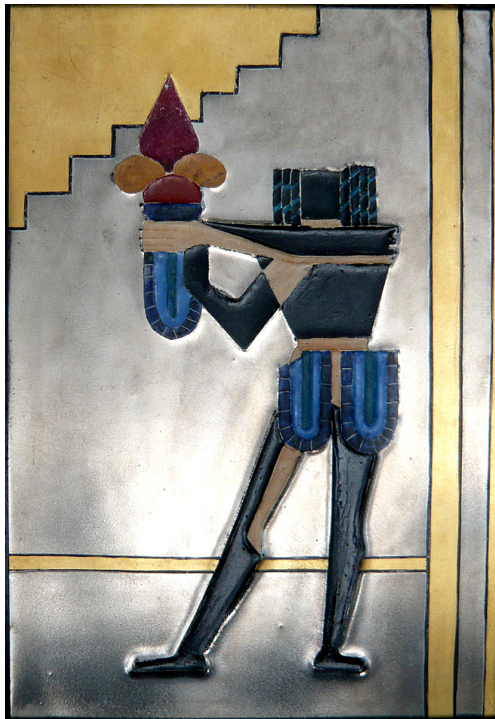
Two Rozane Mara Ware vases. (Left vase, Lot 47 from a 2012 Humler & Nolan Holiday Auction 2012, http://www.liveauctioneers.com/item/14101644_roseville-mara-vase-iridescent-glaze-5-38; Right vase from the Real Price Guides website of Ervin Lewis, <http://realpriceguides.com/rosevillea/mara.htm>)

The American Encaustic Tiling Company of Zanesville also developed luster-glazed tiles at this time.



A 9" AET tile with luster background. (Collection of Richard Mohr)

⁴⁵ http://www.justartpottery.com/Category_List.asp?pottery_category=133&cat=Roseville+Mara)



One of ten AET tiles with luster background based on costume designs for Carlos Chavez' *Aztec Ballet* in New York, c.1927. (Collection of Richard Mohr)



A luster-glazed AET "peacock" tile. (Lot 51, Cincinnati Art Galleries, *Art Tile Auction*, March 1 Thru 9, 2000, p. 9)

Other potters and potteries in the United States also tried their hands with lustre glazes:



Pitcher, Owen China Company (not the J.B. Owens Pottery), Minerva, Ohio, 1906-08, "Swastica Keramos" line. (American Wing collection, Metropolitan Museum of Art, New York)



Vase, c. 1898-1902, Brouwer Pottery or Middle Lane Pottery, West Hampton or East Hampton, New York. (American Wing collection, Metropolitan Museum of Art, New York)

"Theophilus Brouwer (1864-1932)...was a noted sculptor, woodcarver, architect, oil painter and potter. Brouwer created a unique way of firing his pots to achieve quite beautiful pottery. His exact methods are still not known today[, but his] “flameware” pieces were his signature style."⁴⁶



Porcelain vase, University City Pottery, University City, Missouri, 1910. Designed and executed by Emile Diffloth. (American Wing collection, Metropolitan Museum of Art, New York)

"The University City pottery was founded by Edward G. Lewis, an amateur potter and publisher of women's magazines. Lewis recruited Taxile Doat, a French ceramist who was an expert on porcelain and high-fire glazes, and Adelaide Alsop Robineau, one of the leading ceramists in America. The faculty also included Emile Diffloth, a French ceramist who assisted Doat; the British-trained potter Frederick Hurten Rhead; and native St. Louisan Kathryn E. Cherry, who taught china painting."⁴⁷

⁴⁶ <http://www.whbhistorical.org/new-area-history/the-castle-theophilus-brouwer/>

⁴⁷ <http://www.tfaoi.com/aa/4aa/4aa484.htm>



**Stoneware vase, Pewabic Pottery, Detroit, Michigan, 1918-25.
(American Wing collection, Metropolitan Museum of Art, New York)**

“In its early years, the [Pewabic Pottery of Detroit, Michigan] made rich and stunning pottery with glazes that have never been reproduced – they can’t be, because Pewabic founder and glazemaster Mary Chase Perry (later Stratton) destroyed the formulas that made Pewabic’s light-loving, iridescent pottery famous. ...The hallmark of early Pewabic pottery is [a] deep, lustrous glaze so eager to play with light it seems like a living substance. ‘You look at a vase in dark light, you think it’s black or blue,’ [Susan Bandes, Kresge Art Museum director] says. ‘Move it into the light and all of a sudden you see pinks and golds and silvers coming out.’ Perry’s glazes don’t stick like a static coating. They seem to swirl and drift over the surface of a piece, like the atmosphere of a planet. ‘You look at a lot of pots and the glaze seems to be right on the surface,’ Bandes says. ‘You look at Pewabic pots and you’re looking through layers and layers.’ ...In her efforts

to master the work-and-luck chemistry of glaze preparation, Perry sent hundreds of potential splendors and failures into the heat of the kiln. Over the years, she came up with buff, ivory and brown glazes; metallic pigments; a slippery beast called "flowing" glaze; a stunning dark blue matte glaze; and her famous iridescent glazes, to name only a few."⁴⁸

Perry was encouraged to develop iridescent glazes by ceramics expert Charles Lang Freer, and had access to Freer's collection of Asian and Near Eastern ceramics. Perry's experiments began in 1902, and she developed her palette of six iridescent glazes by 1906. She used "a unique frit formula ...for each of her glazes, which she named 1A, 2A, 3A, 4A, 5A, and 6A. The base glaze was fritted or melted in a small high heat furnace and allowed to drip into a pan of water to solidify. The resulting glass substance was dried...and then ground into a fine powder in a ball mill. To create a particular iridescent glaze, Perry added the following materials to her base frit for: 1A silver carbonate; 2A zinc oxide, copper oxide, carbonate of silver and tin; 3A subnitrate of bismuth, carbonate of silver and carbonate of copper; 4A carbonate of silver and copper sulfide; 5A copper sulfide and silver sulfide; and 6A zinc, tin and copper sulfide. Her iridescent glazes were applied singularly or in combination over bisque ware or glazed ware depending upon the desired effect. They were then fired in the Revelation Kiln using kerosene oil for the reducing agent. These iridescent glazes matured at...950-990 degrees C...and were reduced at...650-660 degrees C... ."49

"The uniqueness of Pewabic Pottery lies in the empirical methodologies embraced by Perry and [her partner, Horace James] Caulkins. They traded on the novelty of glaze effects created by harnessing chemical mixtures and firing processes. Their goal was to achieve a certain dependability of production without an industrial control of the process."⁵⁰

⁴⁸ Lawrence Cosentino, "Turning Clay into Gold"; [http://www.lansingcitypulse.com/lansing/archives/051019/stories/Pewabic%20\(Cover%20Story\).html](http://www.lansingcitypulse.com/lansing/archives/051019/stories/Pewabic%20(Cover%20Story).html)

⁴⁹ Thomas W. Brunk, "Painting with Fire: Pewabic Vessels in the Margaret Watson Parker Collection", The University of Michigan Museum of Art, 1995, p. 8.

⁵⁰ Dr. Thomas W. Brunk, "Pewabic Pottery: Patronage, Private Residences, Public Buildings, Sacred Spaces"; <http://www.tfaoi.org/aa/7aa/7aa851.htm>.



143 Awixa Avenue, Bay Shore--The Tile House^{*51}

In 1912 Rafael Guastavino built a home at 143 Awixa Avenue, Bay Shore, Long Island to live in, as well as to showcase Guastavino tiles. The current owner of the “Tile House” still has a group of small experimental tiles that Guastavino made in his private kiln in the boathouse in his spare time.⁵²



The boathouse.

*[This house, itself, was featured in a July 25, 2013 *New York Times* article about it’s present owners. However, an earlier, 2009 article in *The Wall Street Journal*,

⁵¹ *The Wall Street Journal*;
<http://online.wsj.com/article/SB10001424052748704782304574542014266513176.html>.

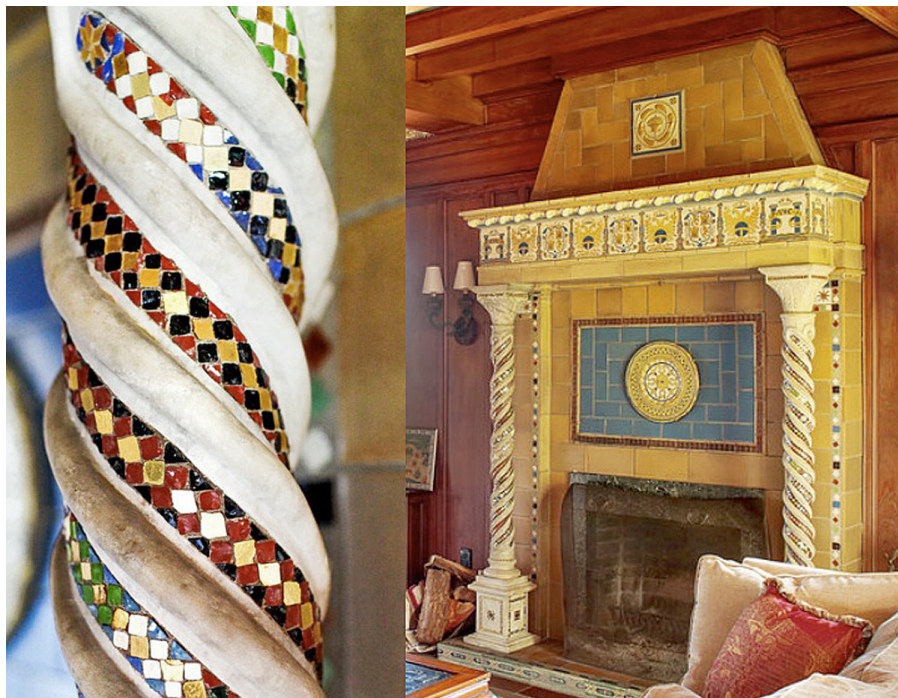
⁵² Penelope Green, “At Home With George McDonald: A Mayoral Candidate Reflects on the Mosaic of His Life”, *The New York Times*, July 25, 2013, pp. D1, D7.

(<http://online.wsj.com/article/SB10001424052748704782304574542014266513176.html#>) has photos of unobstructed views of the house's interior tile work. In addition, the 1989 "Building Structure Inventory Form" of the Division for Historic Preservation of the New York State Parks and Recreation Department, ([http://www.connetquotlibrary.org/services/local-history/buildings/Bay%20Shore/Awixa%20Avenue/Awixa%20Avenue%20\(143\)%20Guastavino%20House%201989%20inventory.pdf](http://www.connetquotlibrary.org/services/local-history/buildings/Bay%20Shore/Awixa%20Avenue/Awixa%20Avenue%20(143)%20Guastavino%20House%201989%20inventory.pdf)), contains a great deal of architectural and decorative information about this house.]



Some photos from the *Wall Street Journal* article.



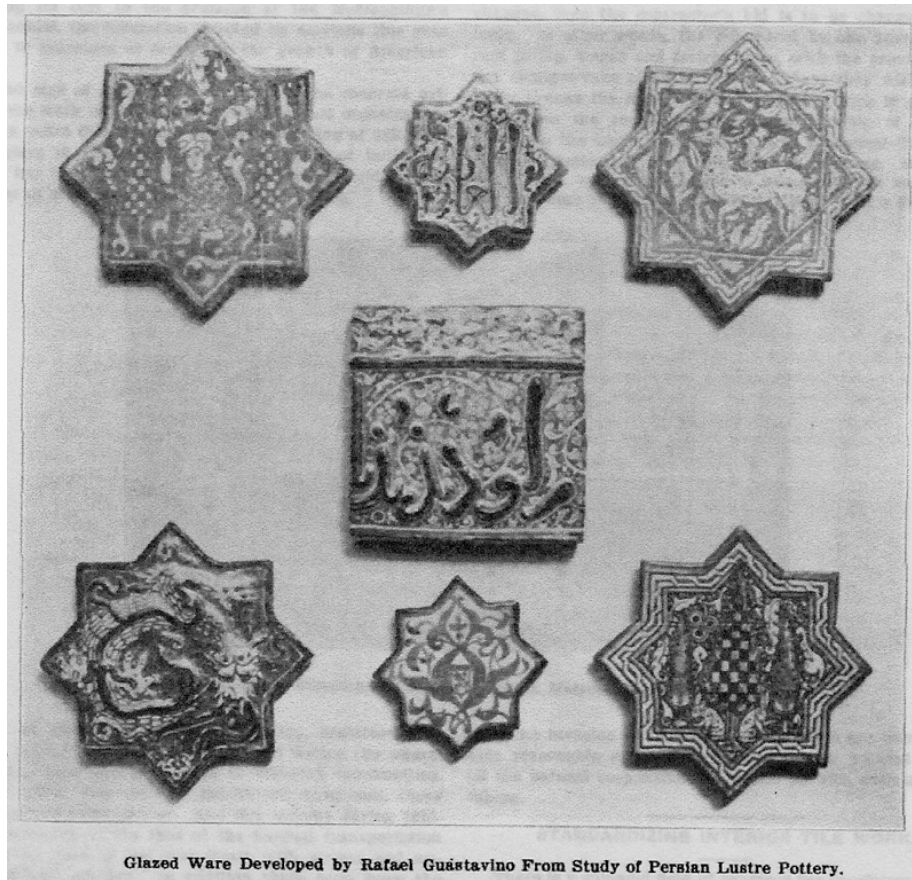


A combination of two photos of the fireplace in the Guastavino house in Bay Shore, which seems to show an artistic use of his luster-glazed tiles.⁵³

After his initial experiments with lustre glazes, Rafael Guastavino was forced to postpone his investigations until about 1915. At that time, he explains, he “took up the original work on the elusive Spanish and Persian lustre. ...I made over one thousand experiments up to two years ago [about 1918]. I was then finally rewarded by being able to duplicate the lustre practically at will, however not always the same shade (which is not always desirable) but under reasonable control to be practical. Being a collector in a small way of the potteries of the Near East, I have come to the conclusion that even these wonderful potters of that age were troubled with the same difficulties.”⁵⁴

⁵³ Original photos from *The New York Times* article by Penelope Green, “At Home With George McDonald: A Mayoral Candidate Reflects on the Mosaic of His Life”, July 25, 2013, pp. D1, D7; [Eric Striffler](#), photographer for *The New York Times*.

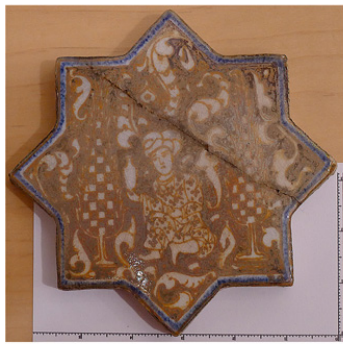
⁵⁴ Rafael Guastavino, “Lustre Pottery: Some Notes on the Pottery Exhibits Shown in the Metropolitan Museum of Arts in New York City, in Connection with the Fourth Industrial Arts Exhibition”, *The Clay-Worker*, Vol. 74, No. 3, September 1920, p. 216.



(Photo in the public domain; *The Clay-Worker*, Vol. 74, No. 3, September 1920, p. 216)

Guastavino also discussed the differences he saw between the current commercial lustre glazes and the older Hispano-Moresque and Near Eastern lustre glazes: “The metallic lustres on old Spanish plates and of the Near East are quite different from the commercial type of lustres which can be bought already prepared and are usually fired on white china in the usual decorating kilns, but for the artist the old lustres stand in a class by themselves. They have a beautiful pearly metallic sheen or iridescence by reflected side light in addition to their pleasing color effect when viewed directly.”⁵⁵

⁵⁵ Rafael Guastavino, “Lustre Pottery: Some Notes on the Pottery Exhibits Shown in the Metropolitan Museum of Arts in New York City, in Connection with the Fourth Industrial Arts Exhibition”, *The Clay-Worker*, Vol. 74, No. 3, September 1920, p. 216.



Unmarked on reverse



Marked on rev.: ???, ???, 184



Marked on rev.: 202, 203, 174 and I-35-???



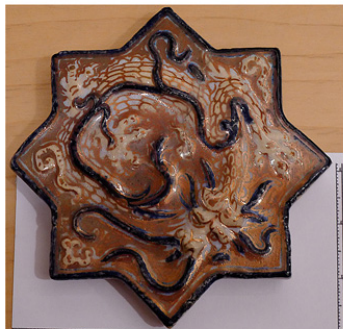
Exp. glazes 13, 64, 84 and 11; app. 3"x3"



Marked on rev.: 67, 61, 78 and B



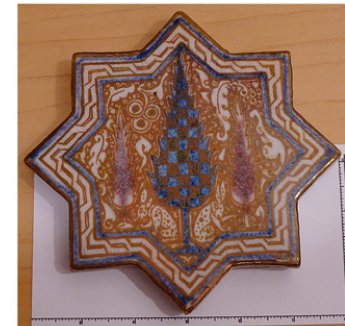
Exp. glaze 05- or D5; app. 1-1.5" long-



Marked "A" on reverse and "D" on an edge



Marked "55" and "66" on reverse; app. 3" High



Marked "A" and 19 on the reverse

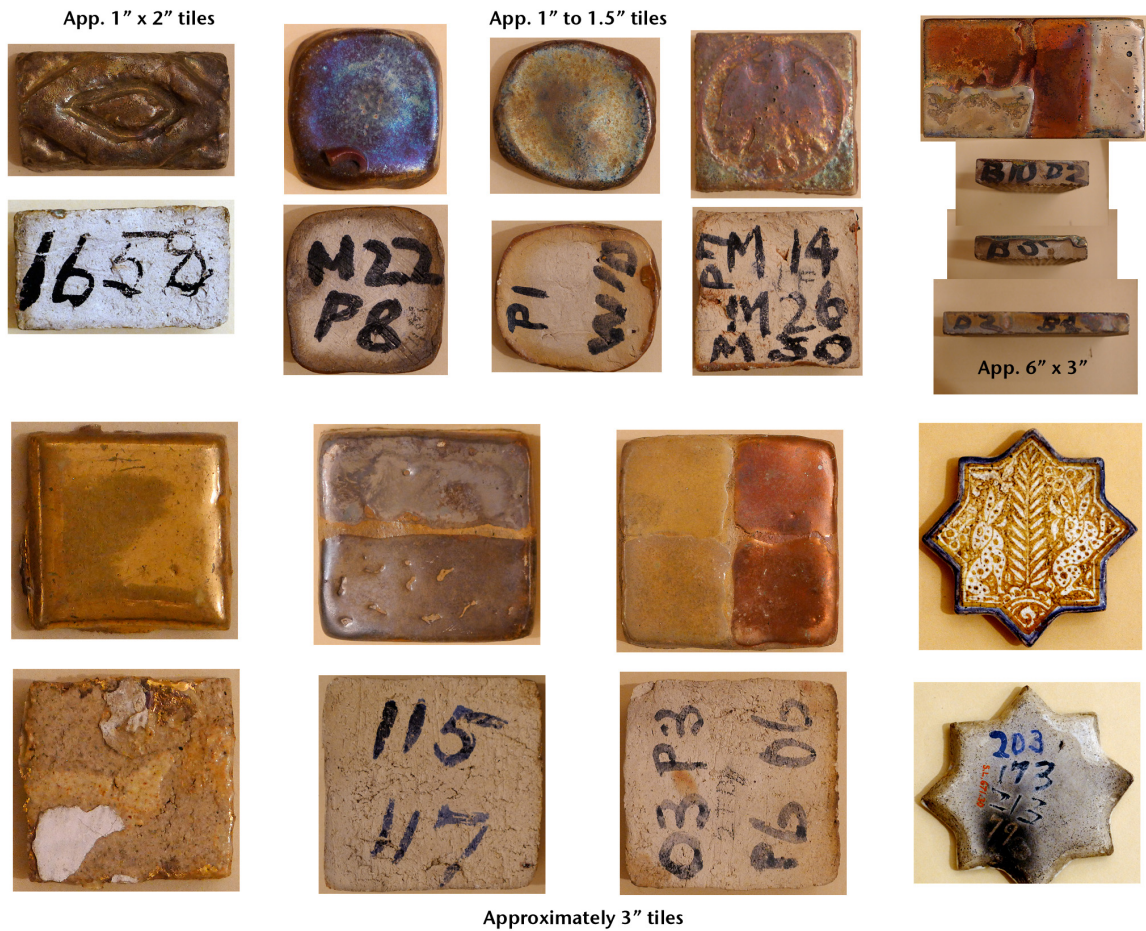
Some Persian tile reproductions by Rafael Guastavino. (Tiles are in the Guastavino Fireproof Construction Company/George Collins architectural archives, Department of Drawings & Archives, Avery Architectural & Fine Arts Library, Columbia University; http://findingaids.cul.columbia.edu/ead/nnc-a/ldpd_3463538/summary). The center tile is possibly a reproduction of a Khanid Dynasty (Kashan) frieze tile from the late 13th-early 14th century.⁵⁶

Joseph Taylor of the [Tile Heritage Foundation](http://tileheritagefoundation.org) asked if Guastavino made his own Persian-style tiles or just glazed over already-existing Persian tiles. Since there were multiple copies of each Persian-style tile in the Avery Archives, some with different glazes, I assumed that Guastavino made molds of existing tiles, either from his own collection, or from the collection at the Metropolitan Museum of Art, and applied his glazes to the molded bisque tiles he made. At this time, however, I have not been able to locate any notebooks that might answer these questions.

Although most of the tiles are marked with the glazes used by Rafael Guastavino, I have not been able to establish the names he used for his glazes nor his glaze formu-

⁵⁶ Elsie Holmes Peck, "Like the Light of the Sun: Islamic Luster-Painted Ceramics", *Bulletin of the Detroit Institute of Arts*, Vol. 71, No. 1/2 1997, p. 16.

las, firing temperatures or firing times. (Glaze formulas were usually well-kept secrets by ceramists.)



Various glaze experiments. (Tiles are in the Guastavino Fireproof Construction Company/George Collins architectural archives, Department of Drawings & Archives, Avery Architectural & Fine Arts Library, Columbia University; http://findingaids.cul.columbia.edu/ead/nnc-a/ldpd_3463538/summary)

In the absence of any notes about how Rafael, Jr. prepared his glazes and how they were fired, and without a chemical or neutron activation analysis (NAA)* of the glazes, we can only very generally infer what he did.



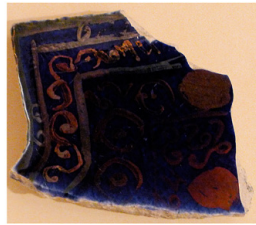
Five of Guastavino's luster-glazed, experimental vases, ca. 1920s.⁵⁷

Rafael, Jr. also experimented with luster glazes painted on generic biscuit vases during the 1920s. Again, there do not seem to be any written records about the creation of the glazes for these vases.

Also contained in the boxes I examined were what may be Middle Eastern pottery fragments. We know that Rafael, Jr. studied fragments of lustre pottery excavated at Fustat, near Cairo “and produced and assembled a small collection of these interesting relics.”⁵⁸

⁵⁷ From: "Palaces for the People: Guastavino and the Art of Structural Tile", an exhibit at The Museum of the City of New York, March 26- September 7, 2014; borrowed from the Guastavino/Collins archive, Drawings and Archives, Avery Architectural and Fine Arts Library, Columbia University; http://findingaids.cul.columbia.edu/ead/nnc-a/ldpd_3463538/summary

⁵⁸ Rafael Guastavino, “Lustre Pottery: Some Notes on the Pottery Exhibits Shown in the Metropolitan Museum of Arts in New York City, in Connection with the Fourth Industrial Arts Exhibition”, *The Clay-Worker*, Vol. 74, No. 3, September 1920, p. 216.



A.



C.



B.



D.

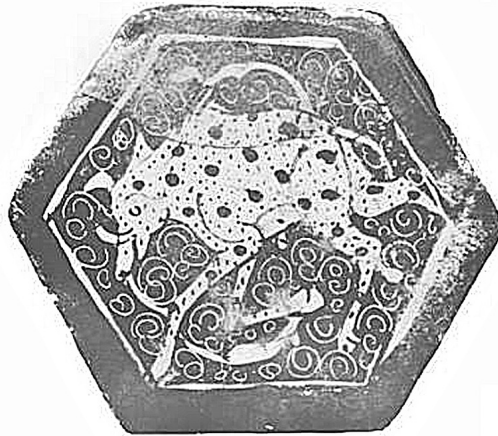


E.

Fragments: "A" and "E" are marked on the reverse with what may be glaze numbers. I do not have photos of the backs of "C" or "D".

Pottery fragments⁵⁹

In 1928 Rafael Guastavino donated at least one Persian lustre tile and two pottery/bowl fragments to the Metropolitan Museum of Art.



Luster hexagonal tile with the figure of a boar. First half of 13th century. Gift of Rafael Guastavino, 1928 (28.89.8).⁶⁰

⁵⁹ Pottery fragments are in the Guastavino Fireproof Construction Company/George Collins architectural archives, Department of Drawings & Archives, Avery Architectural & Fine Arts Library, Columbia University; http://findingaids.cul.columbia.edu/ead/nnc-a/ldpd_3463538/summary.

⁶⁰ Stefano Carboni and Tomoko Masuya, *Persian Tiles*, The Metropolitan Museum of Art, 1993.

In 1984 these bowl fragments, which were luster-painted on a cobalt-blue glaze, were subjected to neutron activation analysis*, and they were determined to be from Syria, near Damascus. ("Mamluk Underglaze-Painted Pottery: Foundations for Future Study", Marilyn Jenkins, *Muqarnas*, Vol. 2, The Art of the Mamluks (1984), pp. 95-114, Published by BRILL, Stable URL: <http://www.jstor.org/stable/1523059>)

*[Neutron-activation analysis is a method of trace element analysis in which a small powdered sample of ceramic is bombarded with neutrons in a nuclear reactor and the resulting emitted gamma radiation measured to determine the concentrations of a range of elements. It was long favoured as a precise, accurate and minimally destructive method of analysis of archaeological materials.⁶¹]



Plates 5.d and 8.b in "Mamluk Underglaze-Painted Pottery: Foundations for Future Study", Marilyn Jenkins, *Muqarnas*, Vol. 2, The Art of the Mamluks (1984), pp. 95-114, Published by BRILL, Stable URL: <http://www.jstor.org/stable/1523059>

Two pottery/bowl fragments in the Metropolitan Museum of Art collection, donated by Rafael Guastavino in 1928.

The unexamined boxes of tiles in the "Guastavino Fireproof Construction Company/ George Collins" architectural records and drawings collection in the Avery Archives could contain many more surprises, and there are many more questions raised, here, than answered.

⁶¹ <http://islamicceramics.ashmolean.org/Glossary/gloss2.htm>

I would like to thank Janet Parks, Curator of [Drawings and Archives at the Avery Architectural and Fine Arts Library](#), Columbia University, and her staff for their patience and help with the research for this article. Much of the material about Rafael Guastavino's experimental tiles came from the [Guastavino Fireproof Construction Company/George Collins architectural records and drawings collection](#) in the Avery Archives.

I would also like to thank decorative arts historian Richard Mohr for the photos of tiles in his collection. Thanks to Alison Davey of [AD Aniques](#) for the use of the de Morgan and Pilkingtons photos; to Nick Cashin of the "[Ukpotheads](#)" blog for the Bernard Moore images; to [Humler & Nolan](#) Auction House and [Ervin Lewis](#) for Roseville's Rozane Mara Ware photos; and, as always, thanks to the [Tile Heritage Foundation](#) for their support and help.