Notes from the Oesper Collections

A Rookwood History of Chemistry

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Just inside the main entrance to the building now known as "Old Chemistry" is a unique ceramic drinking fountain (figure 1) which the chemistry department left behind when it moved to its present location in 1970. Closer inspection shows that this fountain is made of one-of-a-kind faience tiles especially manufactured by the famous Rookwood Pottery Company of Cincinnati and designed so as to symbolically embody, when read from the top downwards, the historical evolution of modern chemistry. Dedicated in 1922, the fountain was a gift to the University from the Senior Engineering Class of 1921. Both the fountain and its symbolism were described in some detail by

Figure 1. The Rookwood fountain in the entrance foyer of "Old Chemistry" as it looks today.

Figure 2. The symbols of the seven ancient planets and/or metals (left to right: gold, copper, iron, tin, lead, silver, and mercury) and the large double-tile reproducing the illustration from Georg Agricola's *De re metallica* of 1556 depicting the manufacture of soda.

Harry Shipley Fry, the then head of the Chemistry Department, in an article published in the *Journal of Chemical and Engineering Chemistry* shortly after its dedication (1).

Figure 3. Original woodcut from the 1556 edition of Agricola's *De re metallica* on which the large tiles in figure 2 are based.

Figure 4. Circular alchemical tile entitled "The Mutual Conversion of the Elements" based on the book, *Theatre of Terrestrial Astronomy* (1676).

Beginning at the top of the fountain, our ancient chemical heritage is represented by a crowning arch of seven tiles (figure 2) showing the ancient Chaldean symbols for the seven planets and/or metals known to antiquity, including (from left to right) the Sun (gold), Venus (copper), Mars (iron), Jupiter (tin), Saturn (lead), the Moon (silver), and Mercury (mercury metal).

Immediately below this arch is a scene composed of two large tiles representing the contributions of renaissance chemical technology to the evolution of modern chemistry. This is based on a woodcut (figure 3) taken from the 1556 edition of Georg Agricola's famous treatise, *De re metallica*, and depicts the manufacture of soda or sodium carbonate (2).

Figure 5. Original etching on which the tile in figure 4 is based

The contributions of medieval and renaissance alchemy are represented by the two large circular tiles to the immediate left and right of the scene from Agricola. The tile on the left (figure 4) is based on a crude allegorical woodcut (figure 5) found in Edward Kelly's *Theatre of Terrestrial Astronomy* of 1676 and entitled "The Mutual Conversion of the Elements," whereas

Figure 6. Circular alchemical tile entitled "The Birth of the Philosopher's Stone" based on the book, *Le triomphe hermétique* (1689).

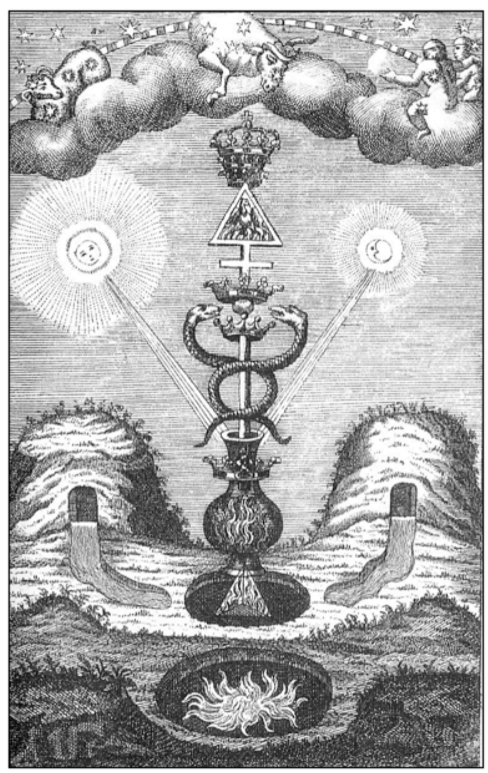

Figure 7. Original etching on which the tile in figure 6 is based.

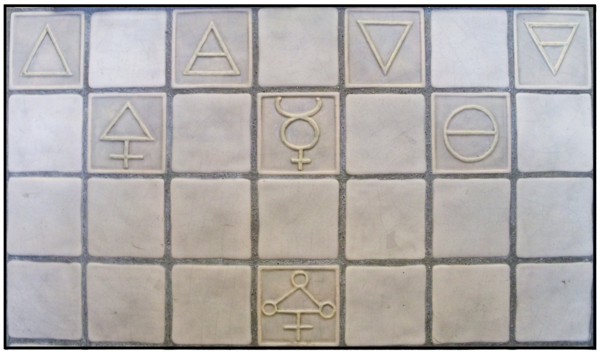

Figure 8. The evolution of the chemical elements. *First line:* the symbols for the four Aristotelean elements of fire, air, water, and earth. *Second line:* The symbols for the three Paracelsian principles of sulfur, mercury and salt. *Fourth line*: The symbol for phlogiston.

that on the right (figure 6) is based on an allegorical etching (figure 7) taken from A. T. L. de Limojon's, *Le triomphe hermétique* of 1689 and is entitled "The Birth of the Philosopher's Stone."

Immediately below the Agricola tiles is a horizontal line of four tiles (figure 8) representing the ancient symbols for the Aristotelean elements of (from left to right) fire, air, water and earth, and immediately below this is a row of three titles representing the symbols for the *tria prima* or three principles of Paracelsus, consisting of (from left to right) sulfur, mercury and salt. Even further down, on a line by itself, is the symbol for phlogiston, the relative vertical spacing of the tiles representing the time lapses involved – the four elements and three principles being the accepted mode of chemical explanation in the 16th century and phlogiston not appearing until the late 17th and early 18th centuries.

Below the tile containing the symbol for phlogiston is a slightly larger tile (figure 9) based on an

Figure 9. The tile representing Lavoisier's chemical revolution, based on an etching of his apparatus for the generation of dioxygen gas from mercury oxide.

etching (figure 10) taken from Antoine Lavoisier's famous *Traité élémentaire de chimie* of 1789 showing his apparatus for the generation of dioxygen gas from mercury oxide – a reaction which played a key role in his oxygen theory of combustion, and which ultimately led to the overthrow of the phlogiston theory and to the establishment of our modern concept of a chemical element as a simple, isolable substance, rather than as a property-bearing abstract principle. This etching is also used on the book plate found in the monographs and journals belonging to the Oesper Collections in the History of Chemistry.

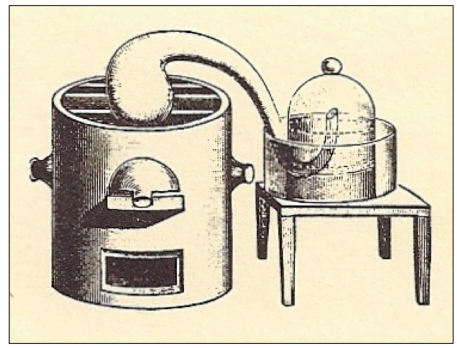

Figure 10. Original etching on which the tile in figure 9 is based.

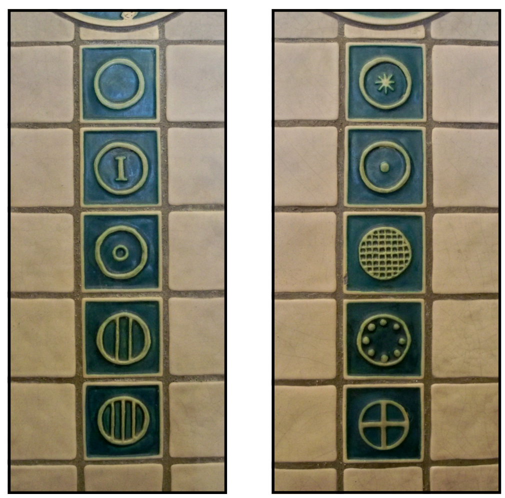

Figure 11. The vertical columns of tiles depicting Dalton's atomic symbols of 1808.

To complete this symbolic survey of the various explanatory theories used by chemists over the centuries, one also finds, to the left and right of the above symbols, two vertical columns of five tiles each, centered below the two alchemical disks (figure 11), showing the symbols introduced by Dalton in his 1808 monograph, *A New System of Chemical*

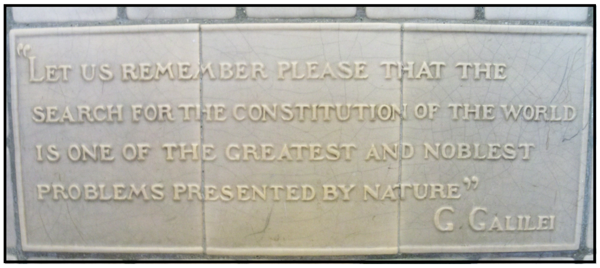

Figure 12. The three-tile quotation from Galileo.

Philosophy, in order to depict his chemical atomic theory. In the column to the left are (reading from top to bottom) Dalton's atomic symbols for oxygen, iron, calcium, sodium, and potassium; and to the right his symbols for magnesium, hydrogen, carbon, mercury, and sulfur.

Figure 13. The tile representing a 19th-century Bunsen spectroscope.

Figure 14. The tile representing a traditional 19th-century double-pan analytical balance.

Finally, just above the basin for the fountain is a quotation from Galileo Galilei, composed of three large tiles (figure 12), which summarizes the primary quest of science and of chemistry in particular :

Let us remember please that the search for the constitution of the world is one of the greatest and noblest problems presented by nature.

Figure 15. Brass spectroscope in the Oesper Apparatus Collections on which the tile in figure 13 is based. As depicted on the tile, parts of the spectroscope have been cut away to reveal the glass prism inside.

Figure 16. Traditional double-pan analytical balance on which the tile in figure 14 is based. As depicted on the tile the wooden case and ivory scale have been removed to reveal the internal structure of the balance more clearly.

This is flanked to the left with a tile depicting a Bunsen spectroscope (figure 13) and to the right by a tile depicting a traditional double-pan analytical balance (figure 14), both intended to symbolize the then

Figure 17. Woodcut of a pelican as found in the 1500 edition of Brunschwig's *Liber de arte distillanti de simplicibus*.

known limits of chemical detectability. Rather remarkably the original instruments on which these tiles are based have both survived (figures 15 and 16) and currently reside in the Oesper Apparatus Collections.

The final symbolic touch is located on the sides of the fountain itself and is best seen in figure 1. Here are found four vertical columns of alternating blue and yellow chevrons capped, just below the fountain lip, by tiles containing an image of a renaissance refluxing apparatus known as a "pelican" and based on the early woodcut (figure 16) of this apparatus found in Hieronymus Brunschwig's famous treatise of 1500 on distillation, *Liber de arte distillanti de simplicibus*.

It is not known for certain who designed the fountain nor what prompted its manufacture and donation to the chemistry department. However, the fact that it was a gift, as indicated by a series of tiles on the front lip of the fountain's basin (figure 17), of the Senior Engineering Class of 1921 suggests that it may have been inspired by the program introduced by Dean Herman Schneider of the College of Engineering to fuse technology and science with art through the acquisition and display of works of art which celebrated the triumphs of modern technology and science (3). This ultimately resulted in the College of Engineering acquiring a substantial collection of murals, oil paintings and sculpture, much of which was originally on display in the landing of the central staircase of the old engineering building and which now also decorates the engineering library. The fact that the Department of Chemical Engineering originally shared "Old Chemistry" with the Department of Chemistry may account for both the gift of the fountain and its current location.

I have found no evidence that Dr. Oesper was consulted in the design of the fountain and, indeed, both the fact that Dr. Fry was the sole author of the article describing the fountain's historical symbolism and the fact that he, rather than Dr. Oesper, is known to have taught a course on the history of chemistry during the early decades of the 20th century, may well imply that it was he who played this role instead.

The fact that the chemistry department left the fountain behind when it moved to its current location in 1970 is a tragic commentary on its failure to preserve its cultural and historical legacy, since the fountain would have made a wonderful centerpiece for the new chemistry-biology library. At present it languishes in a slight indentation in the wall in the front hallway of "Old Chemistry," silent and inoperative due to the capping of its plumbing. The departments now residing in the building no longer have anything to do with chemistry and perhaps dozens of people past it daily without even noticing its presence, let alone appreciating its rich symbolism. The Oesper Endowment in the History of Chemistry contains more than sufficient funds for its rescue and transfer to "New Chemistry." Perhaps the time has come to finally correct this tragic oversight.

Figure 17. The present condition of the fountain's basin showing the dedication tiles and the capped plumbing.

References and Notes

1. H. S. Fry. "An Outline of the History of Chemistry Symbolically Represented in a Rookwood Fountain," *J. Ind. Eng. Chem.*, **1922**, *14*, 868-872.

2. For more on Agricola and his book, see *Museum Notes* for February 2011.

3. C. W. Park, *Ambassador to Industry: The Idea and Life of Herman Schneider*, Bobbs-Merrill, Indianapolis, IN, 1943, Chapter 13.