Chapter 4: Painting with Fire

In probably no other industries does the art of controlling chemical reactions, whose very nature is largely unknown, rise so high as in the firing of ceramic wares.

—Alfred Searle

Learning to fire a kiln is much like learning to throw clay on a wheel. Once the essential mechanics are mastered, there is exciting scope for creative use of the process. A surprisingly rich palette of colors and glaze effects can be achieved in a soda kiln by simply varying the kiln atmosphere and firing schedules. The art of controlling these reactions and repeating them with some degree of accuracy comes from experience with soda, clay and fire.

As a painter learns to mix colors, a potter needs to learn the nuances of atmosphere and fire, and their effects on clay and glaze. Vapor glazing provides a special opportunity to use the firing process as a decorating tool. The images included in this chapter illustrate some of the potential for surface treatment based on control of vapor movement, flame and atmosphere. Such control requires knowledge of cause and effect. There are plenty of firing myths around, based on guesswork. How does one learn the responses of particular clays, slips and glazes to firing temperature, atmosphere and cooling variations? The best means is through a scientific approach to investigation and discovery.

Fig. 4-2. Five small bottles, 3.5 in. (9 cm) in height. Gail Nichols (Australia) 2003. These bottles illustrate the range of color effects that can be achieved with soda glaze on a high alumina clay body varying the schedules of oxidation and reduction during firing and cooling, with some volatilized copper in the kiln chamber.

Fig. 4-1. Vase, 10 in. (25 cm) in height. Gail Nichols (Australia) 2001. This vase was set on seashell wads, soda glazed at cone 9-10, and cooled in reduction, including water reduction.

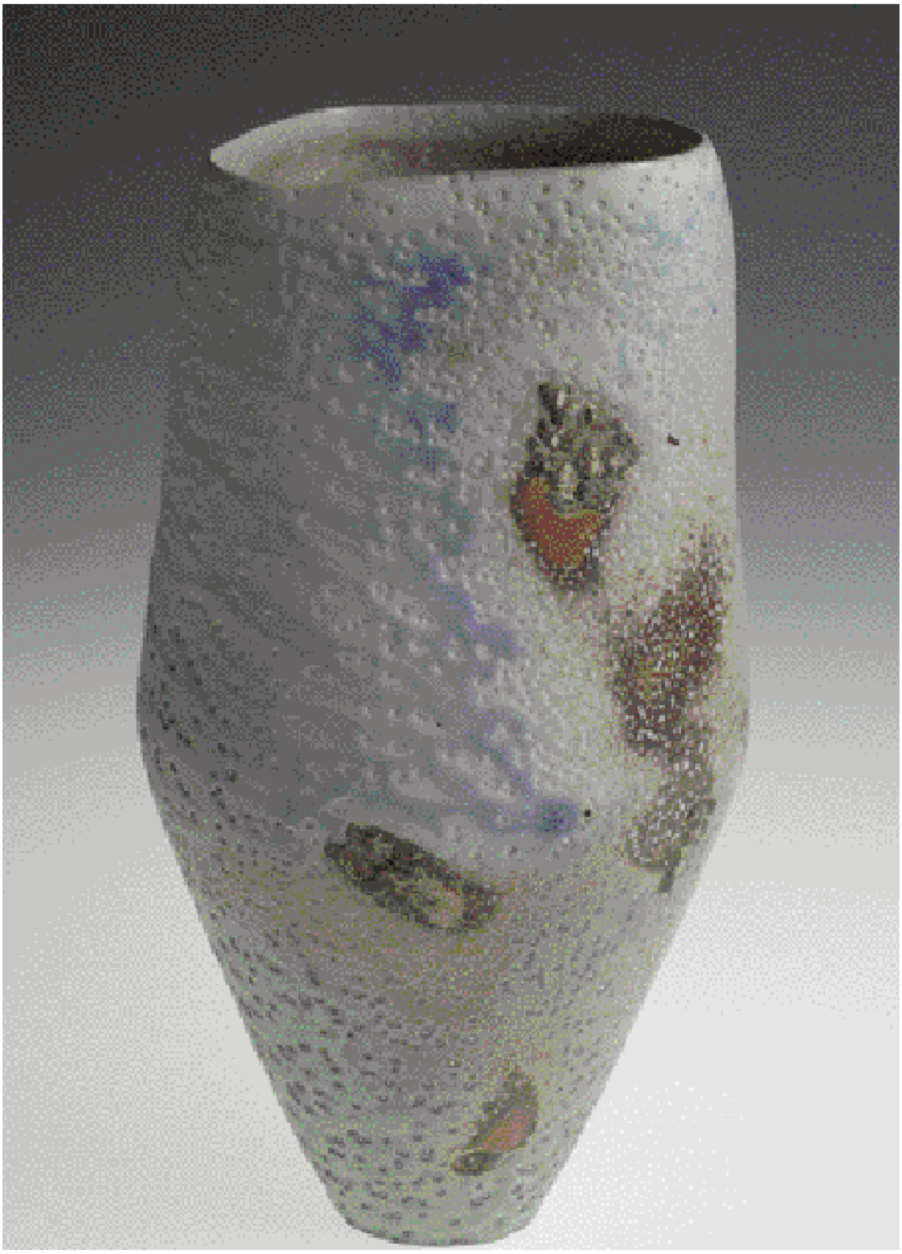

Fig. 4-3. "Blue Ice Jar," 17 in. (43 cm) in height. Gail Nichols (Australia) 2004. A very light cobalt wash contributed the blue coloring and also helped to flux the ice glaze, making it flow over the jar.

It is not difficult to design a series of experiments to explore the effects of atmosphere and other firing variations during stages of firing and cooling. This chapter describes such experiments in detail. A standard firing cycle is used as the control situation, followed by experiments to test the effects of one firing variable at a time. The test pieces acquired during such experimental procedures are then compiled into a catalog of firing effects. Knowledge gained from such experiments enables a more creative and conscious use of the kiln, making it possible to "paint" the work with fire.

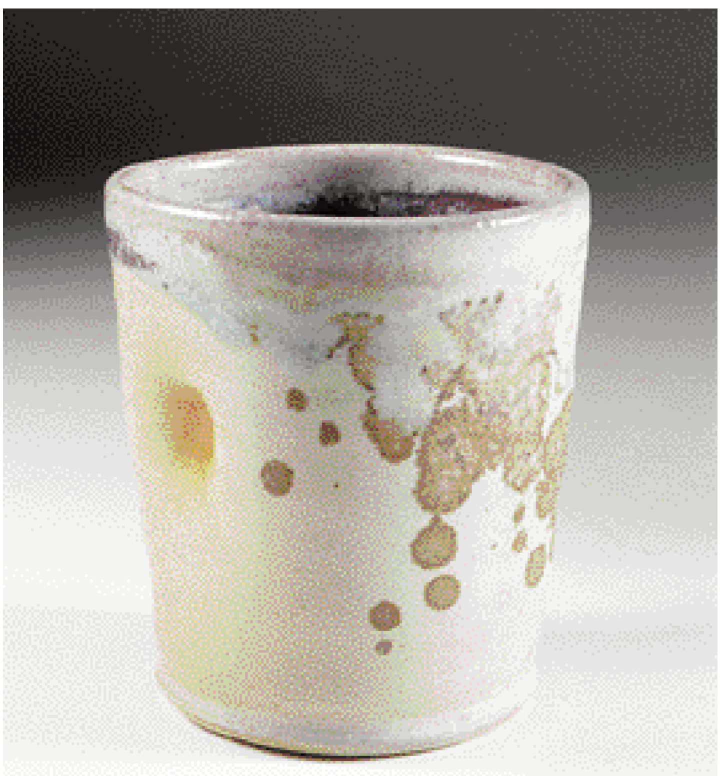

Fig. 4-4. Tumbler, 4 in. (10 cm) in height. Barbara Tipton (Canada) 2002. Spotting on this tumbler appears similar to crystal formation, though the actual phenomenon is unclear from closer inspection. The pot was wood/soda fired and cooled slowly by occasional stoking while the adjacent chamber was fired.

Fig. 4-5. "Place" series sculpture, 11 in. (28 cm) in height, handbuilt with extruded and slab elements, fired to cone 10 in reduction atmosphere with combination salt/sodium bicarbonate sprayed into the kiln. John Glick (U.S.A.) 2000. Post-firing etching created drawing effects.

Test Kiln

A large kiln presents natural variations in temperature and atmosphere. Unless these facto asured in all areas of the chamber, interpreting the results is mere guesswork. For experimental purposes, it is best to use a kiln with a very small chamber, so recorded measurements can be more accurately linked with the fired results. A controlled series of experiments in a small kiln will reveal more about firing in a few weeks than would be learned from years of trial-and-error in a large kiln.

Any fuel-burning kiln offers scope for experimenting with flame and atmosphere. A gas kiln offers greater control than a wood kiln, and is a good starting point for experiments, even for those who normally fire with wood.

It may be possible to build a small kiln within the chamber of an existing soda kiln, using the fireboxes, chimney, burners and soda ports.

Fig. 4-6. This test kiln was built within the author's downdraft soda kiln. Low brick walls form the front and back walls of a small chamber. Kiln shelves and ceramic fiber are used to make the flat roof. There is provision for an oxygen probe to be inserted through the front wall.

Figures 4-6, 4-7 and 4-8 illustrate such a test kiln, built within the four-burner downdraft gas kiln shown in Chapter 3. The test kiln incorporates the two front fireboxes, with their burners and soda ports. A small chamber is formed by constructing two low brick walls across the front of the large kiln's chamber. The flue channel of the large kiln is closed over with kiln shelves to connect the small kiln's flue with the chimney. Partially blocking the flue with a brick will reduce the draft to an acceptable level for the small chamber. Kiln shelves are used as the test kiln's roof, with an outer layer of insulating bricks or ceramic fiber. This test kiln was designed to be easily removed and rebuilt, with as many joints as possible sealed with sand rather than fusible mortar. The layout is dependent on the design of the larger kiln, and would need to be worked out individually for each case. The arrangement illustrated here serves as an example.

The advantages of the kiln-within-a-kiln are that it utilizes existing features such as fireboxes, burners and chimney, minimizes the additional materials needed, and requires no additional space in the studio. The disadvantage is that the large kiln cannot be fired while the experimental firings are taking place. The decision of how and where to build a test kiln will depend on individual studio situations. In teaching institutions, where there is high demand for kilns, a permanent separate test kiln may be preferable.

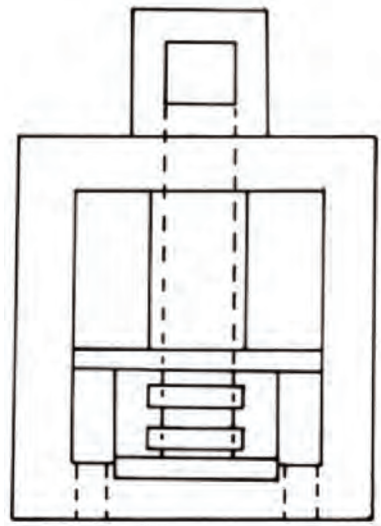

Fig. 4-7. Plan of test kiln. This kiln utilizes the two front burners and soda ports of the downdraft kiln illustrated in Chapter 3. The rear section of the flue channel has been covered with kiln shelves to connect the test kiln to the chimney.

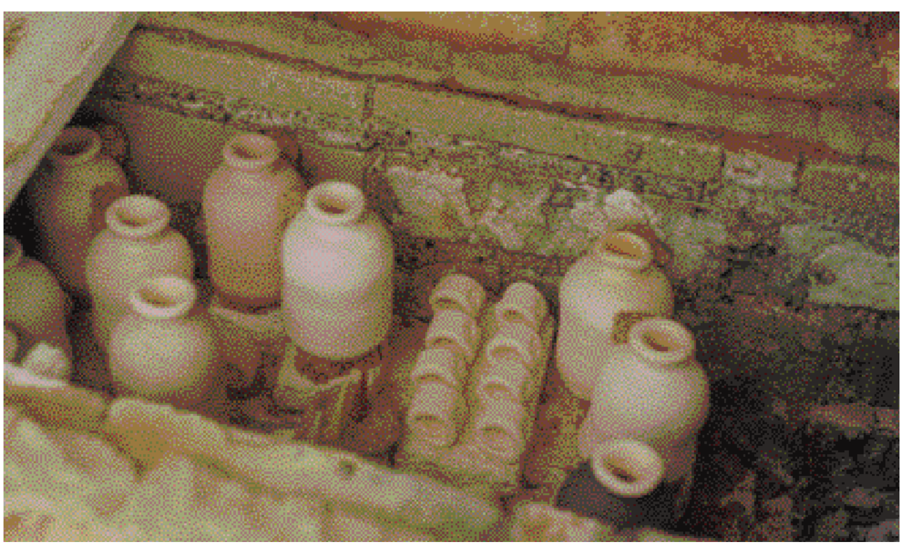

Fig. 4-8. Detail of the pack in the test kiln.