# *A GLASS RECIPE BOOK OF THE NEW ENGLAND GLASS COMPANY*

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I

THE glassmaker's art, so dependent on the chemist's skill in selecting and blending the necessary ingredients, relied for centuries on formulae, hoarded and kept secret by master glassblowers and only rarely published.

A book of glass formulae has the general appearance of a cook book. Indeed, they are both used in the same way. As Helen and George McKearin stated: "There are probably as many recipes for making glass as there are for making cakes, but certain basic ingredients are essential."[1]

An important journal containing glass formulae was included in the exhibition, *The New England Glass Company,* 1818-1888, held at The Toledo Museum of Art in November-December, 1963. This book, leather-bound, and previously never exhibited was lent by Miss Marion H. Pike. It measures 18.4 x 12.7 cm. One hundred white, unnumbered pages are ruled with printed lines in light red for accounting or financial entries, and the glass formulae are all written in ink. This book was undoubtedly an important tool for the operation of the New England Glass Company's furnaces, and as such its secrets must have been closely guarded. It has always been owned by members of the Leighton family, an illustrious line that contributed several of its members to the East Cambridge company. The present owner is the great-granddaughter of the Company's first gaffer, Thomas Leighton (1786-1849).

Inscribed on page two of the book is the signature of Thomas' son, John Hamilton Leighton (1814-1879), one of many Leightons active in the New England Glass Company as gaffers, decorators, cutters, and blowers. On page four is the signature of John's brother, George Charles Leighton, indicating joint ownership or use of the book. The book may have been used by Thomas Leighton before his retirement in 1843, but the entries appear to be, for the most part, in the hand of John H. Leighton. The earliest dated entry is September 25, 1846. From John Leighton's ownership the book passed to his son, Thomas III, and to the latter's son, John H. Leighton III, from whose widow it was acquired by Miss Pike in 1958.

1. George and Helen McKearin, *American Glass,* New York, 1941, p. 7.

First mention of the book's existence was made in Lura Woodside Watkins' basic study of the Company, *Cambridge Glass*, where she states: "Thomas Leighton's receipt book, continued by his son, John H. Leighton, throws much light on this phase of the manufacture in the early period. While the receipts themselves cannot be made public, the list of colors is of great interest, especially as the purpose of the receipt is sometimes noted."[2] The formulae were carefully protected from the scrutiny of competitors and the curious. Even while Lura Watkins was writing her history, permission to reproduce portions of the recipes was refused. She noted: "In this trade, more than in any other, family tradition played an important part. Trade secrets were jealously guarded. After the passing of more than one hundred years the receipt book of old Thomas Leighton is still kept inviolable by his great-grandson."[3]

The New England Glass Company book of receipts which the Leighton family so carefully maintained is an enlightening document regarding many aspects of glass manufacturing at an important American factory. Its primary purpose, of course, was the recording of formulae for John and George Leighton's use. The entries, therefore, span the twenty-five years when John was superintendent of the glass works, about 1848-1873. These formulae indicate weights, ingredients, and directions for mixing different batches. There is no particular order in the arrangements of the formulae, nor is there an index. The earliest dated entry occurs on page forty-four, suggesting that the preceding ones may be earlier. The last is dated in 1874.

While the book's primary worth concerns glass and glass formulae, several entries of culinary, medicinal, or miscellaneous nature testify to its very personal character. Recipes for making mead, "Receipt for Making an English Plum Pudding," pickling pork and beef, cure "For a Hoarse Cold," and cologne water are included in Leighton's handwritten entries.

As Thomas Gaffield wrote: "To write a perfect book on glass a man ought to take off his coat and put on his apron, and go to work in all kinds of glass factories as a workman in all departments."[4] Learning from this valuable book of formulae may be akin to beginning "as a workman in all departments," a task not otherwise possible for many interested historians.

An important feature of the entries is the great variety of types of glass and colors described. Although the Company was noted as a producer of lead glass and one that particularly disdained soda-lime metal, thirteen entries for batches of this latter type occur. The materials designated in the entries are proportioned or measured by parts, not by specific weights. When weights are given, they are rendered in pounds and ounces. A large number of formulae for colored lead glass are given, and thirty-eight entries for coloring glass by enameling, staining, and chemically coloring the metal indicate strong interest in colored glass.

## II
## SOME SPECIFIC ENTRIES IN THE LEIGHTON BOOK

### *Gilding on glass or porcelain (page 30)*

Gilding was discreetly used as a decorative technique. It is known that by 1855, ten men were employed in the decorating shop at East Cambridge. After the Civil War women did all or most of the decorating. The formula for gilding stated: "Dissolve gold in Aqua Regia and evaporate the Acid by heat which will leave a gold powder. Precipitate the Gold from the

2. Lura W. Watkins, *Cambridge Glass*, Boston, 1930, p. 49. The owner of the book of formulae, Miss Pike, believes the book was first owned by John H. Leighton. Of course, some of the formulae may have been inherited from the senior gaffer, Thomas Leighton.

3. *Ibid*, p. 160.

4. Thomas Gaffield, *Journal*, Vol. II, 1864-1874, unpublished mss., p. 258, Massachusetts Institute of Technology Library.

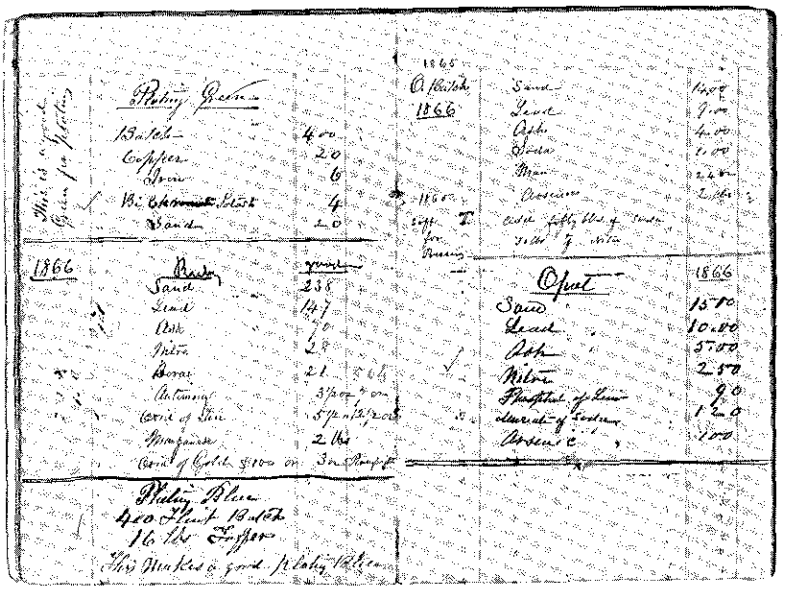

FIG. 1. *New England Glass Co. recipe book, pp. 57-58. Dated formula for ruby glass noting use of gold.*

solution by pieces of copper. Lay this gold on with a strong solution of Borax and gumwater, the figure or letters you design, and it will be ready for burning in after it is sufficient[ly] burnt. Burnish with a dog's tooth or what is better an agate burnisher."

*Stourbridge clay for pots (page 38)*

Proof that clay imported from Stourbridge, England was used in the manufacturing of pots for the Company's glass furnaces is indicated in an entry, the "Preperation (sic) of Clay," where it is written: "For a furnace one part Stourbridge Clay to two of burnt Ditto for pots. One part of ground Potsherds to three and a half of Stourbridge."

*Earliest dated entries (page 44)*

Two formulae, dated September 25, 1846, and November 27, 1846, require the addition of ¾ pound of manganese to a hundredweight of flint batch for purple glass and 10 ounces of cobalt to the same weight for blue. Marginal notes "For Pressing" and "Powder blue makes a much better color for pressing 1 lb. to the cwt" are in addition to indications that the pressing technique was used for "Wine Bottles, Toilet Bottles, or other fancy work," made from these formulae.

*Flint glass without lead (page 45)*

One of John Leighton's more intriguing formulae is titled "To Make Flint Glass without Lead." It is dated June 2, 1848, and lists as ingredients: ash, sand, soda, lime, borax, arsenic, and manganese. This glass might have resembled lead glass, a Company mainstay, in color and brilliance of metal.

*Ruby glass with gold as ingredient (pages 57 and 67)*

A recipe for ruby glass, dated 1866, includes "oxide of gold $100 or 3 oz. 5 Pennyweight" (Fig. 1). While this formula specifically does not mention gold coins, it does support the somewhat legendary account of the use of gold coins as a coloring agent for ruby glass made by the Company. Another formula (page 67)

lists "$40 in gold" as an ingredient for ruby glass. It precedes an entry dated in 1869, so it may date from that year also.

*Separating silver from washings (pages 77-78)*

A lengthy account in John Leighton's hand indicates the gaffer's concern for economy in rescuing silver held in solution. This silver resulted from the decoration of glassware with silver nitrate. It is titled: "To seperate (sic) Silver from the drainings and washings in Silvering Glass Ware." A long procedure follows this title.

*Test for lead (page 89)*

In 1852, a test of lead made at the Company was conducted by A. A. Hays and "an answer," presumably by John Leighton, was inserted in the book. The Company's lead furnaces were the first in America, and they produced substantial income through sales to other manufacturers in addition to supplying the Company's furnaces with a necessary raw material. The answer to the test appears to be an account of Hays' analysis of the lead's purity.

*Furnaces (pages 91-94)*

In four pages of text and crude illustrations, the measurements and construction of an eight-pot furnace, called the Trio, are given (Figs. 2, 3). This furnace was one of the three great furnaces at the East Cambridge site. The other two, Etna and Vesuvius, were also standing in 1846. Leighton's entry is dated 1848.

## III

## INDIVIDUALS NOTED IN THE LEIGHTON BOOK

Nineteen names, mostly contributors of glass formulae to Leighton's book, are included with certain entries. Some individuals are indicated by initials, some by last name, and a few by their full name, such as William Cains, Waldron J. Cheney, William L. Libbey, and Julius Pihet. The entries with no names apparently stem from family experimentation and secrets. "Outside" contributors were given acknowledgment, but only a few of the individuals can be identified. Some remain unknown, their contributions recognizable only in the cryptic formulae alongside their initials or names.

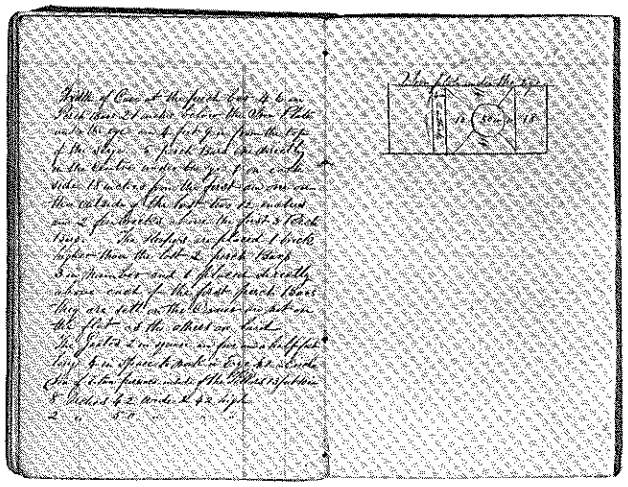

FIG. 2. *New England Glass Co. recipe book, pages 91-92. Description of furnaces and their construction.*

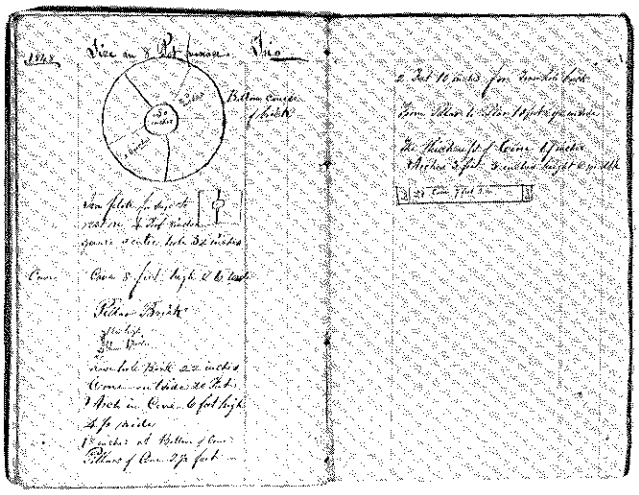

FIG. 3. *New England Glass Co. recipe book, pages 93-94. Description and drawings of the Trio, one of three great furnaces at the Company.*

# *APPENDIX*

## I

### ANALYSIS OF THE ENTRIES IN THE LEIGHTON BOOK OF RECEIPTS

| | *Number* |
|---|---|
| Entries (glass formulae only) | 141 |
| Entries (non-glass formulae, including all entries other than those for batch) | 58 |
| Formulae (lead glass, colored) | 82 |
| Formulae (lead glass, clear) | 21 |
| Formulae (soda and/or lime glass) | 13 |
| Frit and fluxes | 10 |
| Enamels, stains, and coloring agents | 38 |
| Sulphates and oxides | 6 |
| Techniques noted, pressing | 7 |
| silver staining | 3 |
| painting | 3 |
| cutting | 1 |
| gilding | 4 |
| plating | 7 |

### DATED NUMBER OF ENTRIES:

| | |
|---|---|
| 1846, *two* | 1867, *five* |
| 1848, *three* | 1868, *three* |
| 1852, *seven* | 1869, *two* |
| 1856, *one* | 1870, *four* |
| 1860, *one* | 1871, *four* |
| 1861, *one* | 1872, *one* |
| 1865, *two* | 1873, *five* |
| 1866, *six* | 1874, *one* |

## II

### INDEX OF THE RECEIPTS