

## Miscellaneous Correspondence

*Correspondence on various topics was also contained in the Olson papers. These are listed here in chronological order (if possible).*

**From P. J. McCarthy, Cumberland, MD, 12-17-1911 to A. H. Heisey**

Dear Sir:

Your favor of the 14<sup>th</sup> Inst reached me here. I will be home on the 24 Inst & will send you the receipt to the address you give at Atlantic City, NJ on condition of the receipt will not produce glass same as the sample I sent you, you need not pay for it, and you will return me the receipt and agree not to make use of the information contained therein. I know however if the instructions are carried out you will have no difficulty in getting the glass.

**From P. J. McCarthy, Sandwich, Mass., 12-25-1911 to A. H. Heisey**

Dear Sir:

I enclose receipt for alabaster glass. A great deal depends on the handling of this glass. If handled properly it will produce better glass than any that is being sold at the present time. It has a better finish and can be made perfectly free of imperfections. In using this receipt a great deal depends on the quality of the Bone ash, alum & magnesia. If not dense enough increase the proportions about 10%.

I enclose pieces of this glass which I made last week. The large piece shows the glass at it was dropped into the mold to heat the mold.

The very thin piece shows how it blows in iron mold. Another piece shows how the glass looked when the stopper was removed. The batch is well melted but the glass is full of bubbles. All these disappear when the pot is left open. The pot was opened 4 hours before the regular time for lime glass. The coldest pot in furnace was used. Another piece shows the glass with salts on it. The smallest piece shows how the glass worked on top when powdered charcoal was put into pot to remove salts.

The proper way to remove salts is fill the pot so that it will be overflowing and almost run off. If it cannot be raked off it can be taken off with a ladle almost entirely. Any that remains can be removed by putting into the pot salt hay (such as used for shipping pots) steeped in water, tie the hay on end of stopper hook, shove into pot. Close immediately for say 20 minutes. Clay stopper so that it will keep carbon in pot – after this is done skim glass so that it will be perfectly clean. If salts ladled out of pot is dropped into water it will explode.

I will be pleased to hear the result of your trial of a \_\_\_\_\_. You will have no difficulty injecting this glass if instructions are carefully followed.

I will be in Phila Jan 1 to 8<sup>th</sup> and will be pleased to give any further information, should you wish it.

**From C. W. Dorflinger, Honesdale, Pa. 3-13-1922**

My Dear Tim:

Your letter of the 7<sup>th</sup> received late Saturday afternoon (March 11<sup>th</sup>). I had not forgotten about the color but I thought possibly you would have so much to do that you would not care to be troubled with this matter at the present time.

I think that the best way to start would be to send you a couple of lumps of our color and see if they will stand with your glass. So under separate cover I am sending you a lump of green color and a lump of Ruby.

As you probably know these lumps have to be heated up slowly. I usually put them in front of the furnace and gradually moved them closer to an open pot hole until them [sic] were warm enough to stick up. I generally took about five hours to heat up the lumps although it can be done more quickly. If they are heated slowly the danger of breakage is much less.

I would try casing the color both outside and inside. The color is more likely to stand when used inside than when used outside. For the work you would probably want to do all the casing would be on the inside which is more easy to do. After you have tried out these lumps let me know what your results are and then we will be able to go to the next step.

I trust everything will reach you promptly.

From unknown person (name cut out of original letter) of Hamburg, NY to E. W. Heisey, undated

Dear Sir:

I am sending you by express today the Nickel Oxide (Green) In the packing container you will find beside the vials 2 small packets each weighing 5 grams. I have weighed these out on analytical balance. If you have a good sensitive scale weight one of these and keep record of your weight for future weighing. Each one of these packets I feel sure is the right quantity required for 1 batch taking for a base 1000 bb of sand would be equal to 453 K 592 g or we'll say 454 K. The use of Nickel oxide is quite well known as a decolourizer but rarely used glassmakers who make glass by observation and routine only have all come to disastrous results using this metal for this reason an under amount is as good as nothing an over amount is fatal to the life of the crucible it is only through \_\_\_ calculated in milligrams so there are many chances for mistakes I am telling you these facts so you will be careful in weighing. I have already told you of the advantage you will derive from the use of this oxide but I will suggest you start with it in a new crucible as the neutralization of tint will be bad if any other decolourizer remains in crucible such as manganese trioxide, cobalt, selenium etc. if you use arsenic you are safe to continue its use. It is an error to class this metal as a decolourizer Kindly use this in secret as you are the only one to whom I have told of this. I am certain you will be delighted with results as you shall be able to standardize your color. Kindly let me know results.

PS Kindly let me know if you have made shipment of Potassium carbonate

From Crowell & Murray, chemists, Cleveland, Ohio. 4-5-1924

Gentlemen:

We give you herewith analysis of Prisms recently submitted:

		<u>Amethyst</u>	<u>Amber</u>
Silica	(SiO <sub>2</sub> )	80.90 %	84.60 %
Sesquioxide Iron	(Fe <sub>2</sub> O <sub>3</sub> )	.07	.20
Alumina	(Al <sub>2</sub> O <sub>3</sub> )	.59	.80
Lime	(CaO)	7.75	6.02
Magnesia	(MgO)	.40	.42
Manganese Oxide	(Mn <sub>3</sub> O <sub>4</sub> )	1.18	.02
Arsenic Oxide	(As <sub>2</sub> O <sub>3</sub> )	Trace	Trace
Lead Oxide	(PbO)	.60	
Sodium Oxide	(Na <sub>2</sub> O)	6.52	5.45
Potassium Oxide	(K <sub>2</sub> O)	1.89	

		<u>Blue</u>
Silica	(SiO <sub>2</sub> )	82.40 %
Sesquioxide of Iron	(Fe <sub>2</sub> O <sub>3</sub> )	.12
Alumina	(Al <sub>2</sub> O <sub>3</sub> )	.70
Lime	(CaO)	6.00
Magnesia	(MgO)	.45
Manganese Oxide	(Mn <sub>3</sub> O <sub>4</sub> )	.06
Arsenic Oxide	(As <sub>2</sub> O <sub>3</sub> )	Trace
Lead Oxide	(PbO)	2.22
Cobalt Oxide	(CoO)	.15
Sodium Oxide	(Na <sub>2</sub> O)	6.10
Potassium Oxide	(K <sub>2</sub> O)	1.79

*The Heisey Co. used imported amethyst, amber and blue prisms on some of their candelabra. Apparently the company was looking into the possibility of manufacturing their own. They did not do this, using only clear imported prisms until World War II when they made their own pressed one-piece prisms for a short time.*

From Alexander \_\_\_\_\_ to E. W. Heisey (Wilson) 2-8-1929

Dear Mr. Heisey -

Complying with Mr. T. C. Heisey's request of Feb. 6<sup>th</sup> I suggest the following batch for tangerine crystal. Try the glass with and without warming in.

#8569A

Sand.....	100 lbs.
Soda Ash .....	45 lbs.
Lime .....	15 lbs.
Selenium.....	12 ozs.
Cadmium Sulfide .....	12 ozs.
Salt .....	8 ozs.
Granulated Sugar .....	6 ozs.

You may melt this glass in a pot that hasa been used for lime crystal but not in a pot that contained lead glass.

Received sample of yellow #8567A but no 8567B. Mail sample of latter c/o University of Pittsburgh.

From R. R. Shively (Drakenfeld & Co.) to Wilson Heisey, 10-7-1930

In regard to our conversation yesterday, I would suggest that you try out this batch for your Sahara glass -

Sand.....	500 lbs.
Soda.....	130 lbs.
Potash.....	75 lbs.
Nitre .....	20 lbs.
Lime .....	30 lbs.
Borax.....	22½ lbs.
Cerium & Titanium.....	As now
Arsenic .....	As now

I believe that your glazing machine may be partially responsible for this breakage you are having in stemware and would suggest that you try, if possible, running a small batch of stemware through a decorating lehr after it has been cut off and see if this lot does not show a smaller breakage. Several of the glass companies are now running their ware through a decorating lehr after cracking off and are getting apparently very good results.

From R. R. Shively (Drakenfeld Co.) to E. E. Olson, 2-23-1933

In regard to the polishing acid I wish to advise you that the acid necessary depends somewhat upon you glass and you may have to change this formula:

Hydrofluoric acid (concentrated)	1 part
Sulphuric acid (concentrated)	2 part

The piece to be polished is first cleaned in a solution of dilute Hydrochloric and Sulphuric acid. It is then placed in the solution given above for a period of about 30 seconds and then transferred rapidly to a warm water bath. This process may have to be repeated three or four times and the glass is then dried in a warm room.

I will give you all the help I can when I have a chance to see you.

From R. R. Shively (Drakenfeld & Co.) to E. E. Olson, 10-4-1933

Dear Olie:

The following glass for pot opal will be satisfactory for your purpose -

Sand.....	1000 lb.
Soda Ash .....	280 lb.
Nitre .....	30 lb.
Feldspar .....	450 lb.
Kryolite .....	30 lb.
Fluorspar.....	160 lb.
Red Lead .....	120 lb.
Manganese.....	30 oz.
Arsenic .....	3 lb.

All opal glasses are rather hard on pots and this batch is no exception. The reason of it is that when you are melting it in a furnace in which you are melting crystal, you run your temperatures too high. This glass can be melted at much lower temperatures than crystal and under these conditions the pots last much better.

**From Rod Irwin, Heisey salesman (written on A. H. Heisey & Co. stationery) to the company, undated but accompanying invoice is dated 10-22-1933**

Gentlemen:

Ted Kruth took me thru his acid rooms today and gave me the dope on his polishing of our stemware. He does a good job. This is for Rolls information. They dip their stemware in copper baskets. Dipping 7 to 10 times. Keep the acid tanks heated at almost to boiling point. They have one lead tank inside another lead tank and hot steam pipes around outer inside tank.

Kruth is having some copper baskets made in Pittsburgh now and as soon as the new ones are received he is going to send you one to inspect, this holds 20 goblets in two layers. This basket will not have handles as he has his own that he works on. Return this basket at once and pay the expense charges both ways.

I am enclosing a bill of his acid with formula. These copper baskets are made by Reiger Iron Works 824-2<sup>nd</sup> St. Pittsburgh Pa.

I also saw how the Merimec cut glass dip theirs though they did not put out much information on the acid they do put one of the best polishes I ever saw on Louie, Bryce and our blanks. They have a contrivance that looks like a big nut cracker that holds 8 goblets made of copper. The bottom has two notched places that the goblet lays on and the top clamps down. They dip this in acid & rinse 6 to 8 times about 10 seconds each.

This dope is all I could find for your information. This nut cracker seems simplest to work and does a fine job. I note both places keep the acid very hot.

*The Kruth Cut Glass Co. was located in St. Louis, MO and cut designs on Heisey blanks. Occasionally Heisey stems are found with Kruth adhesive labels.*

**From George Blumenthal of Crown Chemical Company, Pittsburgh to E. Wilson Heisey, President 10-28-1933**

Dear Sir:

The Antimony I left with you is the purest obtainable, and is used by a number of concerns to help plane the glass in place of arsenic – some find a cleaner glass results – probably due to the more rapid planning of the Antimony.

I do know that 6/10 to 8/10 of one percent Antimony in lead optical glass frees the glass of bubbles quicker, and that in potash glasses, Antimony seems to be better than arsenic in planning up. It is said to leave the glass cleaner and brighter looking.

Ruby glass containing about seven pounds of Antimony to 900 batch seems to work better than the arsenic, - the color is more intense.

**From R. R. Shively (Drakenfeld & Co.) to E. Wilson Heisey, 1-27-1934**

Dear Mr. Heisey:

In accordance with our conversation a few moments ago, I am sending you some ruby batches from which I think you can work out a satisfactory glass for your requirements.

	<u>Press</u>	<u>Heavy Blown</u>	<u>Light Blown</u>
Sand.....	400	400	400 lb.
Soda.....	170	180	190 lb.
Potash.....	20	30	40 lb.
Cadmium Sulphide.....	11	11	10 lb.
Fluorspar.....	2	2	--- lb.
Borax.....	8	8	9 lb.
Zinc Oxide.....	60	60	60 lb.
Copper Oxide.....	3	3	3 lb.

The batch given below is the one from which one of your good friends worked out their ruby. I think that better color can be secured by reducing the soda to 140 lb. And adding 80 lb. Of pearl ash to the 500 lb. of sand.

Sand.....	500 lb.
Soda.....	210 lb.
Zinc Oxide.....	85 lb.
Arsenic.....	1 lb.
Cryolite.....	4 lb.
Fluorspar.....	4 lb.
Bone Ash.....	5 lb.
Selenium.....	3 lb.
Cadmium Sulphide....	6 lb.
Red Oxide Copper...	10 oz.

**From R. R. Shively (Drackenfeld & Co.) to Emmet Olson, 3-1-1937**

Dear Emmet:

In regard to your topaz glass, I have recently discovered that the cloudiness is due to the cerium being incompletely dissolved in the batch. Accordingly, I think you get better results with a smaller amount of cerium, and the batch which I gave you when I was over there should be a better color than the one you were previously making. I know of one instance where they were using as low as 15 pounds of cerium to 1000 pounds sand, and they are using about 60 pounds of titanium. I also believe in this particular glass that it is not wise to use borax, and accordingly, I would suggest that you try at your first opportunity the following batch -

Sand.....	1000 lbs.
Soda Ash .....	385 lbs.
Lime .....	60 lbs.
Titanium .....	60 lbs.
Cerium Oxide.....	20 lbs.
White Oxide Antimony .....	3 lbs.
Red Lead .....	50 lbs.

I would like to know how this batch works out for you if you ever get to try it.

**From Glass Engineer H. Schnurpfeil, Prague, 3-10-1938**

Dear Sirs:

I have the pleasure to recommend you the following 4 recipes:

- a/ Heat resisting glass without boric acid.
- b/ Unbreakable glass
- c/ Red glass/cheery ruby/ the glass turns out red immediately in the pot, not after annealing.
- d/ Opal glass without cryolithe for kitchen utensils, etc.

It is the question of 4 new recipes. Price of one recipe USA \$36.-, price of all 4 recipes USA \$108.-, payable when ordering. I am sure my batches will give you perfect satisfaction.

Trusting to hear from you soon, I am, dear Sirs,  
Yours very truly

**From H. L. Haney, sales manager, Harshaw Chemical Company, Pittsburgh Branch to Howard Mueller of A. H. Heisey & Co., 4-26-1938**

Gentlemen:

As you know Neodymium is now being used as a decolorizer and a considerable amount of work has been done in this connection over the last six months by some of the leading glass chemists.

They have found that Neodymium gives excellent results and can be used with either Selenium or Manganese and entirely replaces the use of Cobalt. Cobalt has one main draw back in that it causes light absorption to a marked degree. It has been found that Neodymium by replacing Cobalt will produce a much superior crystal, and the finished glass will show less light absorption. In addition to this, the beauty of the glassware is enhanced to an appreciable extent when viewed under an electric light, which is a very important point.

Since the amount of iron present in the glass governs the quality of the crystal produced, the work which has been done was on glass batches containing a known amount of iron. The normal amount of iron present in a glass batch is around .04% Iron Oxide, and the batch giving the best results on this known oxide content is as follows -

Sand.....	1,000 lb.
Calcium Carbonate.....	276 lb.
Sodium Nitrate.....	50 lb.
Sodium Carbonate.....	405 lb.
Arsenic Trioxide .....	2 lb.
Sodium Sulfate.....	10 lb.
Selenium.....	.625 oz.
Neodymium Carbonate (Code 4011)...	12 oz.

The price of our Neodymium Carbonate Technical, Code 4011, in 100 pound lots and up is 65 cents per pound and in less than 100 pound lots 75 cents per pound.

We will be glad to supply at no charge a small sample of our Neodymium for experimental work.

**From R. R. Shively to E. E. Olson, 4-30-1938**

Dear Olie:

Our company [Drakenfeld] control patents on the use of spodumene in glass. It is used in very high silica glasses, such as Pyrex as a source of alumina and Lithia. Lithia is a very good flux as it has a low molecular weight and will combine with a larger quantity of silica than the other alkaline metals. I also think that lithium silicate will hold in solution more free silica than soda or potash.

I do not feel that this product has any particular merit in your case. It is very expensive and with the amount you could use and still maintain the soft nature glass you require, I don't think there is any reason for you to consider it.

**From Mr. Reed to T. Clarence Heisey, 12-16-1948 (Memo)**

Last week you asked that I set forth a few suggestions as to the observations and investigations to the pot failure which being experiencing in this plant.

- #1 Excessive pitting resulting in a very short life of the pots, i.e., a maximum of 25 melts now against a former pot life of 85 to 100 melts.
- #2 Spalling. As an example, the case where a large chunk of clay fell from the side wall of the pot after it had been set in the furnace and before it had been glazed.
- #3 The case of one pot which did not rip or split but developed a break in the form of a hole about one foot from the bottom and through which the entire melt of metal was lost.
- #4 Ripping or Splitting. About five or six pots of glass have gone down the hole in the past ten weeks from this cause. None of these had been in use more than two months. The majority of pots are developing these long fissures in a period of one to two weeks after being set regardless of location in the furnace.
- #5 Although the splitting usually occurs in the back of the pots, it does not follow a definite pattern. Sometimes one or two or more fissures appear and all are perpendicular to the bottom. Some are parallel to the bottom and then times they form diagonal line to a point near the bottom of the pot.

Mr. Olson has a report and quite a few analyses which we made about a year ago on both old and new pot shells. Although the results did not show any marked difference in composition, it might be well to look them over and study them. However, the observation of the various defects and behavior of pots do not point to any marked variation in composition.

I think it would be well to stress the point to these people that you have been devoting much time and expense such as analysis of pot shells, stones, glass, etc. in an effort to ascertain the cause of this pot failure. It might also be well to emphasize the fact that there has been no change in the composition of the glass nor furnace conditions.

I fully appreciate that it is not advisable to do anything that will incur ill-will. However, the following suggestion could be used in, at least, a subtle manner and might prompt them to some action: That is the fact that during the past ten or fifteen years all industry has been making an effort to improve the quality of their product. In this case no improvement has been made and from your own experience and data you can prove that they have not even held the line of quality but have deteriorated from sixty to eighty per cent. WHY?

**From R. R. Shively, Vice President (Drakenfeld & Co.) to E. E. Olson, 1-2-1953**

Dear Olie:

I just received your letter this morning and I will give you all the information I have available concerning smoked glass.

There are all kinds of shades of smoked glass and this one that I am giving you is one I made a number of years ago to match a French import. To 50 pounds of your thoroughly mixed soda-lime-flint glass batch add ½ ounce Black Oxide Nickel and 2 ounces of Manganese Dioxide. The nickel in a soda-lime glass gives a rather brownish cast and the manganese gives a color ranging from a green to a violet, depending on the state of oxidation. I hope you don't misunderstand my instructions. I want you to use your regular soda-lime batch and use the amount of nickel and manganese weighed out accurately that I have recommended. If you want to try out 500 pounds of your regular batch, use 2½ ounces nickel and 20 ounces of manganese thoroughly mixed with the batch and I am sure you will get a smoke that you can, with the instructions I have given you about the colors produced by each oxide, get the shade you are interested in by increasing or decreasing the manganese or the nickel, or both.

**From R. R. Shively, Vice President (Drakenfeld & Co.) to E. E. Olson, 2-26-1953**

Dear Olie:

I am sending you, through the kindness of Pop Fraser, a sample of the original ash tray and a piece of glass we have made here to duplicate it. I think it is a fairly good match and I believe it will look better after you work it, because these pieces we have are very heavy. The batch is -

Sand.....	1000 lbs
Feldspar.....	20 lbs.
Burnt lime.....	110 lbs.
Soda ash.....	175 lbs.
Nitre.....	10 lbs.
Borax.....	25 lbs.
Antimony oxide.....	3 lbs.
Black oxide nickel.....	2 $\frac{3}{4}$ ozs.
Powder Blue.....	9 $\frac{3}{4}$ ozs.

The Powder Blue and the Nickel Oxide are very critical and these weights should be made quite accurately on scales of which you are sure. These will have to be sensitive balances. The Powder Blue used is the Powder Blue we supply that contains always 3.3% cobalt metal. Unless you have some of our Powder Blue you had better let me analyze the Powder Blue that you have before going ahead.

We put in quite a little work in an effort to match this and I do hope that it comes out satisfactorily.

*A handwritten note at the side of the above batch formula was "Swedish Smoke Glass." This was certainly one of the early attempts to produce Dawn glass. Another note relating to smoke color is the following:*

**From Carl Reed to Emmet Olson, undated**

Dear Emmet:

The coloring matter in the green glass is chromium with a little iron and I imagine kept in a highly oxidized condition.

The glass I have chosen to call smoke color is iron oxide and cobalt was quite surprised to find no manganese, copper or chromium.

**From R. R. Shively (Drakenfeld Co.) to E. E. Olson, 12-22-1953**

Dear Olie:

I told you I had been having bad luck melting the glass to make a yellow. It took so long to melt that I had no color when it finally did melt. I took some of this glass, ground it up, added the right percentage of cadmium sulphide to it and melted it. Of course the powdered glass melted more rapidly. The piece in the bag is the glass I got when the ground glass was melted with the coloring agent, cadmium sulphide.

This batch that I used was not the one that I gave you and I will mail it to you this afternoon when Bob Murray gets back from lunch.

Yellow opal [handwritten]

Sand.....	212
Feldspar.....	132
Soda ash.....	50
Borax.....	78
Fluorspar.....	45
Nitre.....	11
Zinc oxide.....	47
Cryolite.....	25
<del>Alumina</del> .....	35
<del>China</del> clay.....	12
<del>Cadmium</del> sulphide.....	10

~~This is the batch that we used to make the sample, but as I told you we did not get it in the first melt, because we felt the cadmium sulphide was volatilized because it was too long in the furnace. Then we took this sample of powdered glass and added cadmium sulphide to it, getting the sample we are sending to you.~~

I feel certain that the above batch, put in a hot pot, would melt down and give you the same color.

**From V. H. Remington, Vice President B. F. Drakenfeld & Co., Washington, PA to E. E. Olson, 9-29-1954**

Dear Ole:

Insofar as I know there are only two ways to make a pink opal glass. One is through the use of selenium and the other would require gold.

Selenium metal is so terribly scarce that you would not be able to get enough of this to do you any good even though you decided to try out an opaque selenium pink. On the other hand, I think it is quite reasonable to suppose that you could make a fairly attractive pink by introducing a gold compound such as a gold resinate, gold chloride or possibly gold stannate into the batch. However, none of us here have the remotest idea just what the batch composition should be.

Since leaving Drakenfeld Doc [R. R. Shively] has been doing some glass consulting work and although he is supposed to be leading a "retired" life, I rather suspect that he is just about as busy as he has ever been. Nevertheless you may wish to write to him and, if so, his address is -

83 Woodland Drive  
Pittsburgh 28, Pa.

**From E. E. Olson to Dr. R. R. Shively, Pittsburgh, PA 11-3-1954**

Dear Doctor:

I am in a predicament. Our Company wishes to try out a pink opal glass and I know it takes gold or selenium.

Selenium is too scarce and gold possibly very expensive. Could a batch be made with gold chloride or gold stannate?

**From Dr. R. R. Shively to E. E. Olson, 11-5-1954**

Dear Ole:

I think an opaque pink glass can be made from gold. I would use the metal and dissolve it in aqua regia.

I am quite busy at the moment doing some work for several companies and rather loaded down until after the 2-th of this month. After that I might be free to help you if you so desire.

**From Henry H. Harrington, Technical Services, Solvay Process Division, Allied Chemical & Dye Corporation, Syracuse, NY to E. E. Olson, Plant Superintendent, 4-4-1957**

Dear Mr. Olson:

During our call on March 26, 1957, at which time we were accompanied by Mr. Robert E. Clagett of our Cincinnati office, various sets of additive factors for the calculation of coefficients of thermal expansion were discussed. Also mentioned was the matter of a colorant charge for a yellow lime-soda glass.

We enclose a photostatic copy of a sheet showing several sets of the factors mentioned above. For lime-soda glasses of normal type we have found the factors of the last column (Ghering & Knight) to be the most reliable. These are the same factors reported by Dr. Silverman. They were determined over a wider range of temperatures than most of the other sets and therefore are less likely to yield deceptively low results. Since they do not include factors for any minor constituents, other sets must be relied upon to furnish those figures.

You will note that fluorine must be calculated to sodium fluoride (NaF) and calcium fluoride (CaF<sub>2</sub>) in the case of opal glasses. This operation casts some doubt on final results. It has been our experience that calculated expansion coefficients of opal glasses are somewhat unreliable, and inadequate for comparison with similar figures for transparent glasses for the purpose of matching the thermal expansions of the two glasses.

Asterisks in the table serve only to indicate those factors which we have found to be the most reliable in those cases where factors are not provided by Ghering & Knight.

We believe that the colorant charge shown below will be a logical starting point for a yellow in your lime-soda batch, based on 1000 lb. Sand.

11 lb. .... Cadmium Sulfide  
2.5 lb. .... Sulfur

Since the melt should be mildly reducing in character, nitre must be omitted, with compensation via an increased soda ash charge if desired. While a small charge of a sulfate might be tolerated, its use could not be recommended unless found to be necessary. Arsenic or antimony should also be omitted.

~~Zinc oxide is generally considered to be helpful in developing the cadmium color, and it is suggested that at least 15 lb. Zinc oxide be included in the batch.~~

Your report concerning the results obtained with a yellow, as well as a small piece of the glass to illustrate the color will be appreciated.

BARIUM IN GLASS

To those who have always wanted to make a better quality glassware, particularly lead glass, there is now available for the first time, in a commercial way for the glass industry, Fisher Barium Flux, a product which will replace lead or lime.

For those who make lead glass, this Barium Flux will take the place of lead and give equally as good results in luster, ring, cut and etching at a far less cost to produce.

True barium glass is about the most beautiful glass imaginable and Barium Flux can be used to make this in crystal or colors, selenium and manganese work well with it, and produced in either tank or pot.

Fisher Barium Flux is not a mixture of different fluxing materials, but is a definite barium chemical recently perfected. In appearance, a glassy product which gives off no gas when fluxing, with no loss of weight. Its use causes the batch to flux at a less temperature than regular soda lime batch, works nicely, setting slightly faster than lead glass and the production is larger.

We invite you to try this in your operations and will gladly furnish you suggestive batches with information which will aid you towards creating the most beautiful glass ever produced.