

Glass: a fluid transfer of knowledge...



Glass: a fluid transfer of knowledge

A thesis presented in partial fulfillment of requirements of the degree Master of Fine Arts
in the Department of Glass of the Rhode Island School of Design, Providence, Rhode
Island.

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2012

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This effort and my time here are dedicated to my parents
Amanda and David McNabb

I would also like to express a special thanks to Stephen Powell and Lino Tagliapietra.

This document could not have been completed and made tangible without the help of
Jen Liese, Anne West and especially Elizabeth Gardner.

Thank you to Rachel, Jocelyne, Tucker and Daniel – for their input into the writing and
my practice.

Thank you to Janusz Pozniak, Dante Marioni, James Mongrain, David Walters and GLASSLAB at
CMOG for their support and images.

Last but not least the folks who collaborated with me and helped me produce and document
the work during my time at RISD 2009 – 2012.

Thank You

Hasan Askari	Charlotte Potter
Mimi Cabel	Jocelyne Prince
Bruce Chao	Jean Prominski
Sinnae Choi	James Rosner
Niels Cosman	Katie Stone
Andrew Bearnot	Liesel Schubel
Maria Enomoto	Mara Streberger
Adrienne Evans	Phoebe Stubbs
Alex Forsyth	Brett Swenson
Tucker Houlihan	Chris Taylor
Tamara Johnson	Stefania Urist
Hannah Kirkpatrick	David Walters
Cooper O'Brien	John Wang
Stefanie Pender	Joe Wichitchu
John Pierce	Chris Yamane

Table of Contents:

Introduction: Living in a Glass Age	4
Defining: a Fluid Transfer of Knowledge	11
Chapter 1– Collaboration	13
<i>Historic Foundations:</i>	
<i>The Journey of an Apprentice and An Assistant as an Extension of the Maker</i>	14
<i>A Gaffer as a translator of Idea and Ambassador for the material</i>	20
Chapter 2 – Experimentation as a means of making work	26
<i>Experimentation through Demonstration</i>	27
<i>Experimentation as a way of connecting The industrial with the Handmade</i>	37
<i>Experimentation/Reinterpretation of Traditional Glassworking Techniques</i>	55
Chapter 3 – Production Lab	63
<i>The Work in a Studio Practice</i>	64
<i>Negotiating Space: The Work in a Gallery Situation</i>	73
Conclusion: What of this World, Surrounded by Glass?	76
Appendix	80
Bibliography	83
Image List	85

Abstract:

Glass is a constant in our daily lives. I look through a pair of glasses to see a screen, I grab a glass to drink from, all the while a light bulb is flickering above. If we look around we see glass. It is in the products we use and the architecture we inhabit. We live in a Glass Age. It is my duty as a glassmaker to explain the intricacies of this material and help others negotiate their way through this Age. Explaining is about unfolding and opening up a scenario. In my case the scenario is about the materiality of the work I produce, the work's content, and my ability to inform others about this material to which we are constantly tied.

Glassmaking is a collaborative endeavor that pushes experimentation and allows one to examine conceptual possibilities that exist in the material. This Glass Age is brought forth to us through industrial and handmade means. Along my journey of glassmaking I have come to these realizations and my intentions for this text is for it to be a guide through my practice, my work and this Age.

explain, v.

Pronunciation:

/ɛk'spleɪn/

Forms: 15 **explaine**, 15–16 **explayne**, 15–17 **explane**, 16– **explain**.

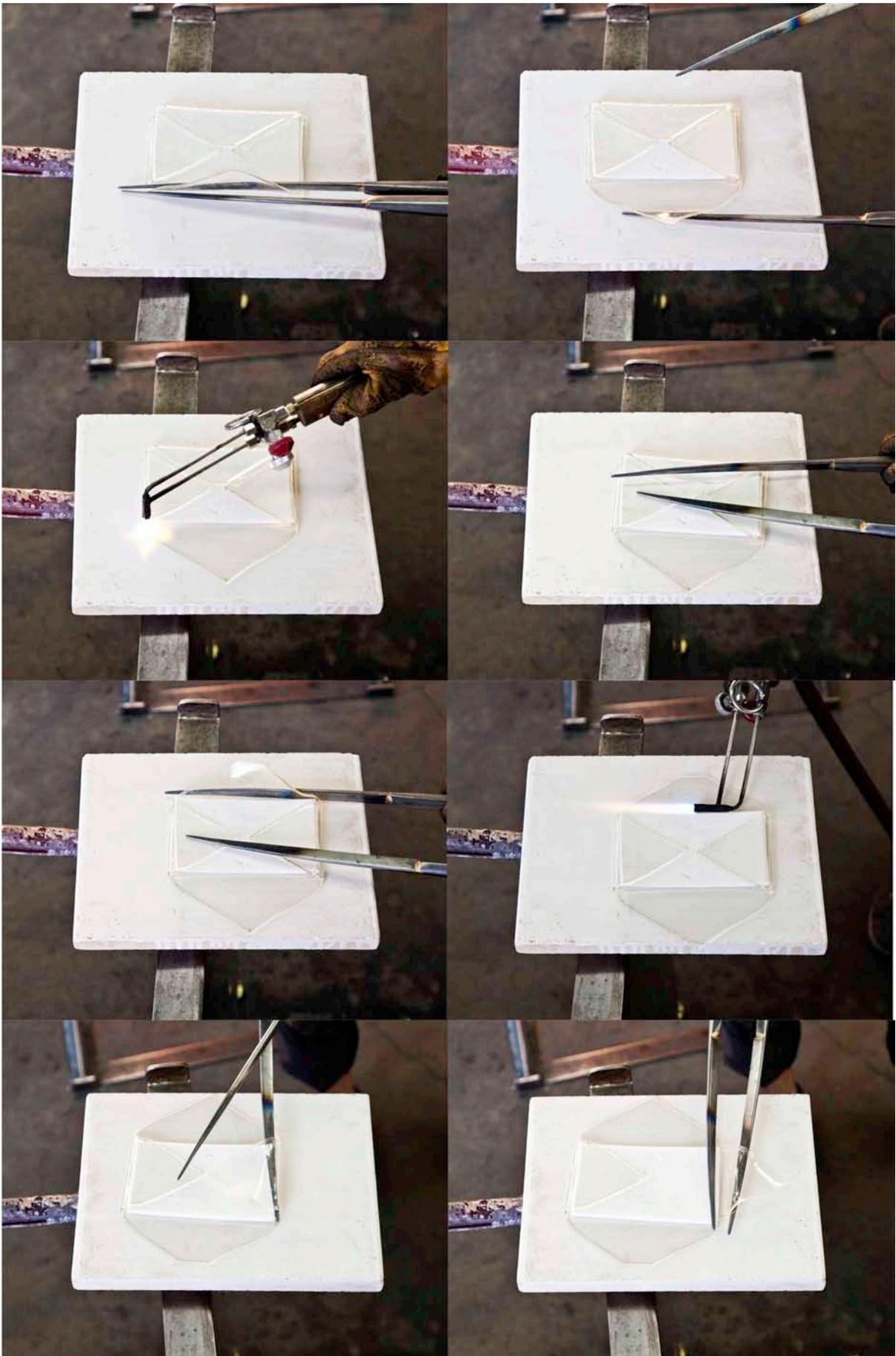
Etymology: < Latin *explānāre*, < *ex-* (see *ex-* [prefix1](#)) + *plān-us* flat, *plain n.1*... [\(Show More\)](#)

- a.** To open out, unfold, spread out flat (a material object). Also *refl.* and *intr.* for *refl. to explain (itself) into* : to develop. *Obs.*

1721 R. Bradley *Philos. Acct. Wks. Nature* 144 Beetles have Wings so disposed as to fold up or explain themselves a the Will of the Insect.¹

My questions, both materially and conceptually, can be placed into five categories. Through the sections of “Living in a Glass Age”, “a Fluid Transfer of Knowledge”, “Collaboration”, “Experimentation”, and “Production Lab” this document will act as a window into my practice.

¹ Oxford English Dictionary, <http://0www.oed.com.librarycat.risd.edu/view/Entry/66595?redirectedFrom=explain#id>



Introduction: Living in a Glass Age -

We live in a *Glass Age*. Think of Silicon Valley outside of San Francisco, California. Silica is an oxide of silicon and a primary ingredient in glass. Silica is a finer grade of sand. The lineage of the microchips in our computers reside in this *Glass Age*. The computer chip contains memory as does glass. While the computer chip's memory is stored electronic information in bits and data, glass's memory is represented in the final product. In this state glass reveals the processes that were implemented in its production, the impressions of making – a material memory. The technology that surrounds us is the latest edition of glass. The iPhone 4 has a glass screen comprised of Corning's Gorilla glass (fig. 1) and its backing is a machineable glass/ceramic.



fig 1 – Gorilla Glass

The Internet that runs to our homes, schools, and places of work comes through the lines of fiber optics. Every day I look through a pair of eyeglasses to see a world composed of glass things. Computers, light bulbs and drinking glasses are all ubiquitous items in our daily lives.

The *Glass Age* denotes an age like that of the *Bronze* or *Iron Age*. In the 1930's Pilkington Brothers Limited, a glass manufacturing company that pioneered the way sheet glass is produced, convened a group of architects to help with urban planning solutions. They called this ensemble the Glass Age Committee of Messrs Pilkington Brothers Limited. Their proposals, which dealt heavily with how glass would be a part of landscape and architecture, were published in *The Glass Age* and later adapted into *Motopia*, a book written by G.A. Jellicoe in the 1960s.

These two works along with Quentin R. Skrabee, Jr.'s book *Michael Owens and the Industry of Glass*, 2007, show how this age is not new but instead is still evolving.²

Whether you are looking out of it or into it, glass is ever present in the expanding world of communication. To quote a friend, glass at present is an "integrated interface."³

interface, *n.*

Pronunciation:

/ˈɪntəfeɪs/

Etymology: < inter- *prefix* 1b(c) + face *n.*

1. A surface lying between two portions of matter or space, and forming their common boundary.

1882 Bottomley *Hydrost.* 13 The term *interface* denotes a face of separation, plane or curved, between two contiguous portions of the same substance.

1883 G. Chrystal in *Encycl. Brit.* XV. 264/1 The interface of the two liquids in the axial line.⁴

Imagine a world without glass.

Anthropologist Alan Macfarlane and glass historian Gerry Martin explore this idea in their collaborative effort *The Glass Bathscaphe*,

Most of us hardly give glass a thought, but imagine a world where glass has been stripped away or uninvented. All glass utensils have vanished, including those now made of similar substances such as plastics, which could not have existed without glass. All objects, technologies and ideas that owe their existence to glass have gone.⁵

It is almost impossible for us to imagine a world without glass.

² The Glass Age, *Architectural Review* (St. Helens, Lancs. England: Pilkington Brothers Limited, 1939)
G.A. Jellicoe *Motopia – a study in the evolution of urban landscape* (London: Studio Books, 1961)

Quentin R. Skrabee, Jr. *Michael Owens and the Industry of Glass* (Gretna, Louisiana: Pelican Publishing Company, 2007)
Corning Inc.

A Day Made of Glass... Made possible by Corning.

http://www.youtube.com/watch?v=6Cf7IL_eZ38&feature=relmfu (feb 12 2012)

A Day Made of Glass 2: Unpacked. The Story Behind Corning's Vision.

http://www.youtube.com/watch?v=X-GXO_urMow&feature=channel_video_title (feb 12 2012)

³ Peter Drobny - designer for Steuben and The Innovation Center at The Corning Museum of Glass

⁴ Oxford English Dictionary <http://0-www.oed.com.librarycat.risd.edu/view/Entry/97747?rskey=YPVvuN&result=1&isAdvanced=false#id>

⁵ Alan Macfarlane and Gerry Martin, *The Glass Bathscaphe* (London: Profile Books Ltd., 2003) p 1



fig2 – Phillip Johnson - The Glass House, 1949

Windows are the precursor to this age. They let light in yet still protect the inside from the outside. A thin membrane as a threshold, a way of keeping up with our surroundings and a way our surroundings can keep up with us. By looking through the window to the nature outside or peering out of an office building and catching another person doing the same, we might see a smile, a brief glimpse of humanity a few floors up. These interactions are catalyzed through glass, they allow us to understand the material as an *integrated interface*.

The architects Mies Van der Rohe and Phillip Johnson utilized these concepts within the material through their architectural ventures, particularly with concern to the home. Johnson's *Glass House*, 1949 (fig. 2) and Mies's *Farnsworth House*, 1945-1951 (fig. 3), depict this membrane of material very eloquently. Their structures have influenced numerous artists in their particular pursuits. One such artist is Inigo Manglano Ovalle.



fig3 - Mies Van Der Rohe - The Farnsworth House, 1945-1951

In 2010 the RISD Glass Department visited Inigo at his exhibition at Mass Moca in North Adams Massachusetts. His pieces *Gravity is a Force to be Reckoned With*, 2009 (fig.4) and the film *Always After (the Glass House)* 2006 (fig. 5) are in direct dialog with the architecture and views of material that existed



fig 4 - Inigo Manglano Ovalle - *Gravity is a Force to be Reckoned With*, 2009

when Johnson and Mies erected their structures. Inigo's work points to this *Glass Age*. He uses the metaphor of transparency and reflection as a direct link to the past while pointing to a future. His ideas stemmed from reading *WE*, a book I also happened to read as a youth.⁶

WE is a sci-fi novel, written in the early 1920's by Yevgeny Zamyatin. The world of *WE* is portrayed as a futuristic utopic state that functions due to its transparency. The book is portrayed as a diary kept by D-503, who is working on the *Integral*, a space ship. The entries of D-503 allow the reader to glimpse into the materials of this world:



fig 5 - Inigo Manglano Ovalle - *Always After (the Glass House,)* 2006

I awoke: a moderate bluish light. The glass of the walls was sparkling, the glass chair and table, too⁷.

The hull of the *Integral* was almost ready; the elegant, elongated ellipsoid made from our glass – everlasting, like gold, and supple, like steel. I saw: they were strengthening the glass body for the interior...⁸

⁶ Mass Moca web – www.massmoca.org/event_details.php?id=510

⁷ Yevgeny Zamyatin, *We* (New York: The Modern Library, 2006) p30

⁸ *ibid.*, p73



fig 6 – Providence, RI

Glass is an encompassing theme throughout *WE*. With chapters such as “The Bell Jar” and “Through the Glass,” the reader becomes placed into a world that resides in a transparent enclosure. Inigo’s piece *Gravity is a Force to be Reckoned With*, juxtaposes this material enclosure from D-503’s world with the architecture of Van Der Rohe and Johnson.

The world in *WE* is governed by the One State and everyone must check in and be checked on. The book is a dystopia; but how far are we from this? Every Space Shuttle in NASA’s fleet had glass/ceramic tiles on their bellies for reentry. It is not as if Zamayatin could have predicted the truths of his novel, even as an engineer turned writer. In writing of the future we could get an inkling that he had already been there.

Glass has changed the way we think of products. Jean Baudrillard, the noted French sociologist and philosopher advertises glass as “the material of the future”, in *The System of Objects*⁹

Glass eliminates all confusion in short order... Fundamentally it is less a recipient than an isolator – the miracle of a rigid fluid – a content that is also a container, and hence the basis of the transparency between the two: a kind of transcendence which, as we have seen, is the first priority in the creation of atmosphere.¹⁰

⁹ Jean Baudrillard, *The System of Objects* (New York: Verso, 2005) p41

¹⁰ *ibid.*, p42

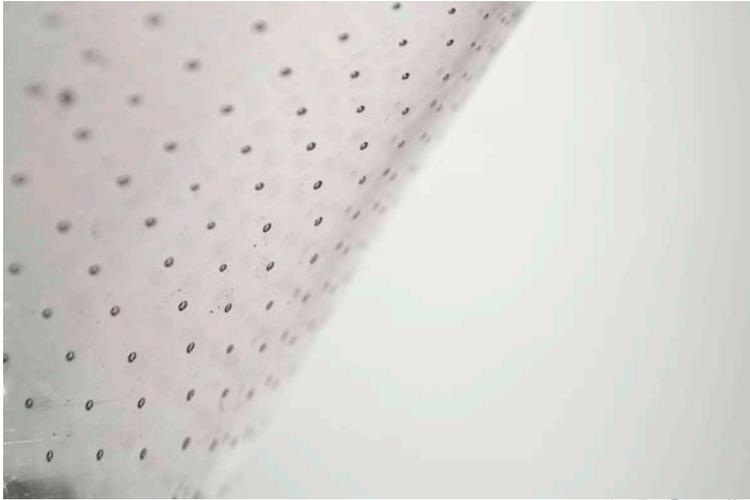


fig 7 – Reticello

Atmosphere is contained – living in a bubble – a glass one. We are flanked by this material¹¹. Glass has been a resilient material since its creation in fire thousands of years ago. How can I, a producer of glass things, enrich this journey and communicate it to others? When it comes down to it I often think of what a friend said when asked the familiar question

“What do you do for a living?”

“I make bubbles¹².”

But what does a bubble connote? In the essay “In the Realm of Spheres,” for the show *Thin Skin*, curator Barbara Clausen describes a bubble as such:

Inside a bubble or pneumatic structure, we are constantly gauging our relationship between the outside and inside, and dealing with real and imagined limits and borders. These are in continual flux, subject to the visual and psychological adjustments we make, filtered through our perceptive and cognitive faculties.¹³

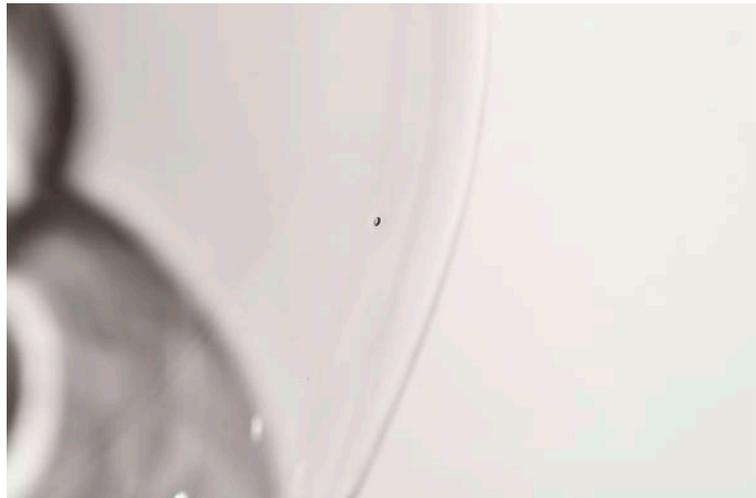


fig 8 – Seed

Glass is a material connected to bubbles. When glass is charged in the furnace it bubbles up; when I make a vessel I have to blow air down a pipe. Bubbles are sometimes noticeable on the finished object; these can either be a technical addition as with reticello (fig. 7) or a seed (small bubble) (fig. 8) not melted out during the charging and fining process in the furnace. If we think of the primordial ooze that is believed to be the origins of life or

¹¹ Flanked by a material see appendix.

¹² Dante Marioni – glassmaker of the highest degree

¹³ *Thin Skin: The Fickle Nature of Bubbles, Spheres, and Inflatable Structures* (New York: Independent Curators International, 2002) p 18

how landmasses were made through volcanoes we can see that bubbles are essential to our very existence. Bubbles are life.

But what of glass bubbles?

Glass as a material is engrained into our language and imprinted onto our consciousness as Fausto Petrella's acknowledges in his essay *Glass and the Psyche*.

The various properties of glass appear, in short, like a veritable orchestra at the artist's disposition for an unending game of inventive recreation. A game that has rooted glass in the cognitive and affective experience of man, from the most childish to the most abstract speculative activity, to reach the imaginative construction of art.¹⁴

Glass and bubbles are in a symbiotic relationship; they can be made by man, constructed by machine or found in nature. Objects of glass are made to endure and to communicate.

The question I must ask as a maker is "Do the objects I make pass this on?"

I believe it is the responsibility of the maker now, just as it was a thousand years ago, to inform and instruct the world about this material. We are the educators and workers of fire, of glass, and of bubbles. We live in a *Glass Age*. Here there is an addictive connection to all things – think about the wiping of a window to get a clearer view or the swiping of our thumb across a screen to answer a call. On the surface of the material a connection is made, communication, a collaboration between a clear, transparent material and a world that surrounds.

A fluid transfer of knowledge.

14 Fausto Petrella "Glass and the Psyche", *Glasstress* (Milan: Evizioni Charts, 2009)p 48

Defining - a Fluid Transfer of Knowledge in this Glass Age

Glass is a fluid material that permeates our everyday lives. There is an intelligence that should be implemented in its production. Glass is an intelligent material that I make with and interpret. As a material, glass can be placed in the past, is present now and gives one a glimpse into the future.

Glass is a fluid transfer of knowledge. As a material, glass could be considered paradoxical; it is a chameleon material that also communicates process. Glass casts light upon suspended questions. These questions can be asked upon first discovery or as one sits upon a stool and stares into the depths of a glass of beer. My work does not necessarily stop at what I produce but extends to what I may help others produce. In producing glass objects the material itself asks the question: Why Glass? In further working with this material I often ask, "What are the transferences of glass? "

material, *adj.*, *n.*, and *adv.*

A. *adj.*

I. Senses relating to physical substance.

Of or relating to matter or substance; formed or consisting of matter. In early use: †earthly (*obs.*).

- a. c1390 Chaucer *Parson's Tale* 182 He that is in helle hath defaute of light material.
- b. a1398 J. Trevisa tr. Bartholomaeus Anglicus *De Proprietatibus Rerum* (BL Add.) f. 114, Picesse & boistousnesse of material parties is cause and welle of heuynesse.
- c. ?c1450 (1400) Wyclif *Eng. Wks.* (1880) 376 Whan he [sc. Christ] was souȝte to be a kynge & to haue taake up-on hym þe material swerde.
- d. 1483 (1413) *Pilgrimage of Soul* (Caxton) v. i. 73 Mundus is the material world, but seculum is taken for the endurynge of the world.
- e. 1991 C. A. Ronan *Nat. Hist. Universe* 28/1 The great goal of modern physics is to create a unified theory of the four fundamental interactions that govern the material world.¹⁵

Whether I am making my own work, helping another glassmaker in their production, or making work for an artist or a designer, problem solving and adapting to various situations are the demands of glassmaking. The collaborative nature of the glass process enables one to surpass their own individual limitations and at the same time find their own voice within the material.

¹⁵ Oxford English Dictionary, <http://0-www.oed.com.librarycat.risd.edu/view/Entry/114923?rskey=UsWkpw&result=1&isAdvanced=false#eid>

Through this journey I have pursued and received a knowledge of and from glass.

The content of my work has to breathe with the material. It must be a fluid transference. Ideas are allowed to recapitulate and evolve. This is not just a part of my own studio process but how I approach the material when I work for others. I have frequently come into a hot shop and asked, "What if we try it this way?" In my own work I often try to grasp what it means to be hand-made or industrially made. How can certain industrial processes feed into those of the handmade and vice versa? How is glass a fluid transfer of knowledge?

A Fluid Transfer of Knowledge.

Fluid – Glass is an amorphous solid. When heated past the point of annealing it is in a liquid state. Annealing is the process of cooling glass from a working or a malleable state to room temperature. Working the material takes a fluid touch. One must flow with the material just as a swimmer must flow with the water.

Transfer – Glass not only changes from various forms of matter but is passed down as tacit knowledge from a Maestro to an apprentice. This not only encompasses the making of objects but the maintaining of a studio, the understanding of glass in its raw elemental state, the chemistry, and physics of melting clear and colored glass. Ideas, ways of working and material expressions are passed on from the gaffer/maker to a designer/artist.

Knowledge – The material itself has a memory. It remembers how it was manipulated and carries this onto the end or its final stasis state. There is a rich history of glass. One can also find this knowledge is present in *Fluid* and *Transfer*.

Chapter 1 – Collaboration

Glass has been a product of man for well over 2000 years. The Glass Age's roots could be seen as starting in modern day Lebanon and sprouting from there to the rest of the world due to the trade and commerce of the day. As a material it has had a philosophical and metaphysical lure, resonates beauty and has crossed the boundaries of design, craft and fine art. These boundaries are sometimes opaque. By making one cultivates an understanding of the material and these boundaries.

Making is difficult. You must have a desire and a willingness to fight through the struggle. You must suffer to make. However, each glassmaker does not do this alone. He or she goes about this through their own unique experiences that become a collection of experiences. The first experience in working with the material is learning the craft from another maker. This learning from the maker is then exchanged into learning with the assistants that surround the maker. Here we see collaboration. As makers we all bring something different to the table, something to share. This is what I bring and believe.

I am a glassmaker whose primary endeavors in glass are mediated through glassblowing. Glassblowing is a craft learned through a master and an apprentice tradition. The skills and techniques passed down by a maker are the same skills he or she learned in their own formal training. This passing down of knowledge and technical information is something that has taken place for hundreds of years. An apprentice is allowed to observe and work with many different makers in this system. Here the system informs and enhances the dialogue that a glassblower has with the material and thereby allows the apprentice to one day become a competent glassmaker. To put it simply, glassblowing is not intended as a one-person experience; it is intended as a shared, and thus a collaborative, experience.

collaboration, *n.*

Pronunciation:

/kə,læbə'reɪʃən/

Etymology: *n.* of action, < Latin *collabōrāre* to *collaborate v...* (

1. United labour, co-operation; *esp.* in literary, artistic, or scientific work.

1860 C. Reade *Eighth Commandment* 374 It is plain that collaboration was not less than it now is in France.

1889 *Spectator* 19 Oct. 522/1 Improvised by that fertile writer in collaboration with MM. Arsène Houssaye and Verteuil.¹⁶

16 Oxford English Dictionary, <http://0-www.oed.com.librarycat.risd.edu/view/Entry/36197?redirectedFrom=collaboration#eid>

Historic Foundations:

The Journey of an Apprentice and An Assistant as an Extension of the Maker

The time spent as an apprentice and assistant opens up many different paths or approaches to glassblowing. These multiple paths influence the way that I make, experiment and approach my own work and the work of other artists and designers. My strongest ability as a glassmaker is adapting to the challenges that exist in working the material.



fig 9 - Lalique Chameleon given to me in 1995, head added in 2011

land), and a pheasant and chameleon from Lalique (France) (fig. 9). These objects, all received or purchased during my youth still provoke memories of the material and beauty.

At Centre in the spring of 2000 I dedicated myself to the practice of glassmaking, to the pursuit of objects. Few moments are so clear. From my youth I can remember the *Challenger* disaster (fig. 10). I was in kindergarten watching from the top of the playground slide as she separated above. Most remembered experiences are traumatic but my stepping into a glass shop was dynamic.

In 1999, I took my first steps into a hot shop as an undergraduate at Centre College in Danville, Kentucky. Glass objects though, have been a part of my life for as long as I can remember, a glass menagerie of sorts. These objects are small glass figurines: a turtle from Steuben (United States), a parrot from Baccarat (France), an eagle from Waterford (Ire-

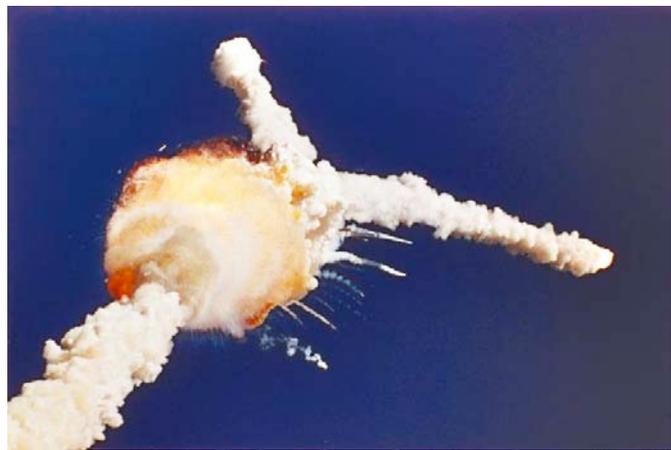


fig 10 - The Space Shuttle Challenger - January 28, 1986



fig 11 - Lino Tagliapietra and Stephen Powell

In 2000, Professor Stephen Powell brought in Venetian Maestro Lino Tagliapietra to teach and demonstrate his approach to the material (fig. 11). Born in 1934, Lino started working with glass at the age of eleven. This experience was the moment that made me decide to pursue glass. When one of the other students asked him “What is your favorite piece?” Lino, without a pause, said, “My next one.” To pursue life for the act of making and sharing work and knowledge seemed then, as it does today, to be a worthy pursuit.

maestro, *n.*

1. A master.

- a. With capital initial. A title or form of address designating someone (originally esp. an Italian) who is a master of or who has achieved eminence in a skill or profession, esp. a musician.
- b. 1607 H. Wotton *Let.* 13 Sept. in L. P. Smith *Life & Lett. Sir H. Wotton* (1907) I. 399 A very true picture of Maestro Paulo the Servite.
- c. 1797 A. Radcliffe *Italian* I. p. vii. He might be a ghost, by his silence, for aught I know, Maestro.
- d. 1875 H. James *Roderick Hudson* in *Atlantic Monthly* Mar. 307/2 The marriage was most unhappy, and the Maestro Grandoni was suspected of using the fiddle-bow as an instrument of conjugal correction.
- e. 1991 *Piano Q.* Fall 24/2 Maestro, the tone is already better than at the beginning.¹⁷

¹⁷ Oxford English Dictionary, <http://0-www.oed.com.librarycat.risd.edu/view/Entry/112113?redirectedFrom=maestro#eid>

I have known Lino for twelve years now and have worked for him for nine. It is incredible to think of the length of his career. It is equally inspiring to see that a person is able to possess that amount of passion and fortitude for their profession. In his book *Lino Tagliapietra* glass historian Giovanni Sarpellon points out the traits that a maestro must possess:

The master glassmaker (whether he is working alongside an artist or is himself an artist) takes a central role during the creation of work. There is one facet of a glassmaker's make-up that he can never shed: the craftsman, who is familiar with all secrets of his medium and knows how to make most of it. Furthermore, glassmakers love and respect the material with which they produce not only a "thing of beauty" but an object that is worthy of glass- an object in which glass is an essential element and which at the same time enhances the qualities of the medium from which it has evolved.¹⁸



fig 12 – Lino, myself, Jen Elek, Dave Walters and Nancy Callan at Pilchuck

18 Giovanni Sarpellon, *Lino Tagliapietra* (Venice Italy: Arsenale Editrice, 1994) p16

To apprentice with a Venetian glassmaker is to learn the historic foundations of the craft; to apprentice with Lino is to work within a system that has been ongoing for centuries. Giacinto Di Pietrantonio indicates this idea in the exhibition catalog to the 2009 *Glasstress* show at the Venice Biennale:

We are still in that modernity whose early founding dominance was outside of Italy, whereas if we look at the artisan's commitment to glass working, we find its foundations, maintenance and development in Italy, which means Venice and Murano.¹⁹

In an apprenticeship system you start at the bottom of the pecking order, even as a college graduate. As the youngest on Lino's team I was at the bottom. At first the apprenticeship consisted of opening and

closing glory hole doors, sweeping up after each piece, running around, and mollifying the rest of the crew (Dave Walters, John Kiley, Nancy Callan, Erika Kohr, Jen Elek and Eric Woll). We



fig 13 – Lino and crew at work

were and still are a

working family, with a few new additions (Jesse Kelly, Darren Denison, Manuel Castro and Harrison Neel). This communal relationship encourages growth and other means of learning. This apprenticeship environment is similar to a workshop of another era. In his book *The Craftsman*, Richard Sennett states that, “the workshop for its very essence lies in the personalized face to face authority of knowledge.”²⁰

19 Giacinto Di Pietrantonio, *The Craftsman and the Manufacturer*,” *Glasstress* (Evizioni Charts: Milan, 2009) p 39

20 Richard Sennett, *The Craftsman* (New Haven : Yale University Press, 2008) p 80

Blowing Glass (

Wed, 23 Feb, 2000

TANK: 04 TEN BBLs

Calculated Expansion:

Ingredients:		Cost :	
quartz	133.500 Lbs	0.000	
soda	46.000 Lbs	0.000	
flurisp	200.00 gr	0.000	
ba-car	600.000 gr	0.000	
antmon	200.000 gr	0.000	
lithia	5.000 Lbs	0.000	
er-ox	20.000 gr	0.000	
s-nitr	4.500 Lbs		
ca-car	28.500 Lbs	0.000	
zn-ox	2.000 Lbs	0.000	
nep-sy	18.000 Lbs	0.000	

Main Composition:			
	Weight	Wt. %	Mole %
SiO ₂	143.882	71.501	71.978
Al ₂ O ₃	4.272	2.123	1.259
Nd ₂ O ₃	0.000	0.000	0.000
Er ₂ O ₃	0.044	0.022	0.003
		+ 73.645	+ 73.241
Li ₂ O	2.001	0.994	2.013
Na ₂ O	30.314	15.064	14.702
K ₂ O	0.886	0.440	0.283
		+ 16.499	+ 16.999
MgO	0.003	0.002	0.002
CaO	16.363	8.132	8.771
SrO	0.000	0.000	0.000
BaO	1.019	0.506	0.200
PbO	0.000	0.000	0.000
ZnO	1.992	0.990	0.736
		+ 9.629	+ 9.709
B ₂ O ₃	0.000	0.000	0.000
Fe ₂ O ₃	0.014	0.007	0.003
As ₂ O ₃	0.000	0.000	0.000
Sb ₂ O ₃	0.436	0.217	0.045
		+ 0.224	+ 0.048
TiO ₂	0.000	0.000	0.000
P ₂ O ₅	0.000	0.000	0.000
S	0.004	0.002	0.004
		+ 0.002	+ 0.004

Appen:	
SiO ₂	23.769
Al ₂ O ₃	-0.378
Li ₂ O	5.436
Na ₂ O	58.075
K ₂ O	1.315
MgO	0.001
CaO	11.403
SrO	0.000
BaO	0.399
PbO	0.000
ZnO	0.368
B ₂ O ₃	0.000
Fe ₂ O ₃	0.003
As ₂ O ₃	0.000
Sb ₂ O ₃	0.034
TiO ₂	0.000
SnO ₂	0.000
P ₂ O ₅	0.000
Mn ₂ O ₃	0.000
CoO	0.000
NiO	0.000
CuO	0.000
CdO	0.000

100.425

Totals:	
Batch Weight :	239.75
Glass Wt. :	201.232
Cost of Batch :	58.553
Batch cost/lb. :	0.244
Glass cost/lb. :	0.291
Volatiles :	37.622
RO :	9.709
RO ₂ :	73.241
R ₂ O :	16.999
R ₂ O ₃ :	0.048
Appen Total :	100.425

Volatiles:

<F>	0.209	0.104
<Cl>	0.003	0.002
<Oxy>	0.334	0.166
<SO ₂ >	0.022	0.011
<CO ₂ >	34.876	17.331
<NO ₂ >	2.435	1.210
<H ₂ O>	0.027	0.013
<LOI>	0.260	0.129

Total of Volatiles: 37.622

Other Colorants:		
Au	0.000	0.000
Se	0.000	0.000
Si	0.000	0.000
Br	0.000	0.000
C	0.000	0.000
Ag ₂ O	0.000	0.000
NiO	0.000	0.000
CuO	0.000	0.000
CoO	0.000	0.000
CdO	0.000	0.000
Mn ₂ O ₃	0.000	0.000
Cr ₂ O ₃	0.000	0.000
Pr ₂ O ₃	0.000	0.000
V ₂ O ₅	0.000	0.000
U ₃ O ₈	0.000	0.000
MnO ₂	0.000	0.000
SnO ₂	0.000	0.000
CeO ₂	0.000	0.000

fig 14 – Clear Glass Recipe

The way I came into glass is through working with a team around the leadership of a master. Though it doesn't always take a large team to execute an idea, it does take at least two people to blow glass. Simply, there are two ends of the pipe, one to inflate the glass and one to work and



fig 15 – with James Mongrain in Turkey

form the material. There are ways to do this by oneself, but more is possible through teamwork.

A level of trust and communication develops through this mode of apprenticeship. Only through diligence is it possible to make glass well. The understanding of glassmaking does not happen over night or over five to ten years. Glassblowing is a refinement that takes decades.

A few years after starting with Lino he asked me to make the batch and color. For any artist color is an integral process; for a Venetian the



fig 18 - Dante Marioni – 'Irio, 2008

color process requires exacting specifications,

thus attaining dif-

ferent colors from what other glassmakers have access to. Batch is essentially the elemental state of glass. The basic composition of batch is sand, soda, calcium carbonate etc. (fig.14) In the batch making process I discovered nuances in the melting of the raw material. These nuances have inspired specific pieces in my work.



fig 16 - James Mongrain – Untitled, 2007

While apprenticing for Lino I was simultaneously assisting other professional gaffers and artists, including Jame Mongrain (fig. 15,16), David Walters(fig. 17), Dante Marioni (fig. 18) and Janusz Pozniak(fig. 19). Each of them had also learned



fig 17 - David Walters – Alice in Blunder-Land's 'Tea Party Cruiser, 2011

through Lino. Their work, as well as their style and approach to making differ, and have evolved from working with Lino. However, their tenacity and problem solving abilities are directly related to what they learned from the *Maestro*.



fig 19 – with Janusz Pozniak at Center College

Working with these artists and makers as an assistant helped me to understand the ways in which Lino's team approaches and finalizes the material. Assisting enables the learning curve to become more legible, the information of glassmaking began to flow.

There is a switch here from apprenticing to assisting. This change in role is hard to put into words. However, once an assistant becomes aware of the material's movement and the flow of the shop

then the assistant becomes a giver of knowledge instead of a taker. I learned then, as I do now, a great deal from those I assist. I learned the most from Janusz Pozniak, as he is a maker and first assistant to Dante Marioni. Through him I learned how to become an extension of the gaffer or head maker. By foreseeing and trouble shooting problems that arise in the process of making, I became an asset and a necessary tool. A team that has worked together for a longer time produces better objects. Through working together a history is crafted, not just between objects but between maker and assistants. Tacit knowledge is passed down. The only way to experience glassmaking is to simply do it. Here there are no short cuts. After years of apprenticing and assisting I started making my own things. By producing your own pieces, a further understanding of the material takes place. The moments of apprenticing, assisting and making your own work prepares you for the opportunity of making work for others.

A Gaffer as a Translator of Idea and Ambassador for the Material

Often artists and designers will use a glassmaker to execute their work, as they have limited or no glassmaking experience. Therefore, these others come to a gaffer to execute their ideas. Choosing the right gaffer is like choosing the right barber. The gaffer has to have a style in finishing a piece that is conducive to the artists' or designers' aesthetic; there needs to be a good rap-

port in this collaboration. A material dialogue should take place between the gaffer and artist or designer. This material dialogue is essentially the gaffer breaking down the process of glassmaking that goes into the execution of the work desired by the artist or designer.

The glassmaker furthers their dialogue as a maker with the material by gaffing artists' and designers' work. Here the gaffer is often called upon to be an ambassador for the material of glass. In exposing material knowledge and becoming moldable to the will of another artist, a gaffer can be an essential and primary tool to an artist's or designer's conceptual undertaking. A gaffer must not only be an extension of the artist's hands but also the artist's mind. Sometimes it's not what you can make but what you can expose and contribute.



fig 20 – with James Irvine at Vitra

artist, *n.*

2. A person skilled or proficient at a particular task or occupation; an expert. *Obs.*

1594 R. Carew tr. J. Huarte *Exam. Mens Wits* xiv. 253 From which two extremes, a king ought to be farther distant, than any other artist. ²¹

designer, *n.*

a. One who originates a plan or plans.

1. 1670 G. Havers tr. G. Leti *Il Cardinalismo di Santa Chiesa* ii. ii. 151 Thoughtful and cogitative, a great designer.
2. 1736 Bp. J. Butler *Analogy of Relig.* ii. Concl. 289 Ten thousand thousand Instances of Design, cannot but prove a Designer.
3. 1863 J. G. Murphy *Crit. Comm. Bk. Gen.* (i. 2) 39 The Great Designer.

b. One who makes an artistic design or plan of construction; a draughtsman; *spec.* one whose business is to invent or prepare designs or patterns for the manufacturer or constructor. ¹⁶⁶² J. Evelyn *Sculptura* vi. 147 Where the Workman is not an accomplished Designer.

4. 1752 Johnson *Rambler* No. 190. ¶10 Sculptors, painters, and designers.
5. 1895 *N.E.D.* at *Designer*, *Mod.* A designer in a textile factory. ²²

21 Oxford English Dictionary <http://0-www.oed.com.librarycat.risd.edu/viewdictionaryentry/Entry/11237>

22 Oxford English Dictionary, <http://0-www.oed.com.librarycat.risd.edu/view/Entry/50854?redirectedFrom=designer#eid>

The last few summers I have been fortunate to be a gaffer at Pilchuck Glass School and for Glasslab, a program of the Corning Museum of Glass. Additionally, during the school year at the Rhode Island School of Design I have been able to gaff for other students and visiting artists



fig 21 – with Sigga Heimis and Dan Mirer at Vitra

through our glass program.

Often it is the artists' or designers' first time being exposed to the material. Here it is the gaffer's responsibility to inform the artist/designer of the possibilities of the material within their conceptual framework. If a gaffer produces an object from an artist's drawing without communicating the processes to the artist then the object

becomes surface without substance. The process must be explained, a material and idea transference. Here the execution of the glass object can become a collapse, as Gilles Deleuze suggests: "In this collapse of the surface, the entire world loses its meaning."²³

The artist's/designer's work is essentially null if they have not learned or received an explanation into the process about their work. There are many ways to make objects in glass; certain ways of making can aid in a piece's conceptual tone.

Giacinto Di Pietrantonio indicates the power of a gaffer within the framework of conceptual art and the communication that exists:

This tradition is still very strong and used by artist, especially in a society of 'conceptualized' art where it is not necessary for artist to know how to create a work with his own hands but to have an idea which can be translated into a work by a good craftsman under the watchful guidance of the artist.²⁴

This importance of understanding fabrication and marrying it with good concepts was well discussed in the October 2007 *Artforum*. The article consisted of a panel of artists, fabricators, curators and collectors who looked at the production of artwork. Mike Smith,

23 Akira Lippit, *Atomic Light (Shadow Optics)* (Minneapolis:University of Minnesota, 2005) p42

24 Giacinto Di Pietrantonio, "The Craftsman and the Manufacturer"*Glasstress* (Evizioni Charts: Milan, 2009) p40

who operates his own art fabrication studio, begins when the question of artists using a fabricator to produce their work is addressed: "I don't think a fabrication studio is just another hand tool. Many artists are disconnected from material to the point that they need to work with people who have a connection."²⁵ He goes on to speak about artists calling in for pieces that need to be reproduced or for series that require editions. I agree: artists need to be involved with the development of their project. I have been on fabrication teams for artists where they have not been present or simply didn't show up.

In making another's work, communication is key. A craftsman or fabricator becomes an ambassador or translator for their expertise to the artist. Ed Suman, another fabricator, supports this notion:

Translation is part of it, but fabrication involves more than translating one language to another. The translator also needs to know and understand the material translated. The challenge is often to first understand the artist's intent, as clearly and precisely as possible, and then to visualize in reverse the steps needed to arrive at the final destination.²⁶

Here a discussion and determination on the modes of working can take place. The procedures and techniques of glassblowing can feed into the conceptual intent of the artist. Through explaining the differences and nuances of process the gaffer can determine the way to make the object that is more in line with the artist's concept. For instance, if an artist wants to reproduce a glass piece that was mold blown, yet does not want to use the mold, then there needs to be a real reason for this historical undertaking. I say historic due to the nature of the piece being a reproduction of something that already exists.

mould | mold, *n.*³

Pronunciation:

Brit. /məʊld/, U.S. /moʊld/

Forms: ME *mowlld*, ME *mowllde*, ME *mulde*, ME-15 *moold*, ME-15 *moolde*, ME-15 *moulde*...

Etymology: Apparently in form < Anglo-Norman *molde* ...

II. A pattern by which something is shaped.

- a. A hollow form or matrix into which fluid material is poured or plastic material is pressed and allowed to cool or harden so as to form an object of a particular shape.

of a (also one) mould: (a) of the same shape (*obs.*); (b) *Eng. regional* having a close family resemblance; cf. *to be cast in a (particular) mould at sense 11a*. *brick-*, *bullet-mould*, etc.: see the first element. 1999

Global Ceramic Rev. Autumn 27/1 The sanitaryware articles are produced exclusively on pressure casting machines using resin moulds.²⁷

²⁵ Michelle Kuo, "The Producers" *Artforum*: Producers October 2007 p354

²⁶ *ibid.*, 354

²⁷ Oxford English Dictionary, <http://0-www.oed.com.librarycat.risd.edu/view/Entry/122807?rskey=YG2piL&result=3&isAdvanced=false#eid>



fig 22 - Dale Chihuly – Venetian, 1991

One time while working in Seattle for Lino Tagliapietra, we were asked to remake a piece from Dale Chihuly's *Venetian Series* (fig. 22). The *Venetians* were originally a collaborative effort between Dale, the artist/designer, and his team of glassmakers with Lino, the master craftsman. In 2006 Lino was years removed from making this series, and another glassblower, James Mongrain, became the primary maker of this series. However, it was important to have the original maker to recreate this broken piece, created in the early nineties. Therefore, Lino was the only person who could do this. Fabrication was executed through picking not just the right tool but the only tool. Lino made Dale's conception of the *Venetian* vessels exist;

no other maestro could have translated or interpreted the drawings as Lino had back in the late eighties and early nineties.

I am a fervent proponent for work that uses a gaffer. An artist/designer can push my boundaries of what I thought I knew conceptually and materially. At the same time discussing the process while working with an artist is extremely gratifying and rewarding. These moments enable the craftsman or gaffer to teach and share their material experience with another maker. I have come to understand that we all have something to offer to the art world. There are many things I cannot do and have no interest in doing, yet I would relish working with a practitioner of another medium or another glassmaker to help me with a project.

However one looks at it, collaboration is communication. Collaboration is about the passing down and transferring knowledge. This is present in the apprentice/master relationship and the assistant/maker relationship and it reaches its apexes in the relationship of gaffer or craftsman to artist. To collaborate is to serve one another for the purpose of an idea or end object; it is the construction of the relationship that allows one to see past himself and realize the power of com-

munication that exists in artistic endeavors and in the material of glass.

Through apprenticing, assisting, and gaffing I have been able to observe and participate in different manifestations of the glass process. In the processes of glass making, states of wonder about the material bubble up and inspire. By simply implementing another methodology to these processes we could discern that experimentation is taking place. Glassmaking has given me knowledge of the material's possibilities. By challenging and pushing tried and true ways of working, new conclusions and outcomes can come to the surface.

Chapter 2 - Experimentation as a means of making work

From my perspective, experimentation denotes a scientific approach. Typically experimentation implies a fact placed with a variable or unknown entity. Together this fact and variable yield a conclusion. This mode of learning and inquiry could be discerned as learning in a collaborative method where knowledge is exchanged. In a workshop, information has been described as being passed down from a maestro to an apprentice. In a lab, information is passed down from the lead researcher to the technicians.

The lead experimenter or researcher writes a hypothesis before carrying out the experimentation. A hypothesis is an educated guess in an if/then format: *if* this is implemented *then* this will happen. The basis for using a hypothesis is through previous knowledge of subject matter; in my case the subject matter is glass. Often the conclusion of the experiment yields something other or something new, something I did not hypothesize. However, through the retracing of facts and re-experimentation one can find a procedure that yields a consistent or desired outcome.

Science and art are rooted in a similar dialog with concern to development of an idea.

Robert Irwin, a California "light and space" artist, indicates this intersection between art and science:

Take a chemist, for example, he starts out with a hypothesis about what might be created if he combined a few chemicals, and he begins by simple trial and error... What the artist does is essentially the same. In other words, what you do when you start to do a painting is that you begin with a basic idea, a hypothesis of what you're setting out to do (a figurative painting or a nonfigurative painting or whatever)...It's just a million yes-no decisions...It's the same thing (*science and art*), the only difference is the character of the product.²⁸

The basis for experimentation is informed by tried and true methodologies that act as a foundation for a leaping off point, or in reference to Irwin, a product with character. Due to the collaborative and communicative nature of glass I am often called upon to demonstrate my approach/methodologies to the material. Demonstrations range from showcasing different properties of the material to various glass working techniques. In my trials of demonstration things don't always

²⁸ Lawrence Weschler, *seeing is forgetting the name of the thing one sees*, expanded edition (Berkeley: University of California Press, 2008) p.137

go as planned, mishaps occur, and I must adapt. These adaptations to the demonstration, whether showing properties, techniques or experimentations with the material, lead to this jumping off point. Demonstrations can inform a maker of a new inquiry with the material.

Experimentation through Demonstration



Fig 24 – with Eric Meek at Vitra

Demonstrations allow glassmakers to showcase their sense of materiality to a broader public or to their peers. Through these means one can explore techniques or properties that broaden the scope of the dialogue one wishes to have with the material and audience. By implementing ways of working that are unfamiliar or surprising, a new process or idea can be developed. Demonstrations are an excellent way to educate other makers in the tacit tradition of the material.

Through working in glass for a number of years I have been fortunate to do many demonstrations with different artists who I have assisted. A few years ago I did my first demonstration at The Museum of Glass in Tacoma, Washington. That experience made me think “What do I want outside observers to take away from a glass demonstration?” My audience could be anybody, some with knowledge of the material, but most without. The past few summers I have done demonstrations and gaffed for various artists and designers through Glasslab, at the Vitra Design Museum in Weil am Rhein Germany (fig 24) and at The Pilchuck Glass School in Stanwood Washington (fig. 25). In Corning, New York, I have also done demonstrations on glass properties for Apple Inc., Sony, and Nokia. These demonstrations influenced me in exploring glass outside the finished work that I produce.



fig 25 - with Bertil Vallien at Pilchuck

At RISD we have set aside time every Wednesday night to demonstrate or aid in the making of other students' work. The students are not just in the glass department and this makes for an exciting collaborative environment. The demonstrations we give the student body outside of the glass department are to provide them with an insight into the possibilities of the material. We call this time *Hot Nights*. Below are a few examples I use to demonstrate properties of the material. We call this time *Hot Nights*.²⁹



fig 26 - Glass as a conductor

Demonstration 1:

Glass can be a conductor of electricity; as a material it can be explosive, a ticking time bomb if not cooled or handled correctly. Showing these properties allows one to understand some of the materials' dynamic properties. By making two crude electrodes and plugging one end into a wall socket and attaching the other to light bulb one could concur we have an open circuit (fig. 26). When hot glass is introduced the circuit is completed and therefore the light bulb turns on. As the glass cools it loses the movement between electrons and therefore the light bulb slowly dims. Cold glass is not a conductor as there is no movement and can actually be considered an insulator.



fig 27 - Demonstration of Glass techniques to Nari Ward

²⁹ These demonstrations are not completely original. They have been replicated or borrowed from demonstrations from the Corning Museum of Glass, that I have helped with, and other demonstrations I have either participated in, seen or read about. These demonstrations are my take and are usually implemented to give a first time glass observer a different experience with the material, an experience other than showing production that yields a finished object.

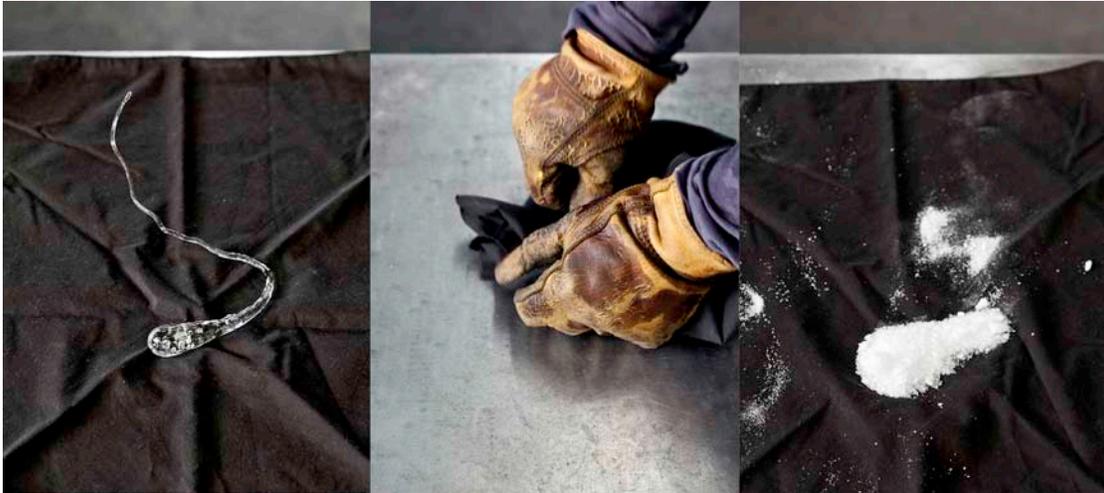


fig 28 - Prince Rupert Drop

Demonstration 2:

To understand this duality of glass one can show the material's strength and volatility to shock. When a gather from the furnace is taken and dropped into a bucket of water it leaves behind a Prince Rupert's drop (fig. 28), a drop of molten glass that has been super cooled due to the water. If a bubble is blown with some thickness, knocked off from the blow pipe and allowed to cool at room temperature, a Bologna bottle is produced (fig. 29). These two examples show glass as a material that is strong in compression and fragile in tension. If one uses a hammer and hits the surface of either the Prince Rupert's drop or the Bologna bottle nothing happens (compression). However, if one breaks the tail of the Rupert's drop or drops a sharp object into the interior of the Bologna bottle, a volatile explosion occurs. This is due to the tension being broken and released. Normally glass is annealed and this type of tension or stress is taken out during the annealing process.



fig 29 - Bologna Bottle

These are but a few of the demonstrations used in showing various properties of the material. Most demonstrations are used to allow the artist to showcase their idea or skill with the material. My concern for demonstration is in doing both, showing glass properties and the act of making glass objects.³⁰



fig 30 - 2300° at Corning Museum of Glass

In the fall of 2011, I was invited to Corning, New York to do the 2300 at the Corning Museum of Glass (fig. 30)³¹. 2300 is a time when the museum is opened to the public for free. In the museum a glassmaker is invited to make use of the hot shop and its crew while a musician plays in the auditorium. Monitors are placed throughout the museum so

that the public can enjoy the glass demonstration and the music while wandering through the museum. I decided to approach this demonstration as a brief synopsis of my last three years in graduate school. As I have explained earlier, glass has a historic tradition that entails a collaborative process that allows for experimentation and conceptual exploration to take place. The Corning stage for demonstrations also has a unique view.

³⁰ One could denote that glass demonstrations could be considered performance. Some artists would say that what I am doing is a performance. As a maker, I have to disagree. In undergrad during Physic, Chemistry or Biology demonstrations in the laboratory they were presented as demonstrations – examples of what we, the student, were going to follow and expand upon. It was a learning experience and one that we could further develop through research and trial and error. Some demonstrations with glass are indeed performative. For me the demonstration is either to show a property or how one comes to an end product. None of this is the right or only way, it is just the way I choose to negotiate the subject of demonstration as a maker.

³¹ During my 2300° I was assisted by Steve Gibbs, Catherine Harris, George Kennard, Eric Meek, and Lewis Olson.

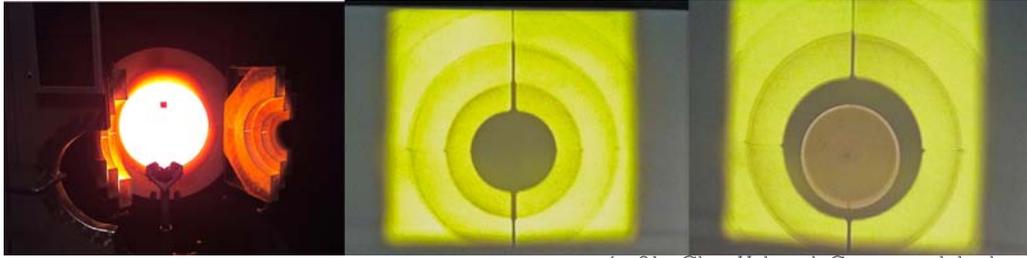


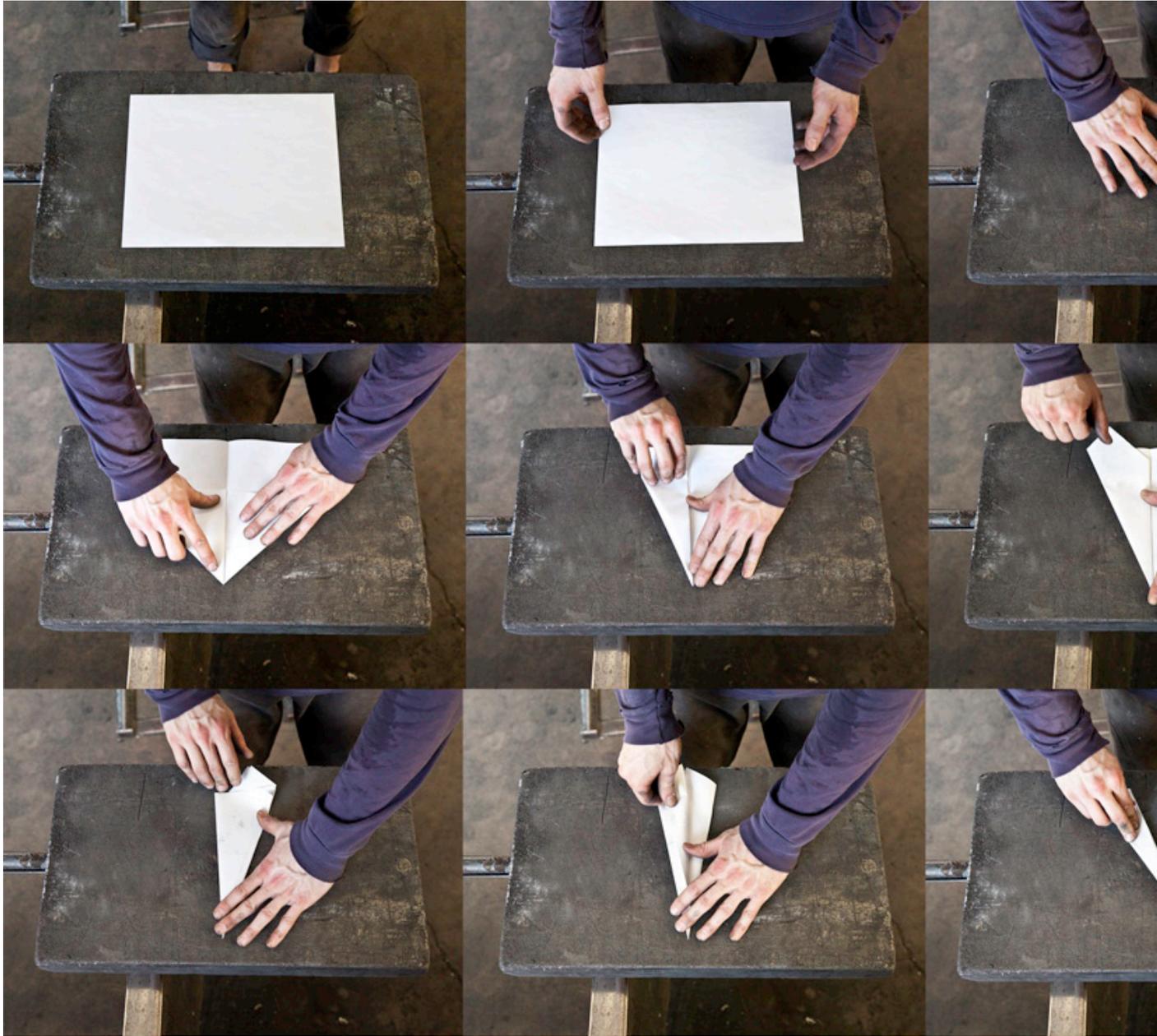
fig 31 - Glory Hole with Camera and display

Their glory hole or glass reheating chamber is equipped with a window and camera at the back (fig 31). This allows for a live feed of what is happening inside the glory hole to be depicted upon screens, thus giving both the glassmaker, and the public, a unique perspective to the process³². Implementing the camera as a tool, I devised a plan to demonstrate unseen or invisible happenings in the glass process. In working with batch, raw glass that is normally melted in a furnace, there are unique moments of transformation before it becomes the clear material we are accustomed to. The batch boils and bubbles up, but this is only observable as it is heated and usually seen just in the furnace. By placing the batch on a pastorelli plate, cooking it and then rolling it up on a bubble, one is allowed to see this bubbling-up occur through the use of the camera (fig 42).

Next I folded a glass airplane after folding a paper one (fig. 32 and 33). This was to demonstrate the transference of material and allowed the public to see the similarities to applied approaches. When folding a glass plane the folds are started with a torch and tools. The folds are finished in the glory hole. This occurs due to heat and gravity allowing for the part that I have folded to collapse upon itself, thereby completing the fold. I was able to better witness this through the camera, and the public could also see this for the first time.

Following the airplane I made a glass goblet and stuck that to a piece of pre-made sheet glass. The sheet glass was heated and rested on a piece of kiln shelf. Here I wanted to observe the slumping of a glass goblet.

³² The processes of how these objects are made will be explained more in depth in the experimentation section.



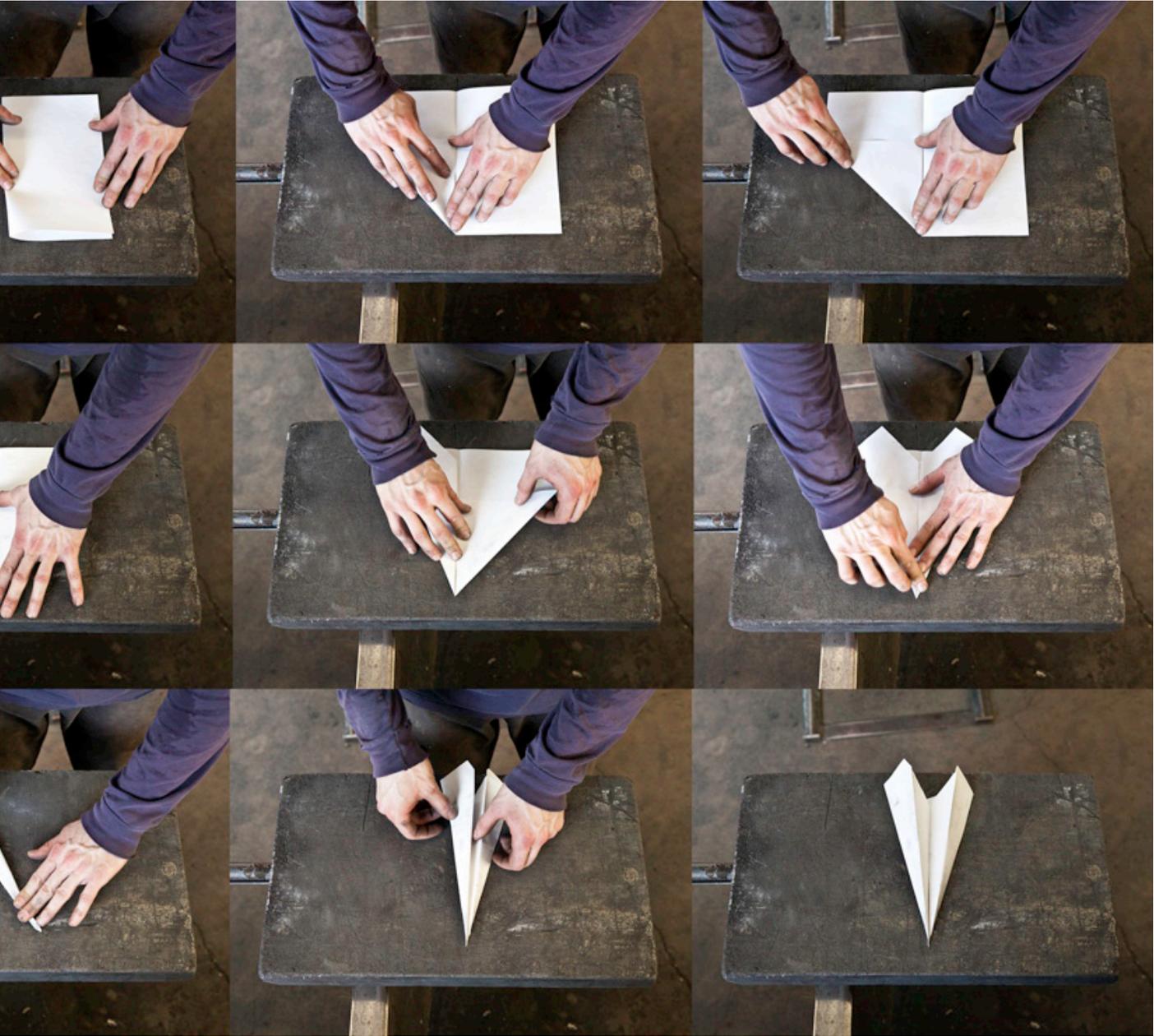
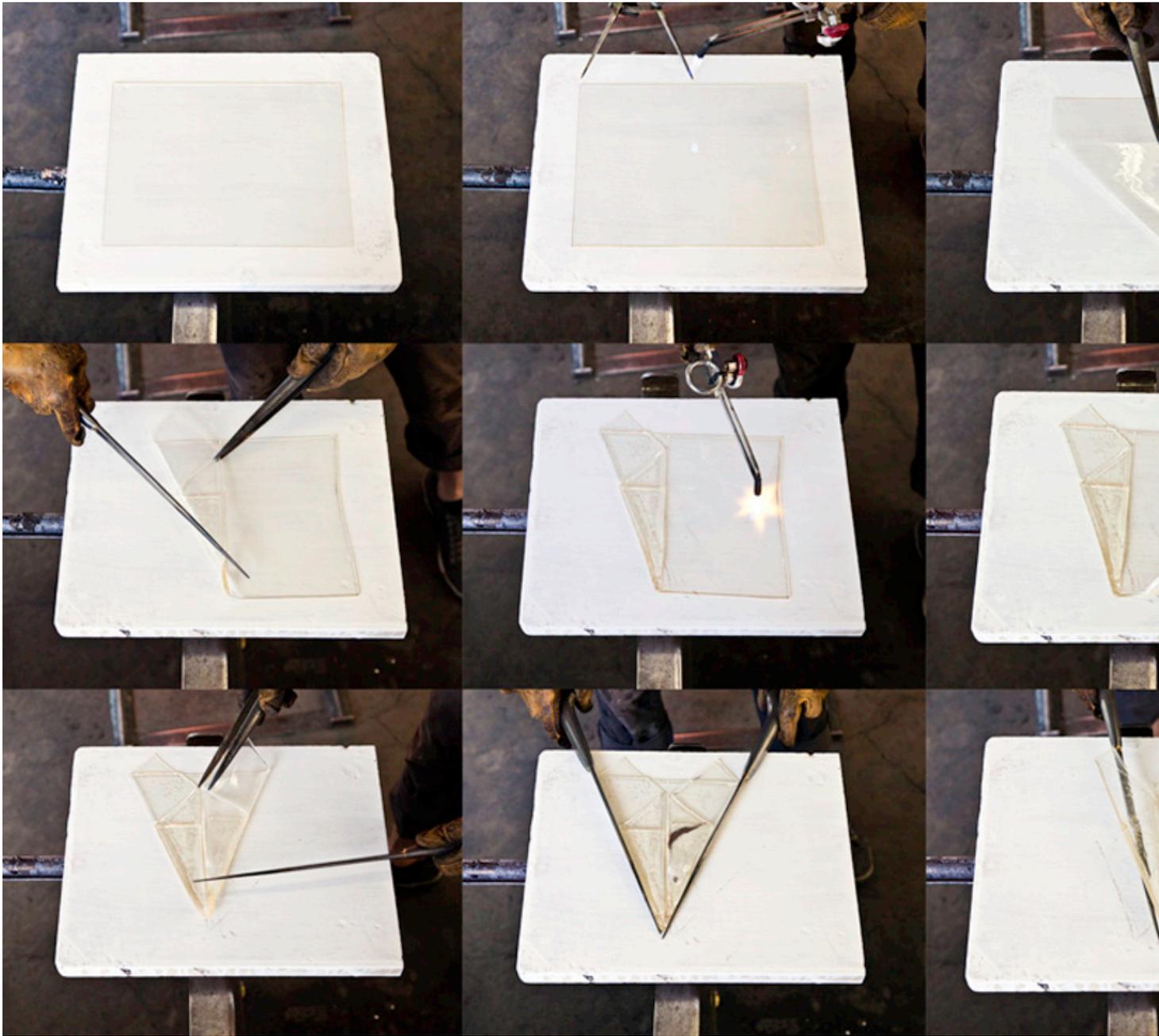


fig 32 - Folding Paper



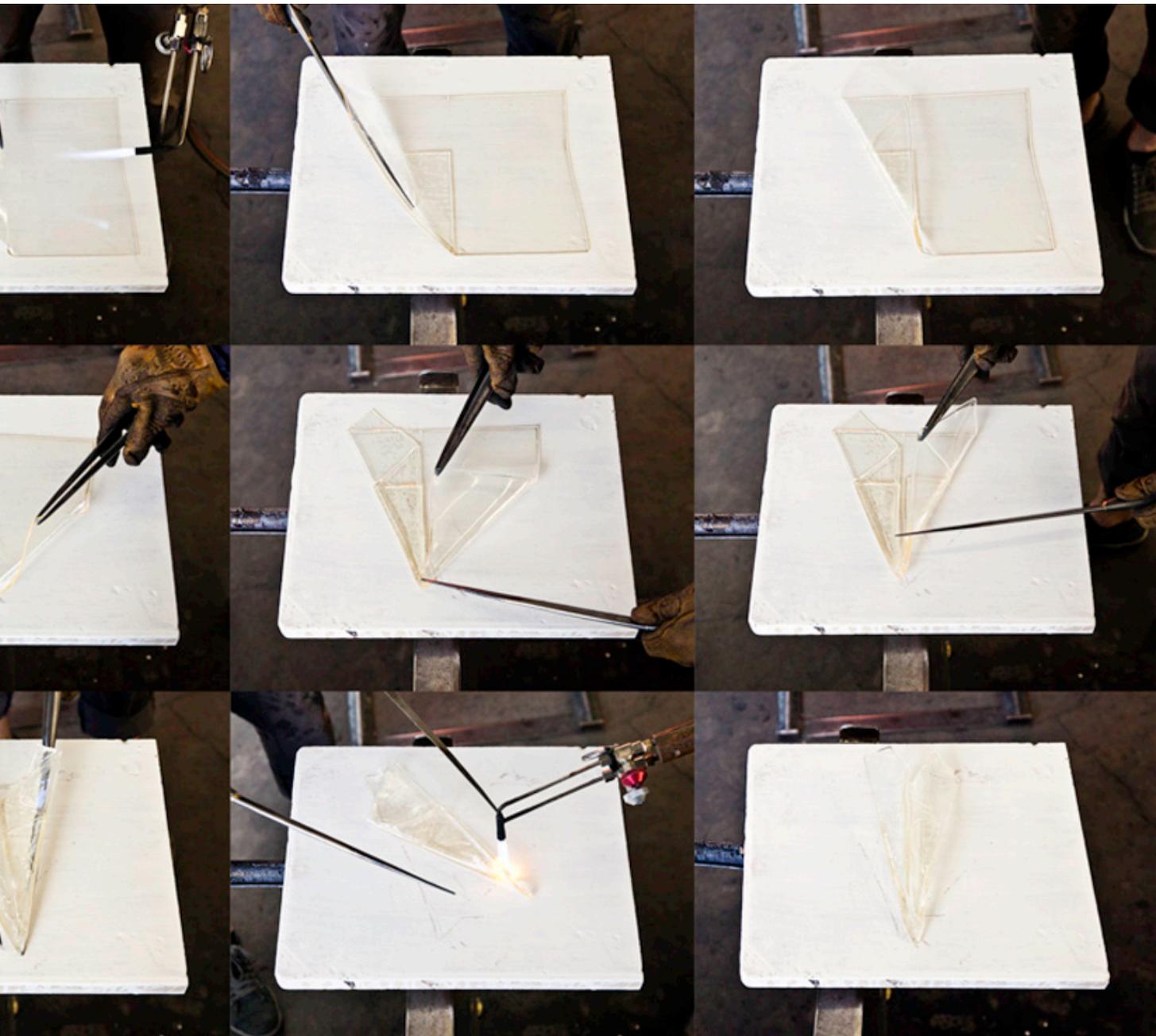


fig 33 – Folding Glass

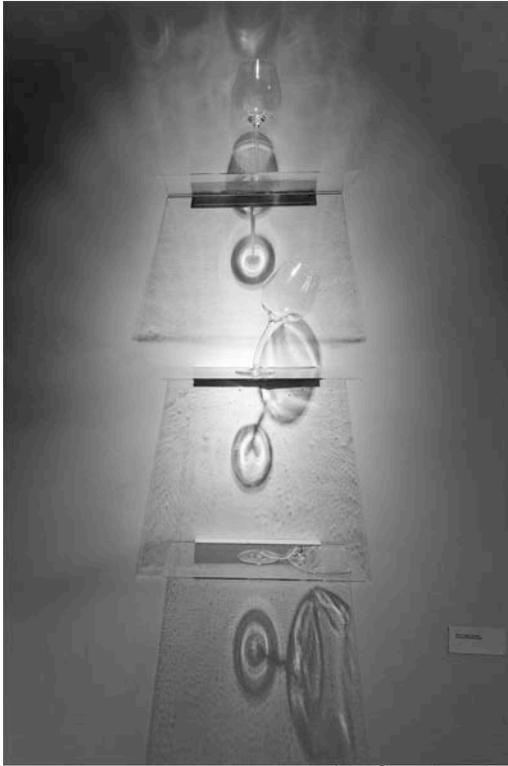


fig 34 - Cups slumping

Usually slumping is something one does in a kiln or a closed and (non)visible environment. Through the glory hole camera I was able to make this an experience that all could watch and also witness the movement of the material. The stem moves first as it is solid; it retains the most heat and therefore is more susceptible to moving than even the thinner bowl or cup on top. By observing this movement I was able to better understand the slumping process and even develop some pieces through my discovery (fig. 34).

My demonstration concluded by showing the rigidity and the fluidity of the material. In the work *Devices for Perception (in)finite* (fig. 35) a cone is blown and then manipulated into the shape of a horn. Once this curve is established the piece is plunged back into the furnace. The fresh/molten material contrast with the worked out and rigid horn shape. By blowing into the piece quickly, after the molten material is added, the cone stays true to its shape with exception to the newly added glass, which expands out and creates a bulbous addition. A small line marks the beginnings and end of this contrast. Here one is able to see the formal shaping and tooling of the material juxtaposed with the act of blowing out an untouched bubble. The end piece is a curious form that allows the two approaches to be married into a single object.



fig 35 - Devices for Perception (in)finity – 2010

By demonstrating what I make and applying it to the space at the Corning Museum of Glass, I was able to receive feedback from a public and my peers about my process and work. The hope though is not just about me receiving feedback, as much as it is about me conveying a different sense of materiality and approach to those in attendance. The demonstration allowed me to experiment with the way and scenario in which I work. This enabled me to understand how different aspects of my glass training have influenced me as a maker. Glass has a dual tradition; the studio/craft tradition and the machine/industrial tradition. My work and interests have involved looking at these two distinct yet intertwined paths.



fig 36 - Marcel Duchamp - To Have the Apprentice in the Sun - 1914

Experimentation as a way of connecting the industrial with the handmade.

There are a few different directions my work takes with concern to the notions of industrial and the handmade. My idea stems from this proposition/hypothesis:

If man created machines and now machines create the things man once made, then I can look at the ways in which machines make and implement a different approach to the material through my hands.

The greatest dilemma faced by the modern artisan-craftsman is the machine. Is it a friendly tool or an enemy replacing the work of the human hand?³³

As a maker I believe we can and must learn from these machines or industrial processes in order to acquire new ways of creating glass forms. Due to this influx of using machines in production versus using able bodies the workshops of the past began to fade away. Machines took over the skills and labor once obtained and preformed by man.

33 Richard Sennett, *The Craftsman* (New Haven : Yale University Press, 2008) p81

Marcel Duchamp's 1914 drawing *To Have the Apprentice in the Sun* (fig. 36), is a commentary on this machine versus man scenario. His idea comes from Alfred Jarry's story *Le Surmale* (The Supermale) from 1902. The story is described as 'a cynical tale concerning human survival in a world of machines.'³⁴

Richard Sennett's *The Craftsman* pin-points the place and time that glassmaking turned to machines and away from apprentices and the handmade.

French glassmakers learned how to make larger sheets of glass, at the Saint-Germain glass-works under the direction of Abraham Thévert, who in 1688 cast sheets in one piece eighty to eighty-four inches high and forty to forty-seven inches wide. This was, the historian Sabine Melchior-Bonnet remarks, "a size heard of previously only in fairy tales," though the glass itself remained in its medieval chemical formula.

He continues:

This machine procedure set a higher standard of a perfectly flat pane than the glassblower could ever achieve by working traditionally; the machine rollers made the glass absolutely, uniformly thick.

In this latter version, the machine sets the terms of quality, raising the game to a standard the human hand and eye cannot achieve.³⁵

Here we see the industrial age pushing away craft, the sense of man to make things singularly and by hand. Machines do not work in this manner. First they cannot adapt like man can and secondly machines can only form and do a task that has no emotion and no sense of style. However, by understanding the ways that machines produce, a new insight into making through the hand can be recognized. This new method can allow a glassmaker to go beyond the normal constraints of glassblowing and the mindless copying of a machine. In this transference of innovative methods for working glass, a new material sensibility can be achieved.

The first look at how industry has influenced my practice of experimentation would be with concern to the batch. Batch, defined previously, is the raw state of the material before it is introduced to the furnace and melted into workable/malleable glass. If we look at the recipe (figure 14) we will observe that some of these ingredients are readily available around town. Here at RISD the glass studio is above the ceramic facility; ceramic studios are excellent venues to forage for the raw ingredients that make up glass.

34 Ades, Cox and Hopkins Marcel Duchamp (London: Thames and Hudson, 1999) p116-117

35 Richard Sennett, *The Craftsman* (New Haven : Yale University Press, 2008) p 100

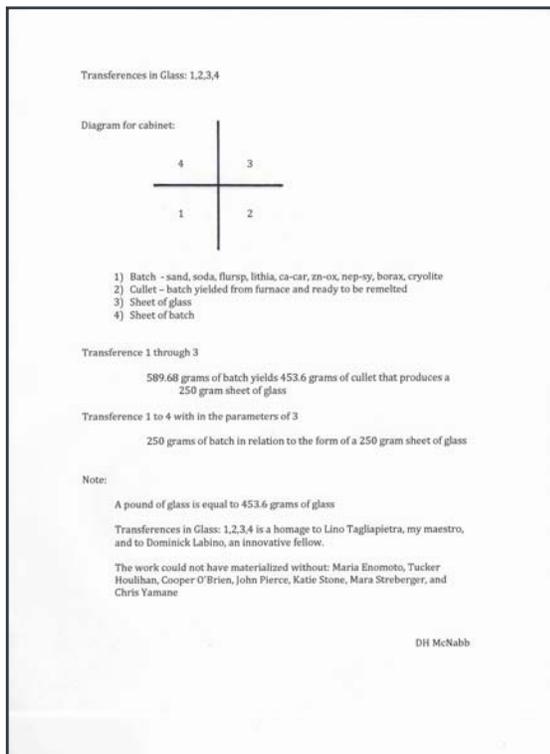


Fig 37 - Transferences in Glass 1,2,3,4

In learning the process of making and melting batch from Lino Tagliapietra it was not necessarily the finished product, the colored glass, that amazed me. Instead it was the bubbling and swirling around of the batch as it is cooked in the crucible that fascinated me. The frothiness simply reminds me of a good pour of beer, a sweet frothy head. In watching this and thinking that glass is a material that is able to be paused, in a state of stasis, I wondered what these pauses or stills look like. How can they inform me, the maker? Can I drop a conceptual undertone into my batch?

transference, *n.*

- a. The action or process of transferring; conveyance from one place, person, or thing to another; transfer.
- b. 1766 H. Brooke *Fool of Quality* II. viii. 29 The transferrance was not difficult.
- c. 1776 A. Smith *Inq. Wealth of Nations* II. v. ii. 467 The transference of stock or moveable property.
- d. 1791 T. Newte *Prospects & Observ. Tour* 127 In Argyleshire it became common to convey land, and make other transferences of property in writing.
- e. 1827 M. Faraday *Chem. Manip.* xv. 318 Moderately-sized funnels to assist in the transference of gas into vessels.
- f. 1839 *Morn. Herald* 13 June, A transference of power to the moneyed classes.
- g. 1875 J. Lubbock *Wild Flowers* i. 8 The transference of the pollen from one flower to another is effected principally either by the wind or by insects.³⁶



Fig 38 - Transferences in Glass 1,2,3,4

My first such attempt at this was in a piece called *Transferences in glass 1,2,3,4* (fig. 37 and 38) In thinking of pauses or stoppages one could come to Duchamp's *3 Standard Stoppages* (fig. 39). In *Transferences* I paused the process of melting, thereby receiving a gradient or measurement of the

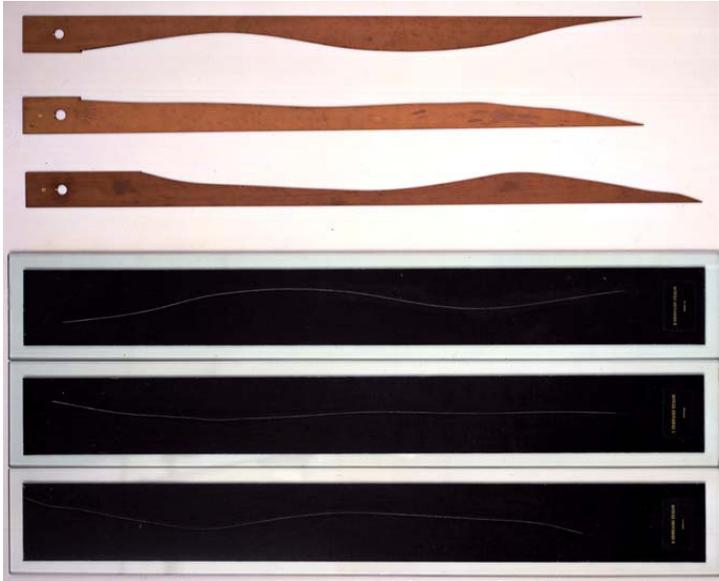


fig39 Marcel Duchamp – 3 Standard Stoppages, 1913 – 1914

in-between state of batch becoming glass. For *3 Standard Stoppages*: 'Duchamp took three one-meter lengths of strings and dropped them from a height of one-meter on to a canvas. He then stuck the threads down and thereby fixed the new lengths that chance, gravity and the whims' of the thread had created.'³⁷

In my case the string is the batch but instead of letting the string complete its journey I would like for it to remain in a state of stasis, to float. Duchamp continually asks the viewer to see the ambiguous problems that surround us. What is this unit of measurement and how does it, or can it change? *Transferences 1,2,3,4* asks similar questions. Where does this clear material come from and what do the states between batch and clear glass reveal? In regards to the sheet of partially cooked batch if you add heat for a longer period of time then we could conceivably get a small sheet of clear glass. Usually this stasis state of the material is not preserved for in a furnace the batch is cooked thoroughly to yield clear glass. Therefore I am not asking what we already know about glass, that it is clear – but instead how does this happen?

At RISD we have Spectrum 96 glass (fig. 39).³⁸ This glass comes as a readymade material or cullet that we simply place back into the furnace so that we have a clear glass to gather and use. The advantage of cullet is that it is healthier for students to charge and is less corrosive on the furnace than batch.³⁹ However, due to this cullet, there is a limited understanding of the evolution of the material in respect to the students. The cullet has already been melted once and therefore, some of the fluxes (such as soda) have been cooked out. This cook-

37 Ades, Cox and Hopkins Marcel Duchamp (London: Thames and Hudson, 1999) p79

38 For annealing chart of Spectrum 96 studio nuggets go to the appendix.

39 Charging is the process of filling the furnace with batch or cullet. The batch or cullet melts and becomes homogenous with the molten glass in the furnace and is then ready for use.

Studio Nugget Annealing Guidelines: 1/2"- 8" (12mm - 203mm)								
Annealing & Cooling								
Target Temps	Step 1		Step 2		Step 3		Step 4	
	960° F 515° C		775° F 413° C		600° F 316° C		100° F 38° C	
Maximum Thickness	Ramp Rate (per hour)	Hold (minutes)						
1/2" 12 mm	None	120	100° F 55° C	10	200° F 111° C	10	250° F 139° C	0
3/4" 19 mm	None	180	50° F 28° C	10	100° F 55° C	10	200° F 111° C	0
1" 25 mm	None	240	25° F 14° C	10	45° F 25° C	10	150° F 83° C	0
1.5" 38 mm	None	360	12° F 6.7° C	45	24° F 13° C	10	75° F 42° C	0
2" 51 mm	None	480	7° F 3.9° C	60	14° F 7.8° C	10	42° F 23° C	0
3" 76 mm	None	720	3° F 1.7° C	120	5.4° F 3.1° C	30	18° F 10° C	0
4" 102 mm	None	960	1.5° F 0.8° C	300	3° F 1.7° C	45	9° F 5° C	0
5" 127 mm	None	1200	1.2° F 0.7° C	375	2.4° F 1.3° C	60	7.2° F 4° C	0
6" 152 mm	None	1440	0.8° F 0.4° C	450	1.3° F 0.76° C	150	4.5° F 2.5° C	0
7" 178 mm	None	1680	0.6° F 0.3° C	525	1.0° F 0.58° C	225	3.4° F 1.9° C	0
8" 203 mm	None	1920	0.4° F 0.2° C	600	0.76° F 0.42° C	300	2.4° F 1.3° C	0

Technical Data	
Strain Point	890° F 477° C
Anneal Point	960° F 515° C
Softening Point	1260° F 682° C



fig 40 - Studio Nuggets

ing out of the fluxes make the glass slightly stiffer and gives it a higher viscosity or more resistance to flow. Cullet is not as forgiving to work as a batch based glass, nonetheless both are workable and essentially have their ups or downs.

In industry the glass is melted in furnaces that have a material capacity in the tons, while in the school or studio setting glass is melted in furnaces well under a 1000lbs. I wanted to see what a sheet of this semi-melted material can offer, what a very minute amount of batch could yield. By taking a plate of kiln shelf and baking kiln wash on it I began to spread my batch on to the plate, sifting and packing it in between pieces of metal on the plate. These pieces of metal are called



fig 41 - 11 x 8.5 blown sheet with single Studio Nugget

ferreti and are designed to hold/keep cane or small glass rods from rolling off the plate. By making thinner ferreti and placing them into a rectangle of 11" by 8.5" by a depth of .0625" I am essentially making a thin sheet that mimics the dimensions of a piece of paper. These dimensions also coincide with the measurements taken from the glass sheet I had previously made through blowing and slumping (fig 41 and 42).⁴⁰

40 See page 52 figure 55 for diagram of the Cylinder Method

Here there is transference in the materiality: paper to glass, batch to glass, cullet to glass. When thinking about paper and how we interact with it one could come to these actions: we draw on it, type on it, print on it, fold it, cut it and tear it to name a few – turns out you can do the same with glass.



fig 42 - Batch and Melted Sheet

In heating this thin sheet of batch on a kiln shelf I am able to pause the cooking process before it turns into the clear material to which we are accustomed. Here we can start to imagine the bonds in glass and the mystery that captured the alchemist of former years. It is my belief that in this stasis a new material sensibility is achieved. It is here that we can go back to Duchamp and his curiosity as to the definable length of a meter in *3 Standard Stoppages*. A new measurement is formed by chance, just as a new texture and material state is realized upon the kiln shelf. By placing this sheet of melted batch with its clear counterpart, a new structure is realized. The compatibility of material is pushed. Compatibility is the fit between two glasses. Essentially, do these glasses (two different states) stay together or crack and split apart?

The paper in our printers and copiers, is an industrial made material. It is something we constantly interact with, whether it is in a sketchbook, on a pad or in a printer. I have always been interested in its accessibility and the idea that certain paper sizes are a basic form of measurement. In thinking of the possibilities of paper being read as a standard measurement one could draw a parallel to Mel Bochner's works on paper. Here Bochner presents, "Sheets of graph paper gridded perspectively or isometrically, that is, a paper support with spatial given, offered an inherent enclosure as volume and dimension. Projecting into those spaces of paper led to the first hints of eventual measurement works."⁴¹

41 Mel Bochner: Number and Shape (Baltimore Maryland: The Baltimore Museum of Art, 1976) p12

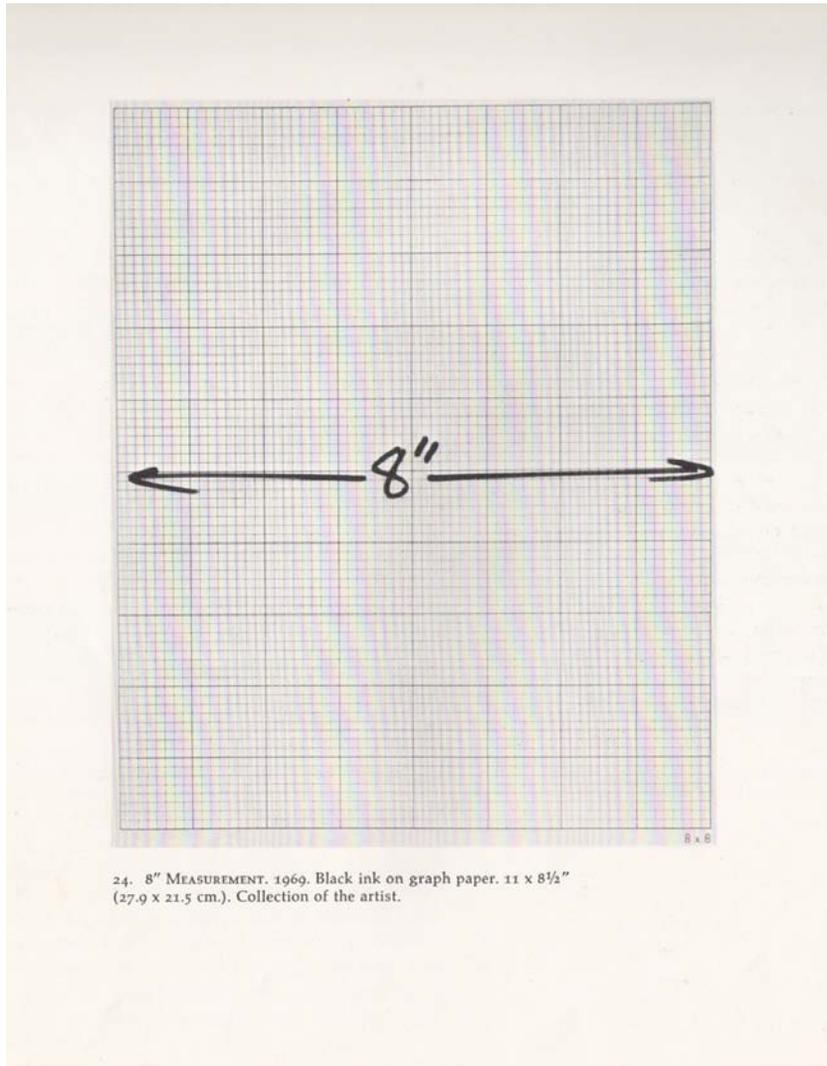


fig 43 - Mel Bochner - 8" Measurement, 1969

Paper is a readymade material where concepts can be explained. A simple shift from one of Bochner's works could simply be:

11" x 8.5" x .005".

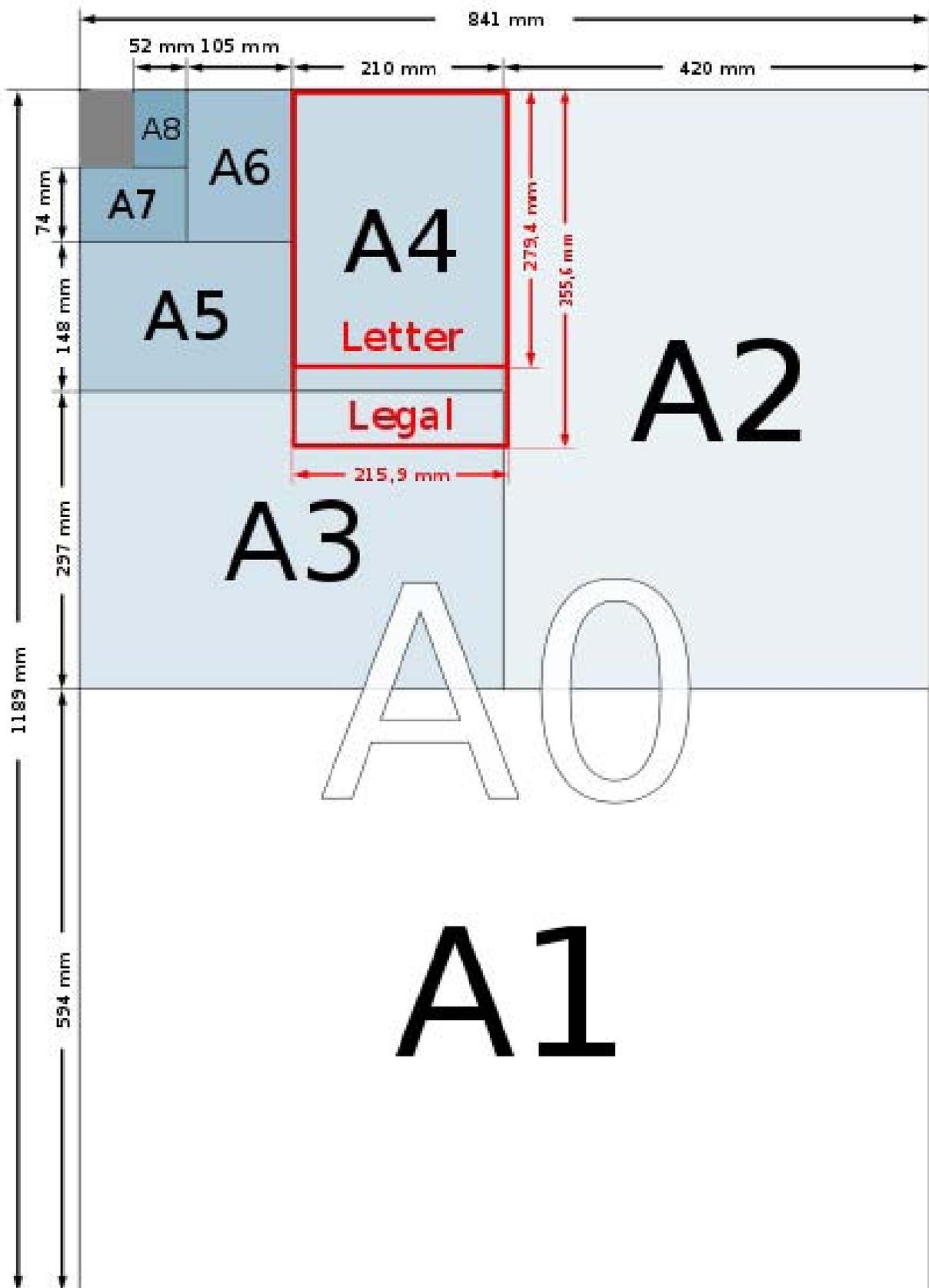


fig 44 - Paper Sizes - A4

When I am referring to paper it will be that of the A4 letter size with dimensions of 11" x 8.5" x .005". (One might notice that I also have the depth for a piece of paper, the simple explanation for this being that I work in and live in three dimensions).

As a child I folded paper into airplanes. This I learned from my father, a retired US Air Force Colonel. In *Portrait of Col. David R. McNabb USAF* (fig. 46) I was interested in the transferences

from one industrial material that is manipulated by hand, to a material and form that is handmade.

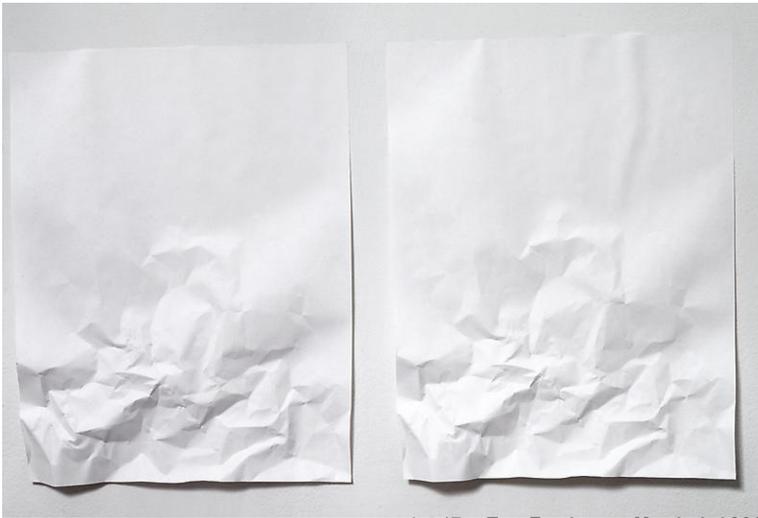


fig 47 - Tom Friedman - Untitled, 1990

Glass allows the underfolds to be seen. Glass retains the memory of these folds like the paper. However, the underfolds on the paper are masked by its opacity. In trying to replicate or copy an object a parallel can be drawn by looking at Tom

Friedman's *Untitled*, 1990, there's a wrinkled piece of white paper (fig. 47). Next to it is another white piece of wrinkled paper. The wrinkles of the paper, like the pieces of paper themselves, look the same but they aren't the same, they can't be.⁴² Friedman's work is a simple reproduction of itself, a clone. In thinking of a mirror and how it applies to the world, I decided to make another piece with this transference of paper to glass.

Here I used Bo Jackson's rookie cards from his two sports – baseball and football – and placed them in an infinity box, two mirrors placed so that they reflect back on themselves. In looking at the cards I wondered how the cards in the mirror seemed just as real but reversed. Could I make a reversed baseball card that when reflected in a mirror would become legible? In making the glass cards, I used an enamel printer that enables the design to be fired onto the glass. Once Bo Jackson's picture and information is fired on, it becomes a permanent fixture upon his new glass

42 Tom Friedman (New York: Phaidon, 2001) p75



fig 45 with Col. Dave at MacDill AFB Tampa, FL

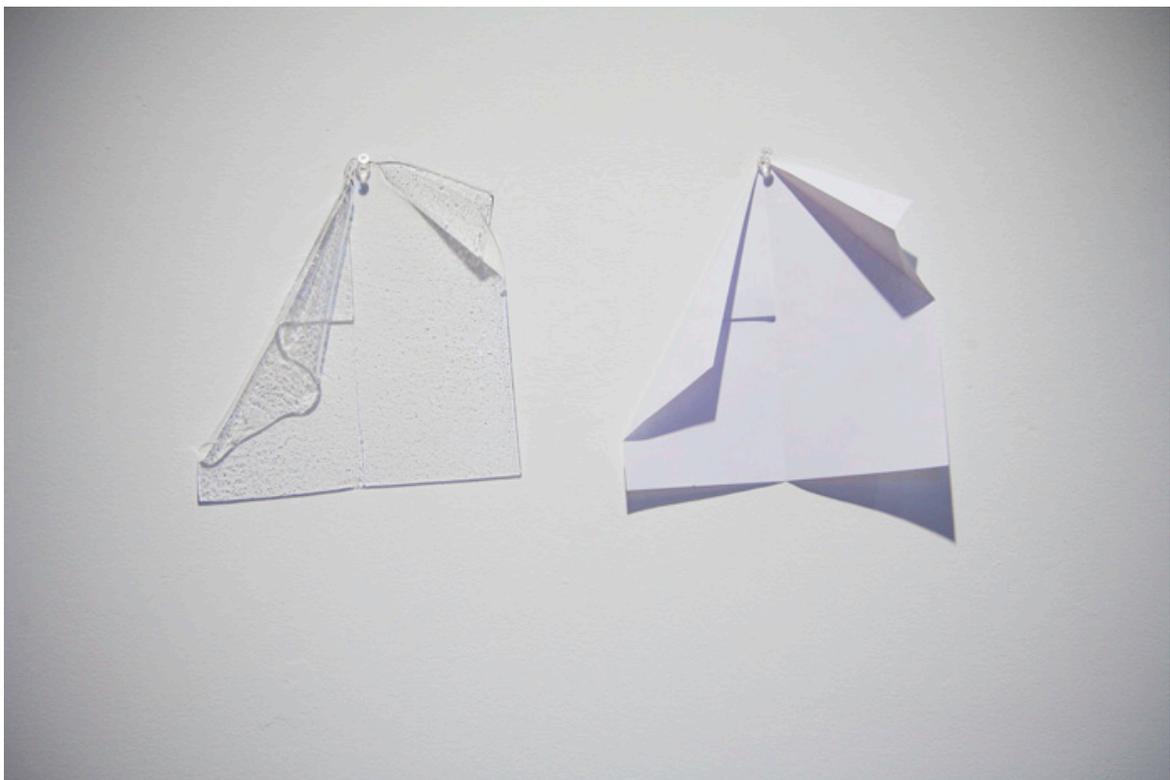


fig 46 - Portrait of Colonel David R. McNabb

rookie card. (fig. 48) Here a discrepancy exists between the real and virtual world or the tangible and intangible image presented in the mirrors.

The world in the mirror could be seen as a virtual world. Since the baseball card or any object in front of a



fig 48 - Bo Knows

mirror becomes reflected in the mirror one could conclude that the reflection is just an image. It is an image you cannot grasp; one that is presented on a flat mirrored plane and thus an intangible image. Through reversing the print on the glass baseball card and placing it in front of a mirror the reflected image becomes readable. The illusion becomes attainable.

The next time I dealt with this discrepancy of tangible and intangible image I decided to take away the mirror. This time I used a dollar bill. I wanted the dollar bill to look found, much as if someone places a dollar on a counter for a tip or if it drops from your pocket. I came to the conclusion to print dollar bills in reverse, the same way as the ball cards, and fold them opposite of their real counterparts, *For What it's Worth*. (fig. 49)

The world reflected in a mirror becomes a world of glass. This glass world could be considered virtual and absent of real physical boundaries. To further augment this notion the mirror is absent in *For What it's Worth*. However, it still is implied in the space that exists between the real dollar bill and its mirror counter part. This reproduction and cloning brought me to Jean Baudrillard's essay *Clone Story*, which also speaks of Walter Benjamin's essay *Art in the Age of Mechanical Reproduction*.



fig 49 - For what it's worth paper/ glass

The individual is destined to serial propagation. It is necessary to revisit what Walter Benjamin said of the work of art in the age of mechanical reproducibility. What is lost in the work that is serially reproduced, is its 'aura', its singular quality of the here and now, its aesthetic form ... What is lost is the original, which only a history itself nostalgic and retrospective can reconstitute as "authentic".⁴³

Friedman's *Untitled*, 1990, my *Portrait of Col. David R. McNabb USAF (RET)*, *Bo Knows Bo*, and *For What it's Worth* all incorporated this idea of duplicity and question the original. However, all are handmade works, in reality not perfect copies or perfect material transformations of one another. Therefore, the work's *aura* is still intact, as argued by Benjamin.

In further thinking of the *aura* and placing it into glassmaking we can see how manmade objects can shift or lose this sense of *aura*. Giacinto Di Pietrantonio's essay *The Craftsman and the Manufacturer* echoes Benjamin by looking at the process of handmade glass: 'The traditional method of working from a gob of melted glass into which the craftsman breathed his body and soul, making use of his great manual skill.'⁴⁴ As a result, blown glass and its traditional handmade methods yield an *aura*, thus yielding something different than machines. However, in looking at glass factories in Europe it is hard to discern the difference from man and machine.

This past summer I worked for the Corning Museum of Glass at Art Basel/Design Miami in Basel Switzerland, after which I was able to travel through Europe on a grant from RISD. One of my stops was in Kufstein Austria. Kufstein is the home of Riedel, known as the wine glass company. (fig.

49,50,51) At Riedel they make different shapes of wine glasses to coincide with the different types

43 Jean Baudrillard, *Simulacra and Simulation* (Ann Arbor: The University of Michigan Press, 2009) p99

44 Giacinto Di Pietrantonio, "The Craftsman and the Manufacturer" *Glasstress* (Milan: Evizioni Charts, 2009) p38

of wine. During the course of my journey and time in Europe I kept a journal. The entry after my visit to Riedel reads as below:

6/24

Men become like the machines that are replacing them:

There becomes a limit when using a mold, when using calipers, when a lip is not opened by the dexterity of the hand, when a piece is untooled.

In becoming like a machine man becomes singular, a linear perspective to material and to making.

A fluidity to production with concern to one thing, end product.

A machine is made with limitations, that of an end product, a man is not, however, a man may choose this.



fig 50 - Riedel factory entrance

of a glassmaker who looked similar to one we had just seen. In fact it was the same person. He had been doing the same job, making the Alto Vase, for over 40 years. He is considered a master



fig 51 - Riedel factory hot shop

This was not the first time I had witnessed glassmaking in a factory. This experience of watching men perform like machines, was similar to what I had seen in Finland at the Iittala factory. The Alva Alto (fig. 53) vase is produced there and the eeriness of my encounter did not happen until I was getting ready to leave. In a book about the factory I saw a picture from the early seventies. In it was a picture

glassmaker, his limits are to the mold, to the specificities of the end piece. A machine-like quality exists due to this glassmaker's specificity. In this situation a man turns the pipe and blows the first breath into the future vase. However, with mold automation and no finishing required, at least in the hot shop, the *aura* of this



fig 52 - Riedel products

handmade yet replicated object comes into question. Here man could be considered as being entirely taken out of the equation, the breath from a pneumatic blower, the turning from a series of gears and pistons. This scenario could bring us back to Marcel Duchamp's drawing (fig) *To Have the Apprentice in the Sun*. Machines are taking away or trying to mimic the handmade; however, in this transference the object loses its *aura*. In no place is this greater represented than in the glass processes used to make sheet glass.

Sheet or flat glass was originally produced through two processes of glassblowing. These processes are named the crown (fig. 54) and the cylinder method (fig. 55). However, now due to the demand and size required for sheet glass, man has become obsolete as machines can achieve a scale and precision man is unable to. Our ingenuity produced machines that we must care for, nonetheless a machine that takes away the handmade origins of the products we need.

In the work *(in)finity in a bag of chips*(fig. 56,57) and the glass goblets (fig. 58) I produce we could also find these attempts at presenting the nuances and subtleties between machine and handmade processes. The following text accompanied the work *(in)finity in a bag of chips*:

In the small exists the grandiose. A chip bag contains a reflective surface that allows the contents of the bag to stay fresher longer. In the 50's Mylar was seen as an excellent material for this purpose. In the act of looking into one such bag when all contents have been emptied or consumed, one sees a metallic interior. This reflective surface, reflecting itself, denotes the idea of a hall of mirrors or infinity. This new empty infinite space can be filleted open, thus becoming a pseudo mirror. A product with this reflective quality can mimic glass when mirrored. Glass, an amorphous solid, can be made into a flat sheet or plane. This plane can be folded, thus mimicking the act of folding and seaming together of a Mylar sheet to make the all-familiar chip bag.



fig 53 - Alva Alto Vase

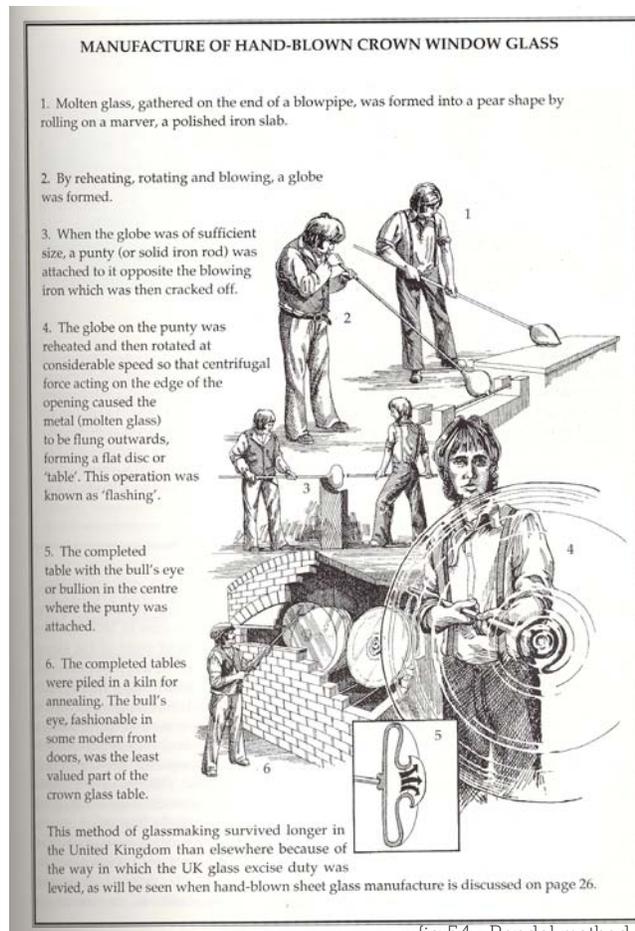


fig 54 - Rondel method

The chip bag is a material and industrial translation where as the goblet is just an industrial one. Below is an excerpt from a text concerning my utilitarian interest, the glasses and my current pursuit:

The objects we hold by hand used to be made by hand. Now the hand of the maker is replaced by the components of the machine. Go back to the last time you spent some good coin at a restaurant. All ingredients were prepared by hand not processed by a machine. A meal is meticulously placed together and arranged by a chef. However, the objects of containment are made from machines. The plate you eat off of to the glass you drink from fit into this mold. ⁴⁵

Through taking a flat sheet of glass and laying it on a pastorelli plate/kiln shelf I am able to heat it in the hotshop and pick it up on a blow pipe. Once this is done I can seam it together similar to how a Mylar chip bag is joined. When the glass is sealed together it can be inflated and given more volume. In this volume exists space, once mirrored it becomes (in)finite.⁴⁵

In making these spaces that show (in)finity I attempted to make a small utilitarian reference, the chip bag and then the glass goblet.

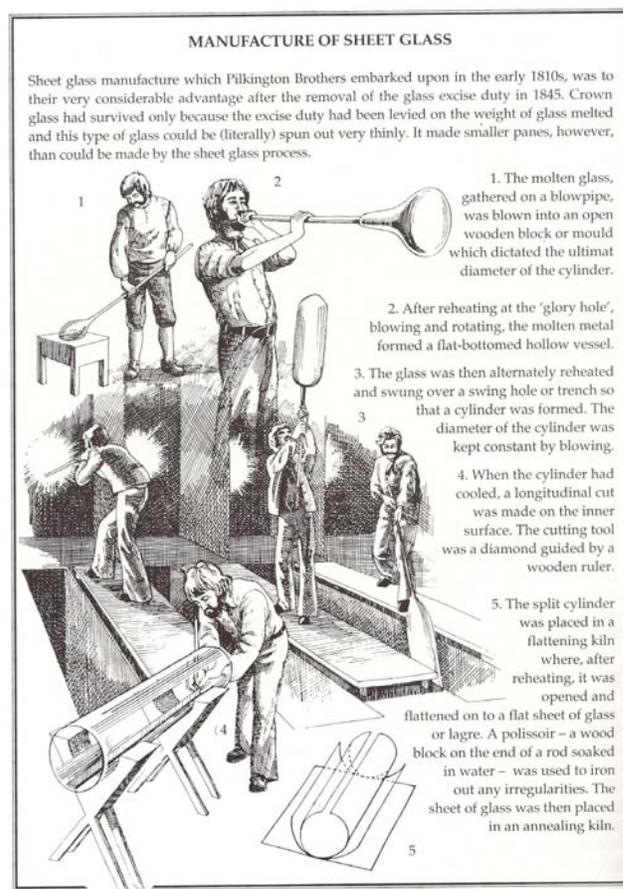


fig 55 - Cylinder Method

⁴⁵ Often when using the words infinite or infinity one will find that my version appears as (in)finite or (in)finity. This is due to the fact that these places that I am trying to show as infinite are actually definable small (model like) spaces. Therefore they are a facsimile or a pause of the infinite henceforth I show it as (in)finite or (in)finity.

⁴⁶ Text from Notes and Words: (un)utilitarian glass: The fate of the utilitarian – full text in appendix



fig 56 (In)finity in a Bag of Chips



fig 57 (In)finity in a Bag of Chips (detail)

By making the same style of cup over and over again I am forcing a machine like quality upon myself. I am becoming machine. Here the practice of making cups is as much a test of muscle memory



fig 58 Martini Glasses Full and Empty

as it is patience. A machine could be described as all-patient and having ultimate precision for the given task therefore having a far superior muscle memory. My cups are off, imperfect. They, as with the machine made glasses, are comprised of a bowl, a stem and a foot. There are numerous variances in mine: volume of the cup, length of the stem and width of the foot. Really I make a poor machine but in doing this practice of replication and repetition I get a different sense of flow. The cups after a few hours start becoming similar. The transference between my eyes, my brain and my hands sharpen, the variation narrows. Through this flow it doesn't necessarily become about the end cup but the meditation of making. Lino once told Dante and Dante told me that making cups is like playing musical scales but really allows one to make anything. It becomes about understanding proportion, parts and spatial awareness.

The biggest differences between machine and man with concern to glassmaking are man's spatial awareness during the act of making and man's ability to understand where one's end product can land. A machine can only perceive or relate to what it has been programmed for, a man can adapt. The objects made from looking at these transferences of man and machine are not necessarily new but they are different. Whether it is the breath that places my body and soul into the object or its uniqueness from the others, an *aura* is present. In this *aura* it is my hope that

other forms and discoveries between the industrial and handmade can be found and pushed.

The works of Duchamp, Bochner and Friedman all had this interplay with machines. Duchamp was pointing out the rigidness of a world led by machines. We can observe this in many of his works but for me the focus is through his drawing from *Le Surmale* and again in his work *3 Standard Stoppages*. A similar story exists with Bochner, by showing a piece of paper as a definable unit of measurement it was an artist, a man, who was adapting and showing these nuances to this changing world. With Friedman a man was attempting to copy a piece of copy paper. By adapting, man will always be a step ahead of machines. In respect to glass none of these links between these two different ways of making, machine and man, could be present if it hadn't been for the pursuit and understanding of traditional glassblowing techniques.

Experimentation/Reinterpretation of Traditional Glass Working Techniques

Along with my brethren I marvel at the glass techniques of culturally enriched systems of glassmaking present in Bohemia, Scandinavia and Venetia. Over the years I have been fortunate to travel to and work in these glass cultures. A departure point is often taken from these historic traditions that allows for something new to be discovered. A new discovery can happen through taking an old (traditional) technique and adapting it to a new modern day context. Sometimes it is simply experimenting with these techniques that allows for a new discovery.

The first example of this way of working that I encountered was through Lino Tagliapietra. In Murano there was a constant pursuit at figuring out the next innovative technique or design to set your mark as a glassmaker and bring further prestige to your factory.

In 1938 Paolo Venini, owner and founder of Venini glass Murano, invited a young Swedish designer, Tyra Lundgren to his factory to work.⁴⁷ Her *Leaf* design started a dialogue between Italian and Scandinavian glass that is still prevalent today (fig. 59) Lino's brother-in-law, Checco Ongaro, worked at Venini and introduced Lino to the technique in the 1960s. In 1996 at Pilchuck Glass School in Stanwood, Washington, Lino reinterpreted the technique. His reinterpretation is

47Anna Venini Diaz De Santillana, *Venini Glass: 1921 – 1986* (Milano: Skira editore, 2000) p 308



fig 59 - Tyra Lundgren, Leaf, 1938

The *Leaf* sat in Lino's mind for almost thirty years before becoming something other, something different. Having accessibility to people such as Lino has enabled me to see this progression of technique and help me pursue my own adaptations.

called the Pilchuck 96 technique. It can be viewed in numerous of his works such as the *Dinosaur* series (fig. 60)

The *Leaf* is started through the picking up of glass canes, from a pastorelli plate, onto a bubble. Once the canes are rolled up they are twisted with a central spine being made by dragging tweezers through the material. After the cane is twisted and the spine of the leaf is marked, the glassmaker grabs one end of the bubble, lifts the pipe end up and lets the bubble sag spine-end down. This makes a stomach-like shape

and was inspiration for Lino's *Batman* series (fig. 61). The piece is then exchanged from a blowpipe to a pontil rod, trimmed in such a way as to leave the stem of the leaf and spun open. In Lino's *Pilchuck 96* he does not twist the cane and after transferring the bubble to a pontil he trims it as a normal cup. At this point he attaches a larger blowpipe on to the opened bubble (cup) and makes a piece with the technique *Dinosaur*.



fig 60 - Lino Tagliapietra, Dinosaur, 1998



fig 61 - Lino Tagliapietra, Batman, 2001



fig 62 - Dante Marioni – Reticello Pair, 2009

Reticello is a glass technique inspired by the nets and lace that surround the Venetian culture. I learned the technique through assisting Dante Marioni (fig. 62) and Janusz Pozniak (fig. 63,64), and they learned the technique from Lino. To begin glass canes are picked up on a collar of a blowpipe. The canes are then twisted and a cup with a small hole in the bottom is made. On a new pipe the same amount of cane is picked up and twisted the opposite direction from the first. This new bubble is then stuffed into its predecessor making a grid like pattern. If you imagine a cane as a single finger and a pick up as the rest of the fingers on your hand, you can demonstrate the technique quite easily. If you place your fingers from your right hand over the ones of your left so that they crisscross you will notice that there are gaps or space in between

this crossing. If they (your fingers) were glass, heated and inflated this space would become smaller and contract hence the tiny bubbles in the pattern.



fig 63 - Janusz Pozniak – Sanctuary, 2009

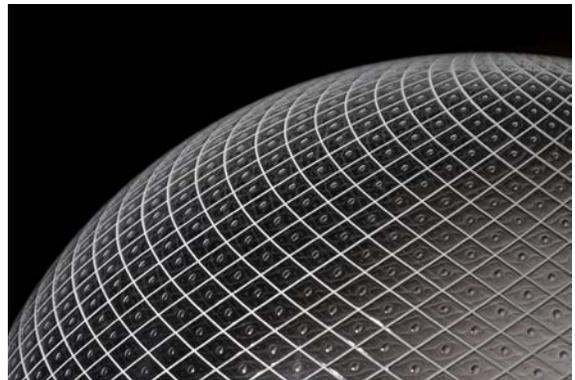
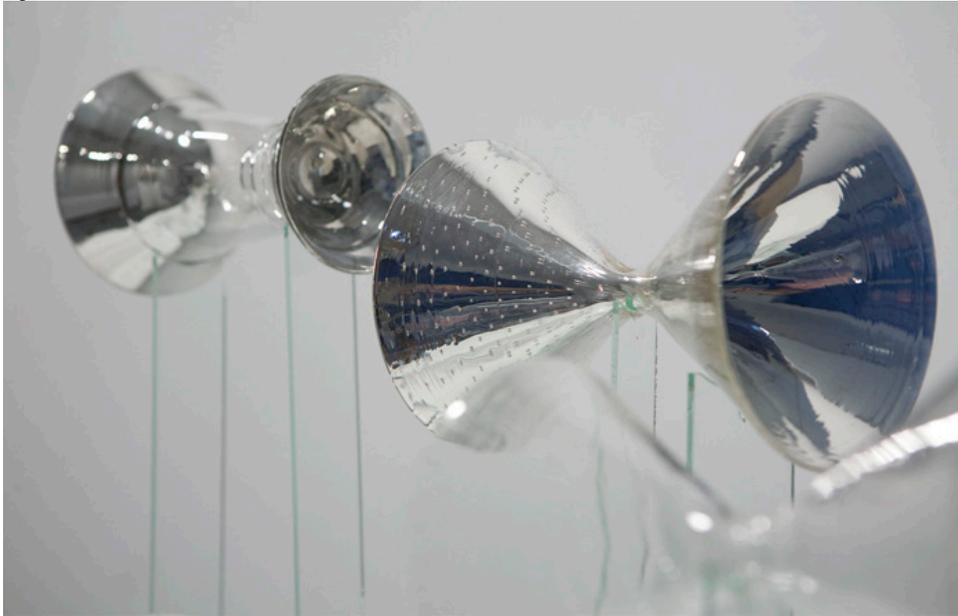


fig 64 - Janusz Pozniak – Sanctuary, 2009

fig 65 - (in)finite models



My works *(In)finite Models*, *Wings*, *Cabinet for Spatial Recognition* and *2 Studies of Compression* are all made with the use of reticello. For *(In)finite Models* (fig. 65) I was exploring wormholes and other spatial entities that are seen as theoretical. Wormholes are typically drawn out on a graph-like structure and essentially represented by a series of plotted points (fig. 66). Instead of using the traditional white or black cane seen in reticello I used clear or crystal cane and then mirrored the end piece. By making the pieces clear I am able to draw attention to the bubbles. Through mirroring the pieces I make the bubbles their own micro atmospheres that contain the reflection of the viewer such as in *(In)finite Models* and *Cabinet for Spatial Recognition* (fig. 67). For *Wings* (fig. 68) I had a slightly different approach. Here I stuffed blown crystal cups with our

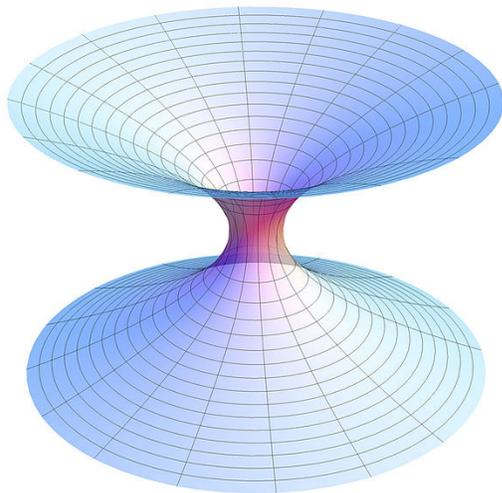


fig 66 - Wormhole diagram

Spectrum studio glass and then pulled this into canes. The pattern in reticello when casing it with crystal changes the visual orientation of the bubbles. The bubbles are no longer the focal point as they intersect where the lines from the different canes intertwine. Thus the space in between the squares is left clear and acts as a distortional lens when mirrored. In canceling out the individual bubble I decided to draw it into focus with the piece *2 Studies of Compression* (fig. 69a,b,c).



fig 67 - Cabinet for Spacial Recognition

In *2 Studies of Compression* the viewer encounters a balloon squeezed between a gallery wall and a window juxtaposed with a pair of small calipers measuring an indiscernible bubble. (fig. 69c). If reticello could be considered two cups being placed together, one inflated into another, compression could be a term used to describe the pressing of these two layers. By making a cylinder out of the pattern, cutting it open and slumping it into a flat sheet I am left with a sheet of bubbles. One such sheet that has been mirrored can be seen in *Cabinet for Spatial Recognition* (fig. 67). Through cutting out a single bubble and plac-

ing calipers around it I was trying to measure an indiscernible space, much as the balloon takes up an indiscernible space in the gallery. The bubble from the reticello finds itself in its present circumstances



fig 68 - Just the Three of Us: Wings



61 fig 69 a - *2 Studies of Compression*

trapped between two sheets much as the balloon is compressed between a gallery wall and window. The work, my process, is fueled by my exploration of the material and experiments that are rooted in demonstration, industrial glass and handmade glass.

fig 69b - 2 *Studies of Compression* –
showing compression of balloon
between gallery wall and window



fig 69c - 2 *Studies of Compression* – Calipers with single reticello bubble

In negotiating my way through life with a material as a guide, discoveries abound. From my working with a Venetian maestro to participating in demonstrations that illustrate properties of the material, an infinite progression resonates.

Glass is a material that acts as a catalyst for the interactions that take place in our daily lives. By experimenting with and demonstrating glass to a larger public, new innovative ways of using and understanding the material are possible. Conceptually experimentation is about using the material in a broad spectrum, from identifying elements on a periodic table to showcasing the making of objects at the human scale. This is but part of the way I define my practice in glass.

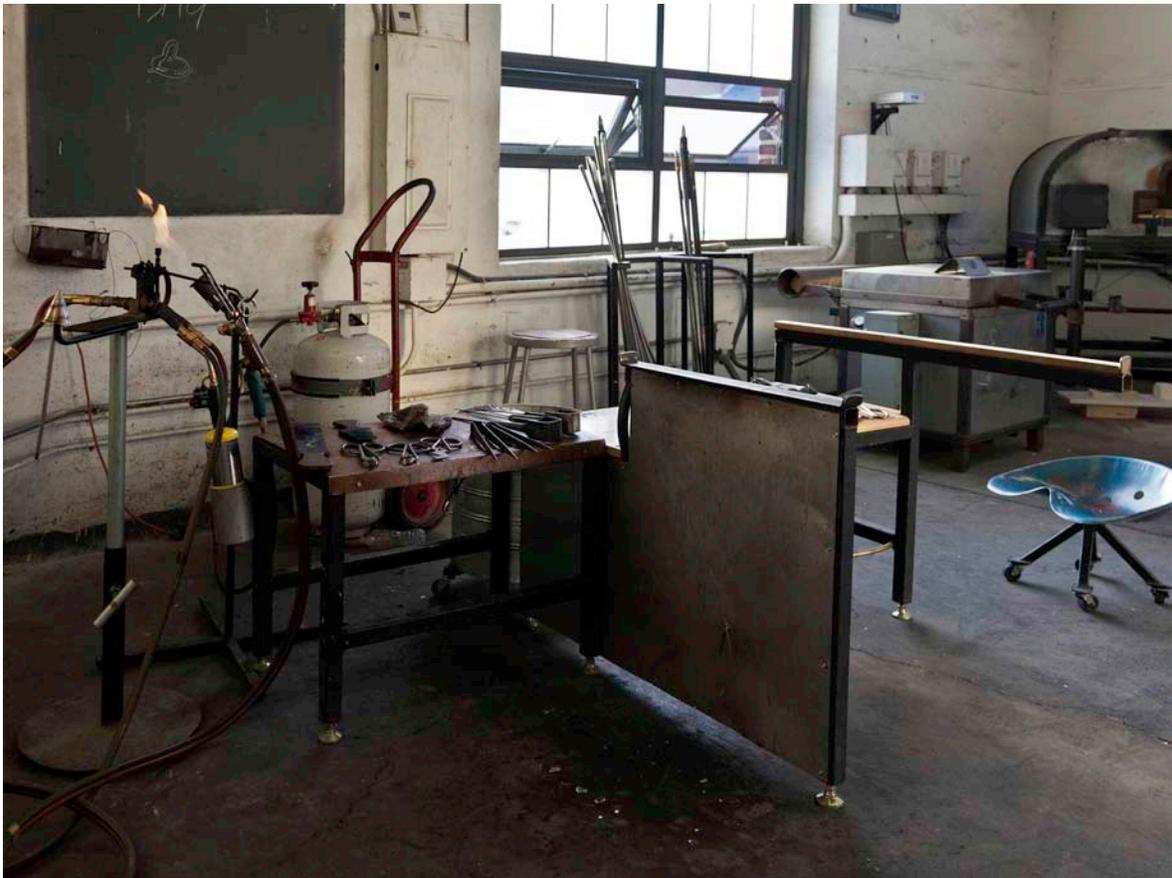


fig 70 – Glass Tools and bench

Chapter 3: Production Lab



fig 71 – sign above studio

Production Lab is the place where I conceptualize the work I produce; it is my studio space. My studio practice consists of adapting and meshing my conceptual notions with the material. Here there is a synthesis between the *Glass Age* and my work.

I attach myself to things. I am a producer of things; however, I am not attached to the things I produce. I am attached to the making. An idea comes as a challenge or a reinterpretation of what is already present, a riffing of sorts. Expressing the materiality of the work conceptually and tangibly is at the forefront of my studio practice. Glass is a material that we are bound to and is essential to our everyday living and survival. In creating glass things a division exists between stating that *I am an artist* or *I am a designer*.

I negotiate this by saying that I am a maker. In my time spent working as a gaffer for artists or designers, I decided that I needed to find a more common ground for my own making. This common ground or play into duality focuses upon a term I came across from the late designer Tobias Wong:

para-con-cep' tu-al 2002 adj

Of, relating to, or being partially conceptual.
(no longer having to be just purely that)⁴⁸

Wong treats design as a medium rather than a discipline to show how it embraces the aesthetics traditionally relegated to the fine arts. He's coined the term "paraconceptual" to describe his dismantling of the hierarchies between "art" and "design." In Wong's hands, both have similar goals.⁴⁹

These goals are communicative and here it is about the transfer of ideas. Whether a viewer is able to take home the designed object or sculptural object tangibly or not is of little

48 "Paraconceptual", <http://www.brokenoff.com/paraconceptual.html>, accessed 12/04/11

49 "Tobias", <http://www.brokenoff.com/tobias.html>, accessed 12/04/11



fig 72 - Tobias Wong – *Alto Door Stop*, 2003

ity. These pieces evoke memories for me. *Alto Door Stop* reminds me of the Alto Vase I have on my kitchen table and the time spent in the factory in which the vase was produced. *Money pad* recalls any of the numerous iterations one has come across concerning the dollar bill. These pieces provide an accessibility. This accessibility comes through the experiencing and remembering of the objects. Can I make objects that evoke this and are readily accessible?

difference. For me the taking home comes in the form of the viewers' experience with the object. The hope is that a common thread between what I made and the viewer's experience can evoke a memory later on.

Tobias' works *Alto Door Stop* (2003) (fig. 72), concrete cast into an Alvar Alto vase (fig. 53) , and *Money Pad* (2000)(fig. 73), a stack of 100 single dollar bills turned into a stack of Post-its™ exhibit this dual-



fig 73 - Tobias Wong – *Money Pad*, 2000

The work in a studio practice

The challenge in making lies in the transference between my eyes, my brain and my hands. I am simply limited to what I can do. The endeavors in the studio are to broaden this by challenging my limitations as a maker and a thinker. As a maker I play into the natural beauty of glass. The things I make become my voice, yet how does the world interpret these things?

I first interpret the things I make through tools held by my hands.





Calluses from turning and stopping on the Left



Calluses from turning, stopping and tooling on the Right



I touch a tool to feel a material...

With this notion of hand comes the notion of seeing through the hand. There are many makers who readily acknowledge this. Tapio Wirkkala, the Finnish designer, is the paradigm for thinking through the hand. He notes:

Making things with my hands means a lot to me. I could even say that when I sculpt or mold nature's materials it has an almost therapeutic effect. They inspire me and lead me on to new experiments. They transport me into another world. A world in which, if eyesight fails, my fingertips see the movement and the continuous emergence of geometrical forms.⁵⁰

My hands fidget when not readily working, searching out for what to go to, searching for a material to hold. The material gives the hand of the maker a suggestion of its future intent. Glass, being my focus, is a material with a memory of its own production and a material that follows its own laws. Wirkkala suggests, "I have the feeling that materials try something according to their own laws and the artist's task is to direct its movement towards the end."⁵¹ The tools in my hand are there to suggest this movement, there to help it flow into its end.

This idea of thinking with ones' hand can be described further by Martin Heidegger in *What Calls for Thinking?*

*Perhaps thinking, too, is just something like building a cabinet. At any rate, it is a craft, a 'handicraft,' and therefore has a special relationship to the hand. (...) But the hand's essence can never be determined, or explained, by its being an organ which can grasp. (...) But the craft of the hand is richer than we commonly imagine. (...) Every motion of the hand in every one of its works carries itself through the element of thinking, every bearing of the hand bears itself in that element. All work of the hand is rooted in thinking.*⁵²

If my hand is indeed an instrument of thinking then it could be considered as an instrument that seeks. My hands have a desire to make, I have a desire to make. In this there exists a quest to understand the beginnings. How did I become a maker?

50 Tapio Wirkkala, *eye, hand and thought* (Helsinki: Werner Soderstrom Osakeyhtio, 2002) p. 21

51 *ibid*, p. 17

52 As quoted in, Steven Hall, Juhani Pallasmaa and Alberto Perez – Gomez, *Questions of Perception Phenomenology of Architecture* (San Francisco: William K Stout Pub, 2006) p 28

Learning could be divided into two categories, nature and nurture. Our nature and nurture get us through the past, brings us to the present and pushes us into the future. In thinking about how I got myself into these present circumstances of being a maker in graduate school, I set on a quest of handmaking a globe to signify my existence. Do we only know what we see? Can we only understand what we are taught? My



fig 74 a - *Where I've been is where I'm at* - with airline safety cards

piece *Where I've been*, is *Where I'm at* (fig. 74 a,b) presents a 13" diameter glass sphere representing the globe. Inside the sphere there is a smaller mirrored sphere. Both spheres are fitted to a metal rod suggesting the earth's axis tilt. A metal armature on top of a turned wood stand supports the rod connecting the two spheres. The metal, wood and glass are all made by hand.

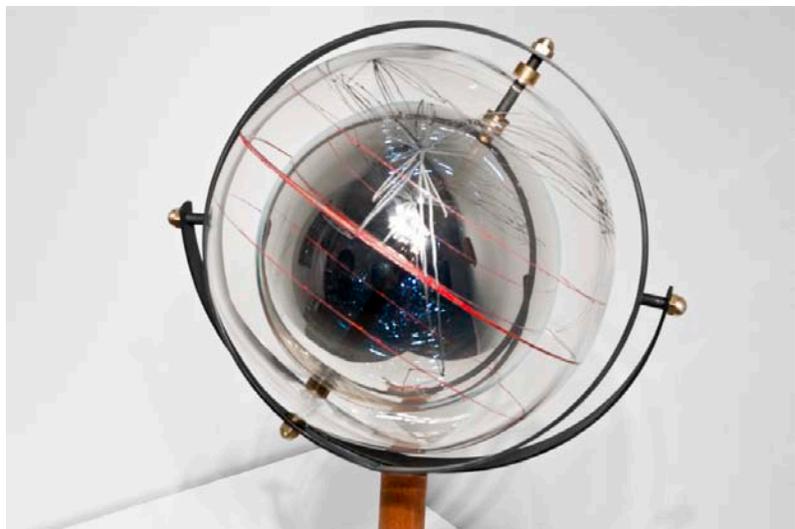


fig 74 a - *Where I've been is where I'm at* - detail

The outer sphere contains red lines marking the Equator, Tropic of Cancer and Capricorn. The sphere also contains black dots connected by black lines. These dots and lines represent the cities I have flown to. My

nature has been to travel and to make. The nurture has been from the places I have traveled to and people I have learned from. In making my own globe I am able to realize how little I have been exposed to in this vast world. The mirrored sphere in the work becomes a reflection of my memories, my past travels and at the same time places the viewer in the piece.

Jorge Luis Borges's poem *Mirrors* recalls the notion of one encountering their own reflection: *I am no longer alone. There is something there.*

*In the dawn reflections mutely stage the show.*⁵³

The eeriness of your own reflection becomes apparent. In the inner mirrored globe of *Where I've been, is Where I'm at* the viewer's reflection is distorted, here the distortion sweeps you across the globe, you travel.



fig 75 - Josiah McElheny – *Possible Mirrors*, 2002

Mirrors are seen as manipulating the sense of sight. Josiah McElheny (fig. 75) adheres to this dialog concerning mirrors in his final line of *A Short History of the Glass Mirror*, "Nothing to do with the mirror is ever fixed – reflections of ourselves are always in flux."⁵⁴ Even though these

53 Josiah McElheny, *a Prism* (New York: skira Rizzoli, 2010) p 212

54 *ibid.*, p 210



fig 76 - *Devices for Perception (in)finity*

devices are used to observe ourselves there is something artificial about the reflection.

In its flatness the mirror compresses our own dimensional state. We are depicted on a sheet of reflective glass, we are trapped in a single plane, upon a single pane. My

works such as *Devices for*

Perception (in)finite (fig. 76) show further distortion of one's surroundings by allowing one to travel visually through the inside of a small curved white form. These perceptual devices could be seen as a direct lineage to my previous work such as *Models for Space: (In)finite and Worm Holes* (fig. 77). The mirror is an engaging and sometimes overused object in art making, it is bright and shiny,



fig 77 - *(in)finite Model* - detail

it caters to our narcissistic desires. However, the mirror can also be used as a way of depicting a event. Metaphorically, objects and mirrors can alter the viewer's perception and allow us to reflect upon where we might be.

Negotiating Space: The Work in a Gallery Situation

In the work I made for the show *Incidental/Essential* the idea of mirroring a situation is present. The note on the show poster stated: *In transitions of the everyday we leave things behind some thought out, some not markers of where we have been.* Throughout the space and mingling with other artists' work, visitors found



fig 78 - After the Opening

beer, wine and champagne glasses. The glasses contents have been consumed and they look as if they are waiting to be picked up and cleaned. However, this was the piece I had submitted to

the show. My piece's title was *After the Opening* (fig. 78). These typical opening night cups were anything but typical; they were handmade and had lipstick smears on the lips of the cups and finger smudges on the vessel. These markings mirrored their utilitarian origins. The fingerprint smudges and lipstick were fired on enamels, thus becoming a permanent marking on a seemingly regular yet handmade cup.



fig 79 - Josiah McElheny - The Metal Party:
Reconstructing a Party held in Dessau on
February 9, 1929, 2001

55 *ibid.*, p 174 - 177

The origins of my idea conceptually and rationally came from Josiah McElheny's *Metal Party*. (fig. 79) *The Metal Party* was in response to a Bauhaus party, of the same name, in the 1920's⁵⁵. However, my work was not in response

to either party but more a remembrance of a picture from McElheny's party. In looking at the lone figure standing amongst the detritus, we can wonder did he miss out on the proceedings, was he just late or is he the last man standing? Either way I wanted people to come to the show and get a feeling that something had already taken place or wonder why this detritus had not been cleaned up. In these states of confusion a similar distortion could be concluded as happening within a non-flat mirror.

In *After the Opening* I was also trying to rethink my work in a gallery space. How can I make my work accessible to all? Accessibility in a gallery or white cube space is not an easy undertaking and by no means am I saying that mine was a success. Felix Gonzalez Torres' candy pieces continue to be a success (fig 80). His reflective candies on a gallery or museum floor allowed for all to take and thus participate. The viewer, who can become the digester at their own discretion, can contemplate the place and situation that they have entered. Here Torres provides an unparalleled accessibility.

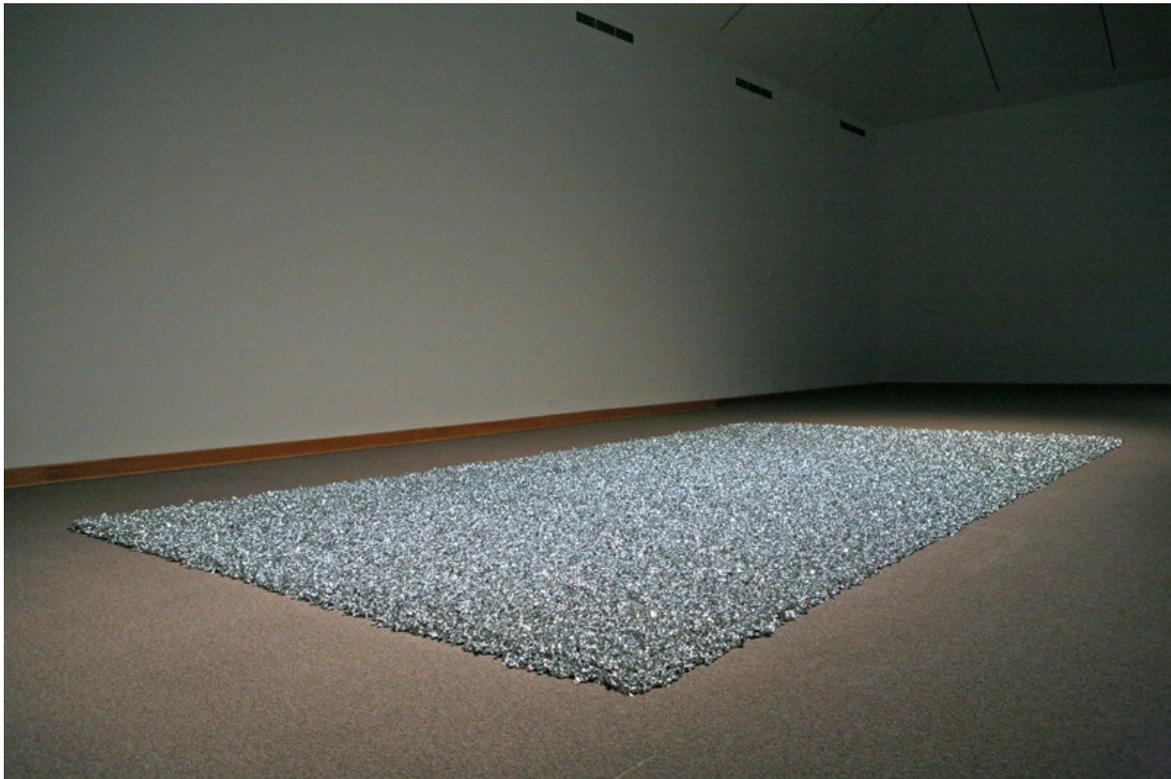


fig 80 - Felix Gonzalez-Torres - Untitled (Placebo), 1991

This accessibility to the work conjures a notion of how and where does an artist or designer view their work. Today we are faced with galleries, museums, and boutiques, to name a few.

Brian O’Doherty, an artist and writer, noted this dilemma years ago in his essay collection *Inside the White Cube: The Ideology of the Gallery Space*. In the expanded edition he states:

Many artists were irritated by the audience available for art; it seemed numb to everything but, at best connoisseurship. And the expensive compound (gallery, collector, auction house museum) into which art inevitably was delivered muffled its voice. Art’s internal development began to press against several conventional boundaries.⁵⁶

The venues and modes of displaying glass things are plentiful. However we place numerous boundaries upon the material. Due to these limitations and boundaries I often ask myself ‘Where can the things I make be seen and enjoyed?’ When really with a quick glance at the places of display (museum, gallery, design shop, boutique and our homes) we can conclude that material surrounds us.

⁵⁶ Brian O’Doherty, *Inside the White Cube The Ideology of the Gallery Space* (Berkeley: University of California Press, 1986) p.111

Conclusion - *What of this world surrounded by glass?*

We have traveled through history, my history. Along the way we have stopped off and looked at various traditions and people who have influenced me as a maker and as a thinker. Most important has been my focus on how we think of this material and how our countless daily interactions with it envelop us. Everyday we are bound to this material – it's seamless. In no further place than a window do we need to look, to see and to observe the material.



fig 81 - Robert Irwin - 1°2°3°4°, 1997

In 1997 Robert Irwin inserted his piece, *1 2 3 4* (fig. 81) in the San Diego Art Museum to demonstrate glass's seamless place in our everyday lives. Here the unnoticed, the nuances and details that Irwin has been known for take another step into the realm of awareness and seeing. Hugh M. Davies, writer of the essay, *One Perspective*, unfolds and explains the piece upon entering the room:

When viewed head on, the missing pieces of glass in the corners look like flat floating squares oddly hovering before the distant ocean view: the tall skinny trunk of a palm tree outside crookedly mimics the missing mullion at the northwest corner... In *1 2 3 4*, the brilliance is further compounded by the gesture of cutting away from the material that is already transparent and aspiring to invisibility – clear glass.⁵⁷

Glass is a material that can fluidly and effortlessly negotiate the venues artists and designers choose to show the material in. However, its constraint is us. The maker, the collector, the curator,

⁵⁷ Robert Irwin, *Primaries and Secondaries*, (San Diego: Museum of Contemporary Art San Diego, 2008) p 44

the critic, the artist, the designer, the professor: we are all guilty of this constraint.

Works such as *1 2 3 4*, 1997 demonstrates the ability of the material to evoke thought, alter the perception of the viewer and transcend the constraints that are imposed upon the medium. Vision is distorted while our other senses are tested. This clear, odorless and sterile partition is in fact a threshold for the existence of this medium in respect to the fine art of living. It is an *infrathin* between design and art⁵⁸. To see Irwin's work, *1 2 3 4*, 1997, in the pages of a book or the sheen of a computer screen brings a smile.⁵⁹

I get it.

To smile, not because of a clever story or some mastery of skill but instead to smile as an act of acknowledgment, that is the greatest form of recognition. For me glass is about looking out a window, drinking from a handmade cup, watching a televised game of FC Barcelona, or working in a hot shop with my friends. These events or moments yield experiences brought forth by a material. This material has been described as a collaborative endeavor, learned, practiced and passed down. Glass is experimentation, as a material it transcends boundaries.

What do you see? Where does this material fit into your vocabulary of utilitarian and sculptural, industrial and handmade, does it not blur these lines? Glass comes from an old world approach, it takes years to understand and to perfect its creation. In this world consumed by the immediacy of the next thing can the tradition of glassblowing keep up? If so, and believe me I hope so, then what might be asked of a producer of this material in the future? Is this not a question of man's adaptability?

Simply for me to see; to peer through the spectacles sitting atop my nose and spanning my face, and to walk with sand pressing up between my toes is enough for me to know that I am on the right journey in this *Glass Age*...

⁵⁸ Infrathin is a Duchampian term describing the indeterminable line between two things.

⁵⁹ I have only seen this piece through these means. I imagine it is a different experience when seen in person, and that is an experience for another time.

...a fluid transfer of knowledge...

Appendix

Footnote 8:

Flanked by a material: an artist statement

There is light. It exudes from the lamp; shadows and reflections are cast upon the wall. My eyes follow a blinking line, a cursor. We have to name everything. In making all things definitive what is left to define?

The cursor blinks, my eyes glance through a material, my reflection is faint upon a screen. A transdimensional occurrence is evident, the threshold between me and the blinking is proof. The screen is flat and still except for the cursor and the words that follow. My hands rummage at the bottom, scurrying to portray this as a cohesive thought.

Making is about transference, from my eyes, to my brain and then executed through my hands. I am a glassmaker so it's not just about my eyes and brain and hands but those who collaborate with me, those I work for or with.

Glass is a communicative endeavor, a struggle. It's not something you get in a year or five or ten. It is about being an ambassador and a translator for a material. The process of conveying and informing others through the making of glass things is at the forefront of a practice. Action as statement, object as question. What are these transferences?

Material integrity: it's not about what one can make but what one can expose.

I reach for a glass. It doesn't matter if it is half full or half empty, I made it. Beer is fresher in the glass, the pouring from keg, pitcher, can or bottle releases the flavor. The frothy head floats, the bubbles too. A liquid suspended in a liquid.

I, you, we live in a Glass Age. A reflective world where mirrors are not always present but a lens might be. We have a necessity to communication, the interface is the material – think about the internet, think of your phone, think outside and through the window, be aware of the light that is on and above you.

Footnote 46:

Notes and Words:

(un)utilitarian glass

The fate of the utilitarian:

The objects we hold by hand used to be made by hand. Now the hand of the maker is replaced by the components of the machine. Go back to the last time you spent some good coin at a restaurant. All ingredients were prepared by hand not processed by a machine. A meal is meticulously placed together and arranged by a chef. However, the objects of containment are made from machines. The plate you eat off of to the glass you drink from fit into this mold.

There is a disconnect here. Fine dining is a foodie experience. Yes, there are companies out there making stemware for the enjoyment of meals as there are specific wines to go with specific foods, and therefore specific glasses. Riedel has made some through machine and some through the process of the craftsman. However, in the day-to-day shuffle these crafted objects are stored on a shelf collecting dust in a home, waiting to be used for an occasion. A few restaurants do use such wares, but they are few and far between. The experience is about what you plunge into your mouth not the vehicles that aid in this consumption. What has happened to these vehicles that used to be prepared by hand?

Can a cup be rendered differently? Its memory as a handmade object; its memory as a partaker in an event, a meal, a drink, a conversation amongst people, a conversation amongst objects. The memory is the reflection of who we are and what we left behind. It is the residual. In shifting the utilitarian to the sculptural a bowl and foot can become a lens. From a use of taste to the use of sight it becomes a sensual transition. How would these objects judge their former selves? Does the inspiration become a determination to drift further away from their ancestral past? The objects are made by hand and they are different because of this and they are similar because of this. I have made some glass – glasses so that one can have a conversation on just glass – glasses. They reflect into themselves to reflect upon themselves. The mirror acts as a liquid, a trace of their possible utilitarian function.

The objects or glasses consist of the same personifiable parts as their utilitarian counterparts. They have a lip for a mouth, a body to hold and foot to stand on. However, in this transitional shift they become objects for a conversation. They are a curious case of contextual containment. The glasses nestled on themselves – a simple sculpture that implies the last swig of a beverage. Nestled upon the lip of each pair their reflection can be seen. They are a remnant and a memory of their former selves. A frozen moment is depicted in a material that is a frozen liquid. Suspended animation

Cups are bent and show the last signs of their utilitarian upbringing. Like watchers, three stand as if to judge their fate. However, they too are of the same stuff, the same parts. Only their function, their ability to act as a container of a liquid for a functional means is shifted, the bowl on edge. The back of the bowl becomes a lens, a peephole into a new altered state. A sculpture with a nod to its past and a focus to a new. The fate of the utilitarian lies in the hands of the maker. He/She decides which direction an object will go. However, the owner will ultimately decide if it has a place on their table as a utilitarian object or is to be rendered in a new light on a shelf destined to dust, but changed from its origins.

A shift of glasses is a shift of words.

The utilitarian often yields the (un)utilitarian. It precedes it by giving it a place for contemplation on where a maker can take it next. A muse if you will. Glasses made by hand are seen as more precious, as being more valued. They are used for that special occasion or not at all. Glasses stand on a shelf as objects of desire or a memory long since passed. Their function has shifted and yet it is the same. Objects of desire are ultimately utilitarian yet rendered (un).

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Explain
Interface
Material
Collaboration
Maestro
Artist
Designer
Mould/Mold
Transference

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Image List:

My eye – dhmcnabb

Envelopes - Alex Forsyth

Introduction: Living in a Glass Age: pages 4 - 10

Figure 1 - Gorilla Glass – courtesy of Corning Inc.

Figure 2 – Johnson, Phillip - The Glass House, 1949

Figure 3 – Van Der Rohe, Mies - The Farnsworth House, 1945-1951

Figure 4 – Manglano, Ovalle, Inigo - Gravity is a Force to be Reckoned With, 2009

Figure 5 - Manglano, Ovalle, Inigo - Always After (the Glass House) 2006

Figure 6 – Providence, Ri – dhmcnabb

Figure 7 - Reticello – dhmcnabb

Figure 8 – Seed - dhmcnabb

Chapter 1 - Collaboration :

Historic Foundations: pages 14 - 20

Figure 9 - McNabb, DH - Lalique Chameleon - glass, 2011

Figure 10 - Space Shuttle Challenger – NASA

Figure 11 - Lino Tagliapietra and Stephen Powell

Figure 12 - Lino and crew at Pilchuck – Russell Johnson

Figure 13 - Lino work – Russell Johnson

Figure 14 – Clear Glass recipe

Figure 15 - James Mongrain at Cam Ocagi, Istanbul Turkey

Figure 16 - Mongrain, James - untitled, 2007 – Russell Johnson

Figure 17 - Walters, David – ALICE IN BLUNDERLAND'S TEA PARTY CRUISER, 2011 – Russell Johnson

Figure 18 – Marioni, Dante – Trio, 2008 – Russell Johnson

Figure 19 - Janusz Pozniak at Center College – Danville, Ky

A Gaffer as a Translator of Idea and Ambassador for the material: pages 20 - 25

Figure 20 - James Irvine – courtesy of GLASSLAB

Figure 21 - Sigga Heimis - courtesy of GLASSLAB

Figure 22 – Chihuly, Dale – Venetian, 1991 – courtesy of Chihuly Inc.

Figure 23 - retired figure

Chapter 2 - Experimentation as a means of making work:

Experimentations through Demonstration: pages 27 - 37

Figure 24 - Eric Meek and myself at Vitra Design Museum – courtesy of GLASSLAB

Figure 25 - Bertil Vallien at Pilchuck – Gregg Gilbert Seattle Times

Figure 26 Glass as a conductor - dhmcnabb

Figure 27- Demonstration of Glass Techniques for Nari Ward – courtesy of RISD Glass Department

Figure 28 - Prince Rupert Drop set – Alex Forsyth

Figure 29 - Bologna Bottle set – Alex Forsyth

Figure 30 - 2300° at Corning Museum of Glass – courtesy of CMOG

Figure 31 - Glory Hole with Camera and display

Figure 32 and 33 – Glass and Paper folding – Alex Forsyth and Hasan Askari

Figure 34 - Cups slumping – similar to piece made in Corning - dhmcnabb

Figure 35 - McNabb, DH Devices for Perception (in)finity – 2010

Experimentation as a way of connecting the Industrial and the Handmade:
pages 37 - 55

Figure 36 – Duchamp, Marcel - *To Have the Apprentice in the Sun*, drawing 1914

Figure 37 and 38 - McNabb, DH - *Transferences in Glass 1,2,3,4* – information sheet and display, 2011

Figure 39 – Duchamp, Marcel – *3 Standard Stoppages* – 1913 – 1914 – courtesy of MOMA

Figure 40 - Studio Nuggets – courtesy of Spectrum

Figure 41 – McNabb, DH - *11 x 8.5 sheet*, glass 2011

Figure 42 – McNabb, DH - *Batch and Melted Sheet*, glass 2011

Figure 43 - Bochner, Mel - *8" Measurement* - from *Number and Shape*

Figure 44 - Paper Sizes – A4

Figure 45 – Me and Col. Dave – Amanda McNabb

Figure 46 – McNabb, DH - *Portrait of Colonel David R. McNabb* - Mimi Cabell 2009

Figure 47 – Friedman, Tom - *Untitled*, paper, 1990

Figure 48 – McNabb, DH - *Bo Knows* – Blown Glass, Mirror, Enamel Decals, Baseball Cards 2009 - Mimi Cabell

Figure 49 – McNabb, DH - *For what it's worth paper/ glass*, dollar bill, glass enamel decal, 2011

Figure 50 - Riedel factory - dhmcnabb

Figure 51 - Riedel factory (working) - dhmcnabb

Figure 52 - Riedel products - dhmcnabb

Figure 53 - Alva Alto Vase – courtesy of Iittala Finland

Figure 54 - Rondel method – McGrath, Raymond -
Glass in Architecture and Decoration,
(London: The Architectural Press) 1937.

Figure 55 - Cylinder Method McGrath, Raymond -
Glass in Architecture and Decoration,
(London: The Architectural Press) 1937.

Figure 56 and 57 – McNabb, DH - *(In)finity in a Bag of Chips* and detail – 2010

Figure 58 – McNabb, DH - *Martini Glasses Full and Empty* – 2011

Experimentation/Reinterpretation of Traditional Glassworking Techniques:
pages 55 - 62

Figure 59 – Lundgren, Tyra - *Leaf*, 1938 – Venini Inc

Figure 60 – Tagliapietra, Lino – *Dinosaur*, 1998– Courtesy of Lino Tagliapietra Inc.

Figure 61 - Tagliapietra, Lino – *Batman*, 2001– Courtesy of Lino Tagliapietra Inc.

Figure 62 – Marioni, Dante – *Reticello Pair*, 2009 – courtesy of artist

Figure 63 and 64 - Pozniak, Janusz – *Sanctuary*, 2009 – courtesy of artist

Figure 65 – McNabb, DH - *(in)finite models*, 2010

Figure 66 - Figure Wormhole diagram

Figure 67 – McNabb, DH - Cabinet for Spatial Recognition
mahogany, blown reticello mirrored glass,
dovetails 19.25" x 11.25" x 4.25" – 2011

Figure 68 – McNabb, DH - Just the Three of Us: Wings, Mirrored Blown Glass,
Mirrors, Spotlight – 2010 mimi cabell

Figure 69 a,b,c – McNabb, DH - 2 *Studies of Compression*
reticello bubble, calipers balloon Graduate Glass Biennial
RISD Sol Kofler Gallery 2011

Figure 70 - Tools and Work bench – Alex Forsyth

Chapter 3 - Production Lab:

pages 63 - 64

Figure 71 - Production Lab – sign courtesy of University of Washington

Figure 72 – Wong, Tobias – *Alto Door Stop* , 2003 courtesy of brokenoff

Figure 73 - Wong, Tobias – *Money Pad*, 2000 courtesy of brokenoff

The Work in a Studio Practice: pages 64 - 72

My hands scans – dhmcnabb

Figure 74 a,b – McNabb, DH - *Where I've been is where I'm at* mahogany, brass, cork, enamel paint, mild steel, blown glass and mirrored blown glass – 2011,

Figure 75 - McElheny, Josiah – *Possible Mirrors* 2002
French-polished ebonized wood, mirrored engraved crystal glass. Courtesy of ICA Boston

Figure 76 – McNabb, DH - *Devices for Perception (in)finity* 2010

Figure 77 - McNabb, DH - *(in)finite Model* – detail 2010

Negotiating Space: The Work in a Gallery Situation: pages 73 - 75

Figure 78 - McNabb, DH - *After the Opening* - 2011

Figure 79 - McElheny, Josiah - *The Metal Party: Reconstructing a Party held in Dessau on February 9, 1929*, 2001

A Project of the Public Art Fund, New York and Yerba Buena Center for the ARTs, San Francisco, CA

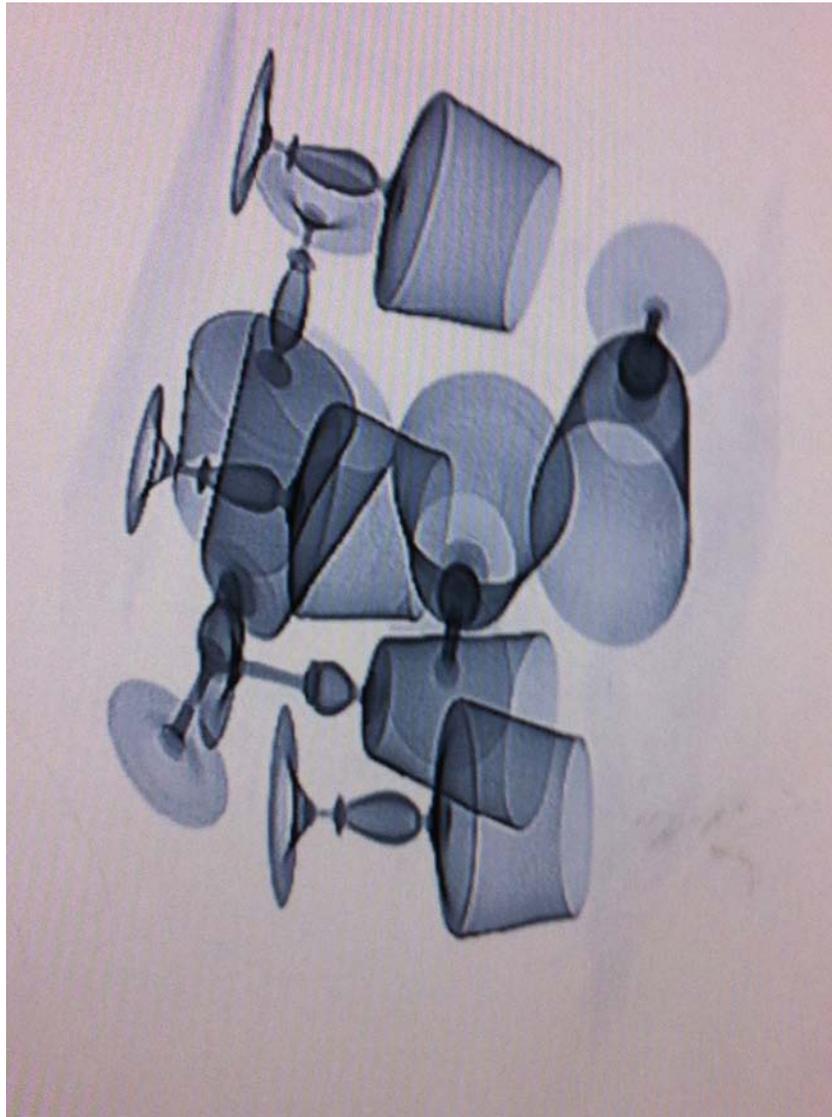
Figure 80 - Gonzalez-Torress, Felix - *Untitled (Placebo)*, 1991 -
Image courtesy of the Williams College Museum of Art;
photo by Roman Iwasiwka

Conclusion - What of this world surrounded by glass?

pages - 76 - 78

Figure 81 – Irwin, Robert - *1 2 3 4* , 1997 – courtesy of San Diego Art Museum

X Ray of Cups in Box – Mailed - dhmcnabb



*We can lift ourselves out of ignorance, we can find ourselves as creatures of excellence and intelligence and skill. We can be free! We can learn to fly! ...
His race to learn had begun....*

Johnathan Livingston Seagull