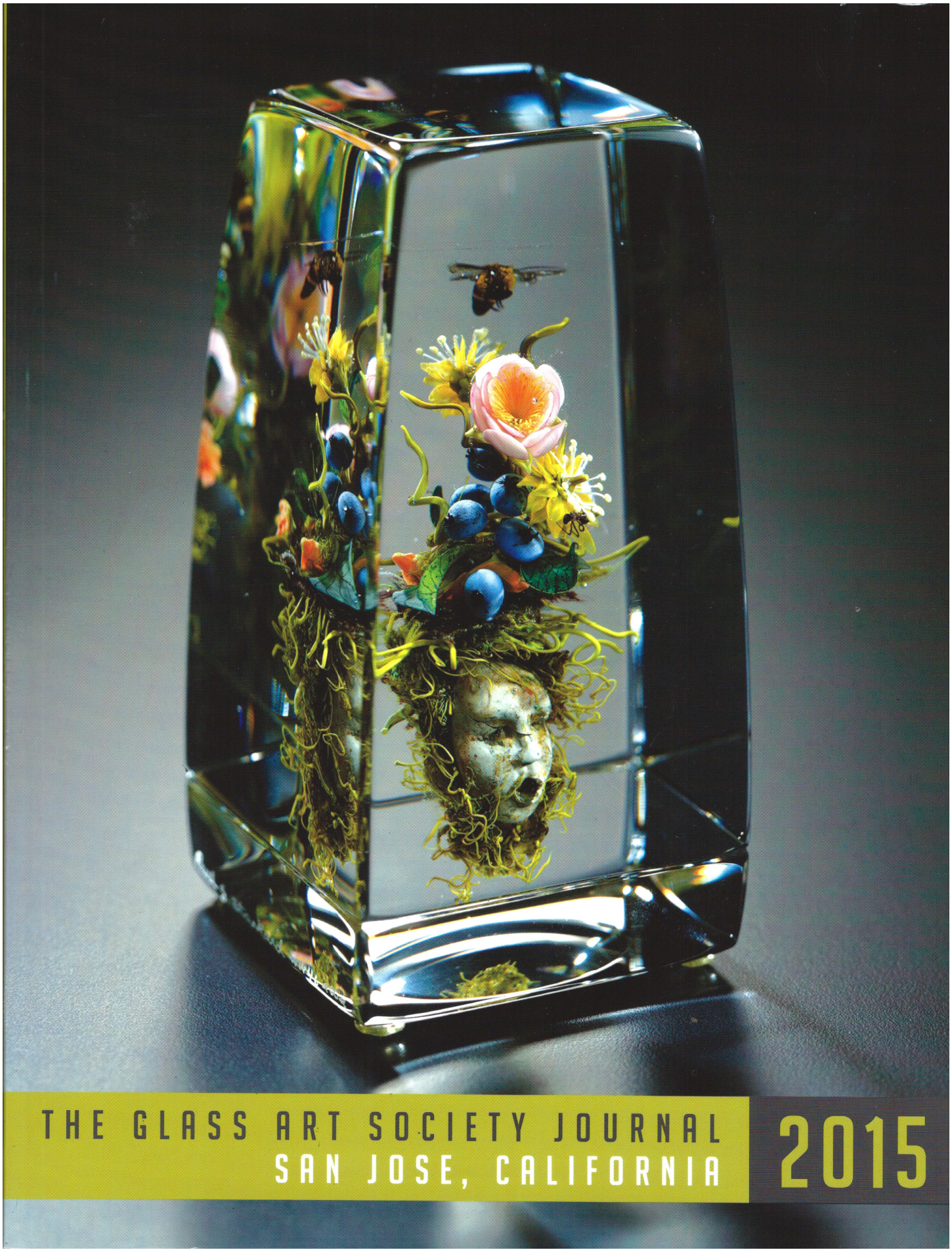

THE GLASS ART SOCIETY JOURNAL
SAN JOSE, CALIFORNIA
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PANEL

Green Forum: Simple Green

Moderator: Tracy Kirchmann
Panelists: Julie Conway, Hugh Jenkins, Timm Muth, Dan Schwoerer

Introduction

by Julie Conway

Since 2007, GAS has hosted a "green panel," a themed panel discussion with a focus on how to use less energy and to save money in our fuel-intensive industry. At the 2015 San Jose conference, where the focus was on technology, new innovations in glassmaking were featured. As the founder of BioGlass.org, I sat on the panel with Timm Muth of Jackson County Green Energy Park, Hugh Jenkins of Big Island Glass, and Dan Schwoerer of Bullseye Glass. Tracy Kirchmann of Ignite Glass Studios in Chicago acted as the moderator and served as the the liaison between GAS and the panel.

The most influential argument I can make is that no matter where you are, joining a community is the most efficient method of making glass. Sharing carbon footprints, building materials, tools, fuel costs, equipment, and building and maintenance responsibilities produce massive savings. Communities are able to create interdependent relationships between artists, assistants, and technicians, and can utilize the hotshop or casting studio to its maximum capacity by filling time slots with multiple users. Seeking out a community is the first step to eco-efficiency, and the benefits are similar to that of public transit.

Glassmakers now must learn about the area where they live to find the best way to cut energy costs. Prices of fuel and electricity can vary greatly from state to state and globally. That will determine the best solution for your furnace, your largest cost of operations. Will an electric system cost more or will gas recuperation be more efficient? Doing your research and knowing your energy costs is an essential knowledge to the contemporary glassblower.

In my remarks, I offered a global view of how action is being taken around the world to save energy and keep innovating new ways to practice glassmaking. In Africa, the Kitengela Glass studio is burning used car oil with steam to melt glass, and the Shanga River House art center operates with sunflower oil and forced air. The use of recycled glass is becoming more popular and effective. For instance Ngwenya Glass in South Africa sells recycled glass objects with the proceeds going to the conservation of endangered animals in the region. Developing countries are resourceful and innovative, since they do not have easy access to fuel like the more wealthy countries.

Green panelists sit down for lunch together after their presentation.

In Europe, there has been a resurgence of Roman-built furnaces and glass festivals in Belgium, the Czech Republic, and England. Solar operations off-set systems such as the ones at Worcester Glass in Maui, Hawaii and the Crucible in Oakland, California are becoming more accessible and helping studios cut high energy costs as public utility services are assisting owners in buying into the solar program.

GAS Presentation Synopsis

by Hugh Jenkins

Over the last 15 years there has been an increasing awareness of energy costs for the fire arts, glass blowing in particular; however, the discussion actually goes back much further. In the 1970s Dudley Giberson was talking about energy efficiency, not from a cost perspective, but because he thought there would someday be a fuel shortage. Several very inventive heat recovery ideas were reported in the Hot Glass Information Exchange of 1981. By 1985 Charlie Correll had created the first available recuperated burner for glass studios use. I was part of installing these burners at Penland School of Crafts and Punahou School in 1990. Costs and impact on budget were the main considerations. Both Dudley and Charlie had a big influence on my awareness that equipment development and studio practices play a big role in the cost of glass shop operation.

In 2001, I started my own private studio. The events of September 11, 2001 initiated a sharp increase in oil prices and a drop in the visitor market in Hawaii. Within that year propane prices jumped 50%, from $1.25 to $1.85 per gallon, and continued to rise steadily for the next eight years up to $5 by 2009. My fuel consumption was a fairly reasonable: 900-950 gallons per month just about evenly split between the furnace and glory hole. Knowing most about furnace recuperation, that is where I put my efforts. By 2004 I had committed to the recuperation of my glory hole, even though the results seemed less certain. The combined results reduced my consumption by about 60% to 320-350 gallons per month depending on the number of melts and the total hours of active studio use. I continue to consider what my energy costs would have been for 900 gallons at $5, which continues to be the price in Hawaii, even though prices have gone down on the mainland.

From 2001 to 2012 our electric rate has risen from $0.23 to $0.43 per KWH, averaging about $450 per month. Hawaii is a prime

location for solar electric generation. With net metering we, and other Big Island and Maui studios, are meeting 90% or more of our electric costs through solar power.

I have had real success with the use of waste vegetable oil as a fuel, but up until now only for the furnace. The infrastructure of tanks, filtering, plumbing, and metering has been demanding. Contamination, spoilage, and general maintenance are continuous considerations in addition to having a reliable supply of vegetable oil. For these reasons, vegetable oil is not for everyone, however its low cost was a major factor in allowing our studio to survive and be profitable.

Different locations have very different energy access and cost factors. Electricity is very affordable in some areas, but is a major cost for others. Fuels like propane, natural gas, and utility gas vary hugely in supply and cost from place to place. I strongly encourage creative thinking about energy use, since it plays such a major part in the operational cost of a glass studio.

We are living in a time when the impact we make on resources and the environment has to be taken into consideration. I hope with the help of more technically savvy members of the glass community new methods of combustion control and equipment development will make all of our ideas more easily accessible and understood. I appreciate the collaborative approach I have experienced with many studios across the country.

The Cost of Doing Business?

by Timm Muth

On the whole, hot glass work is one of – if not the – most expensive forms of traditional artwork. The largest expense? Energy costs! It is not unusual for even small-to-medium shops to use $1,000 to as much as $3,000 worth of fuel in a single month! And with that level of energy costs, it's no wonder that so many shops can't make it.

There are several wise, experienced folks doing an excellent job of making recuperators and other efficiency-improvement systems to reduce fuel costs. Likewise, a number of equipment suppliers are constantly experimenting with better refractories, or improved glory hole designs, or multi-use stations, all in the name of lowering energy costs.

But it's the other end of that supply chain that is just starting to garner some interest – namely, finding alternative fuel sources that can reduce both the cost and carbon footprint of glassblowing operations. Bio-methane harvested from landfills has proven to be a simple substitute for propane or natural gas. It is a waste product that burns hot and offers significant reductions in greenhouse gas emissions. Operations at the Green Energy Park in western North Carolina have reached temperatures nearing 2,400° F using purely landfill gas. While proximity to a landfill can be a limiting factor, a new generation of small, simple anaerobic digesters – fed on food scraps, yard waste, or animal manure – can provide a continuous supply of bio-methane nearly anywhere in the world.

Waste vegetable oil is also gaining recognition as a viable, sustainable fuel for glass operations. With similar energy content to gasoline, WVO offers a safe, biodegradable alternative. Even wood – the original glass furnace fuel – is staging a comeback, as evidenced by several of the Roman-style furnaces recently constructed.

Remember, energy is all around us. The trick is to recognize that a pile of used wooden pallets, a nasty swine lagoon, or a dumpster full of food scraps is just energy in a different form!

Recuperation of fuel has been making massive strides and savings for many, thanks to the equipment builders and our fearless leaders in the green glass industry. Durk Valkema, Eddie Bernard, Charlie Correll, Doug Ohm, Hugh Jenkins, and others have been leading the way and offering their expertise to our community.

Julie Conway is a glass artist and owner/designer of Illuminata Art Glass Design LLC, a studio dedicated to the creation of functional and sculptural art glass lighting. She has refined her practice to combine traditional techniques with a contemporary design aesthetic. Conway incorporates reclaimed steel, recycled glass, and energy-efficient LED lighting in her finished lighting installations. She is founder of BioGlass.org and an environmental leader in the "green glass" community. An active member of GAS for over 13 years, Conway appreciates being part of the global glass collective.

Hugh Jenkins has blown glass since 1969. From 1972 to 1998, he led the glass program at Punahou School in Honolulu, Hawaii. While teaching at Penland School of Crafts in 1990, he helped build their first recuperated furnace, and that same year he added recuperation to the studio at Punahou. His interest in recuperation and fuel saving has carried over into his own personal studio operation since 2001, and to operating his furnace on vegetable oil since 2006. Now, with a photovoltaic (PV) system to offset of electric costs, his studio continues to operate at lower cost than any previous year. Evaluation of the cost returns and retrofitting to existing equipment are of particular interest to him. He has helped many glass blowers modify or build equipment with recuperation. Currently the emphasis is on developing a DIY installation kit for recuperation. Aside from cost savings, the atmosphere and resource preservation are of great concern to him as well.

Tracy Kirchmann was born and raised in Chicago. She is currently the educational program manager for Ignite Glass Studios and Ignition Community Glass. For the previous four years, she was the founding glass studio instructor and art department lead at the Little Black Pearl Art and Design Academy where she taught high school glass and sculpture classes to youth from Chicago's South Side. Kirchmann graduated with a BFA in glass from Southern Illinois University in Carbondale and an MFA in sculpture from Western Carolina. As a graduate student, she focused on the research and development of the Jackson County Green Energy Park, where she helped build a green glass studio powered by the methane from the park's landfill gas. Kirchmann served as student representative to the Board in 2009-2010 and joined the Glass Art Society Board of Directors in March 2014.

Timm Muth has worked on energy projects since 1980, from nuclear power plant construction to making methane from horse manure. In 2006, he began leading construction of one of the world's only landfill gas-fired art complexes: the Jackson County Green Energy Park. Now, as the director of JCGEP, Muth has the opportunity to open minds and expand the boundaries of how we define, create, and use the energy resources around us. Muth has worked as an engineer, a sensei, a mountain bike tour guide, a writer, a tiger handler, and a mad scientist. But being Dad is the job he loves best.

Daniel Schwoerer is a founder and owner of Bullseye Glass Co., which developed and tested compatible colored glass and methods for kiln forming. He is a graduate of the University of Wisconsin (BS, civil engineering; MS, engineering mechanics), where he also worked in the art department as a graduate assistant to Professor Harvey Littleton from 1968-69. After graduation, Schwoerer moved to Portland, where he founded Bullseye Glass Company with partners Ray Ahlgren and Boyce Lundstrom. In addition to serving as Bullseye's CEO, Schwoerer works with the company's Research & Education team to investigate leading-edge issues in kiln forming.