NOVEMBER, 1985

FUSION

JOURNAL OF

THE AMERICAN SCIENTIFIC GLASSBLOWERS SOCIETY
1507 Hagley Rd., Toledo, Ohio 43612

Downtown Cincinnati as seen from the
Kentucky side of the Ohio River

PRESIDENT'S MESSAGE

Why do we belong to organizations? Hopefully it is to gain knowledge, disseminate knowledge, and get to know others who have a common bond; their profession.

Belonging to an organization, to many people, is paying dues, offering comments and criticism whenever possible, and attending meetings when they fit nicely into their schedule.

It is my belief that belonging to an organization, such as the A.S.G.S., requires a great deal of devoted time and energy. The organization should not be the only source of that time and energy; it should be shared equally by the organization and its members.

To repeat an old cliche, "You only get out of something what you put into it." That is to say, the more you are able to contribute to an organization, the more you will gain from that organization. These are the feelings I have toward "the Society" (A.S.G.S.).

It is my hope that many of you share this same feeling and, hopefully, will find the time to become more involved. Remember, scientific glassblowing is your chosen profession. The society is offering all of us a way to expand our knowledge and expertise in this unique profession.

The time has come for us to become participants in our society, not just another nameless person in the crowd. We should be proud of our society and seek new avenues to expand and help it to grow. "The Society" offers us so much that it is important to place a value on it.

With all of this in mind, I hope each and everyone will become more involved in their local sections as well as in the national society. The opportunity is there; please accept the challenges and opportunities presented to you.

I would like to wish you and your family a happy holiday and a prosperous New Year!

Jerry A. Cloninger
President A.S.G.S.

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FUSION

Journal of
THE AMERICAN SCIENTIFIC GLASSBLOWERS SOCIETY
1507 Hagley Road • Toledo, Ohio 43612

Volume XXXII November, 1985 Number 4

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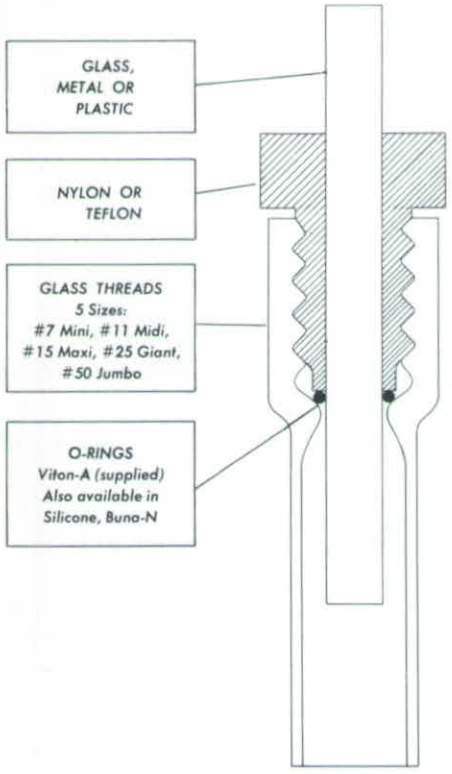

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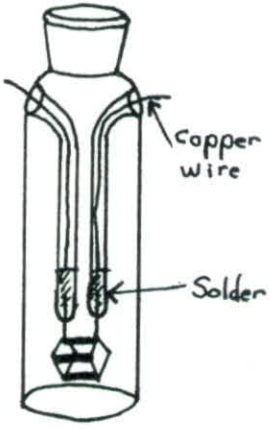
LAMP SHOP HINTS

The undergraduates here at the University of Wisconsin – Milwaukee use the Freas type conductivity cell in one of their labs. The manufacturer and supplier recommend filling the electrode arms with mercury to connect measuring circuit bad wires.

In an effort to eliminate mercury spills, I simply placed a small amount of soft solder from our electronics shop in the arms, put the cell in my small oven and ran it up until the solder melted. Then, by placing a copper wire into the molten solder, a good solid connection will be made as the solder cools.



Robert J. Ponton
Univ. of Wisconsin-Milwaukee

SPECIAL NOTICE

In the August issue of Fusion there was a section, pages 40-57, that were mixed up badly by the company that does the binding of our Fusion. If you by chance received one of these books, please send it back to me and I will see to it that you get a good replacement.

The second mistake was made by the 30th Symposium Committee, on page 12, second picture from the left – Dieter Damrow works for the ALDRICH CHEMICAL CO., not Friedrich Chemical Co.

Third mistake – Here I sit RED-faced; for pages 56 & 57 in the Section News, I offer my apology to the Southeastern Section. Their meeting was sponsored by AUTOKEG and not Autokey. This got thru two proofreadings. For this issue we will have on our clean glasses.

Editor

PAST-PRESIDENT'S POINTS

Jerry Cloninger called me one evening in August to ask me to write a Past President's report for Fusion. My immediate response was, "Yes". After I had time to think about it I thought, "What in the world am I going to write about?" I've been retired for over two years and have avoided any mention of the word "work", as I had known it for over forty-two years.

I am pleased that Jerry is starting these articles again. I hope not to bore you with this one. Art Dolenga wrote the article for the August issue, and Art is a hard act to follow when it comes to the written word.

To start with I am going to use a quote from a past article written by Art for Fusion (February, 1973). "The turning of the calendar to a new year seems to release in all of us an attitude of adventure as we begin a quest that will unfold new things and our expectations are full of hope and ambition."

How true this phrase when in reference to my retirement and present activities. Only I didn't turn a page of a calendar; I started a whole new calendar. I started a whole new life with great expectations.

I had always hoped that I could retire at 60 but I didn't quite make it: I was 61. My ambition was to move away from the severe northeast winters to where it was warm. This I accomplished, as we are now living in San Marcas, California, and appreciate every minute of it. We bought weather and got our money's worth.

When one opens that new calendar, one has to admit that it is with apprehension. No matter who we are or what our position, we have carved out our niche in our work environment and our community. We had good friends, good neighbors and good working acquaintances. Now we must start all over again, naked as the day we were born. We must again prove that we are worthy of friendships and a place in our new community.

Here again you can't sit back and wait for the community to come to you. You must meet it head on, join in, and ask, "What can I do to help us enjoy the things that we have?" How many times have we heard, "What can the Society do for me?" The Society, or the community, can do nothing for you unless you join in and help it along. The rewards or return on your invested time is immeasurable.

At the 1984 symposium, I had the honor of nominating Karl Walther to the office of President Emeritus. I have been associated with Karl since he was elected president in 1964. I have the greatest admiration and respect for Karl. He was the second president of our society and, since then, had been most active in its direction. Certainly there are many more who have done much, are doing, and, I hope, will continue to do, much for our society.

After my talk with Jerry, I started reading my old Fusion magazines, looking for a clue to a theme for this paper. As you get older, this is not a good thing to do. There are so many friends you haven't been in contact with, so many things you were once part of that is now history, and you are into that new calendar.

I read some of the papers I had written and, especially, the paper on "Professionalism" that I delivered at the symposium in Rochester in 1982. I hope others will read it again because that's the way I feel. Since I have moved to Southern California, the points I was trying to emphasize have been proven again and again. There are so many people moving into this area that there are more people than jobs. Therefore, the person with the job tries harder, works harder and is much more pleasant to deal with than we had been

accustomed to. This is true from the bag boy in the grocery store to salespeople, doctors, lawyers and other professionals.

Another incident I came across which brought back memories was when President Earl Nagle proposed to the Labor Department a new title in the "Dictionary of Occupational Titles" for "Scientific Glassblowers". The time that Earl, Joe Baum, myself and others spent negotiating this through the Labor Department to a successful conclusion is just another example of "What your society has done for you".

This article turned out to be nothing about glass and not much about the Society. I believe our society is in good hands. The men who are in charge of our affairs were bright young stars of the future when I was winding down. They proved their ability then and, have no fear, they know where it is all at. The keeper of the keys, Ted Bolan, will be with you always and, with Bev and Jim to keep the home fires burning, we are in good hands.

I would like to read in Fusion what has happened to some other members of our family. Where are the Pooles, Barrs, Cassidys, Smiths, Pahls, Haaks and Walrods? I thought it was only old generals who just fade away. It sure would be nice to hear from them.

IT WAS NICE: I miss my friends, but what I have now is the greatest reward I could ask for, for my 42 years in the working environment.

Sincerely,
Bill Gilhooley

Obituaries

EDWARD D. DEERY, age 86, died July 31, 1985 in New York City.

His career began with Eimer & Amend in New York City and later he joined Western Electric and Bell Lab. He founded Heights Lab Inc. after 30 years of service with Bell Lab. He became very much involved in the development of the Auto Analyzer as we know it today. During his career, his work was featured at the 1939 World's Fair in connection with the first co-axial cable tube and U.S. first space satellite.

Technicon Corp., IBM, CBS, Gillette Corp., Ethel Corp., and Fordham and New York Universities were some, among others, that required his services.

As a charter member of the Metropolitan New York section, he served many years as treasurer. Edward joined the Nationl A.S.G.S. in March of 1956.

Surviving are a son, Edward Jr., and a daughter, Eleanor; six grandchildren and four great-grandchildren.

Geza Sebok, a member of the New York Metropolitan Section, was killed at the age of 62 years, on September 14, 1985. He was killed by a drunken driver, while driving home. His wife, Kate, was also in the car and was hospitalized.

Geza was born in Hungary, where he worked for Philips Co. He also worked in Paris and, in 1958, he came to the U.S.A. For 23 years he worked for Buchler Instruments Co. in Fort Lee, NJ. His last employment was with IBM Corp.

GEZA SEBOK

He joined the A.S.G.S. November 23, 1965. His survivors are his wife, Kate, and a son Edward, who is a medical student in Europe.

We of the A.S.G.S. wish to extend our deepest sympathy to both families.

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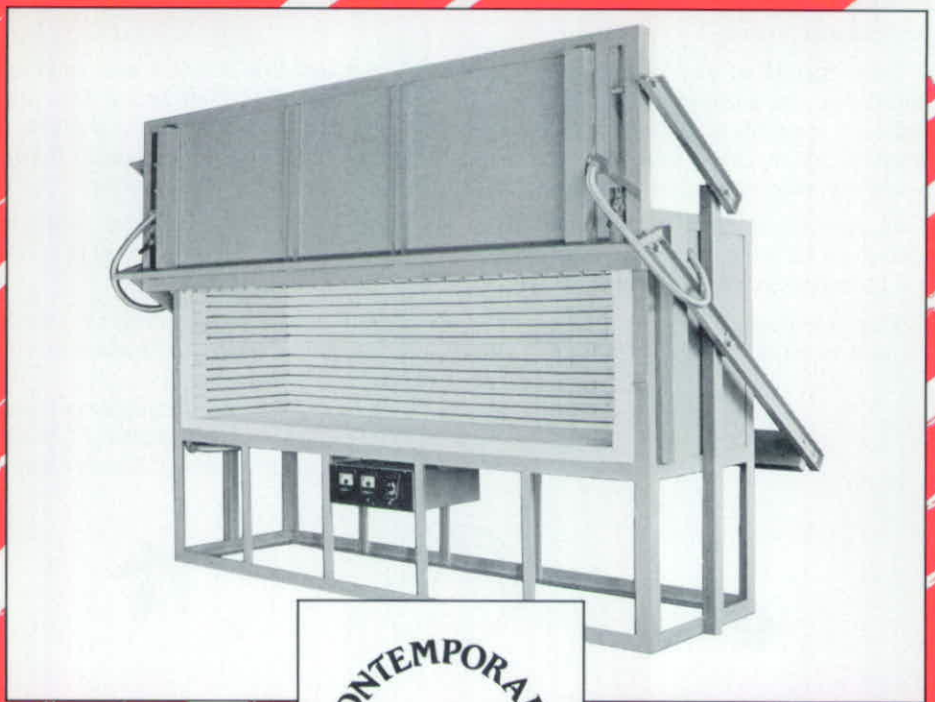

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A MESSAGE FROM

THE NATIONAL TECHNICAL PAPERS CHAIRMAN

A short time ago, I was discussing the American Chemical Society's national meeting, which was held in Chicago, with several of our faculty members who had been in attendance. One of them related a problem he had during the Papers Sessions. In his inorganic chemistry division, six simultaneous Papers Sessions had been scheduled. Being interested in three of the papers being presented at the same time posed quite a problem for him.

Now I don't envision the A.S.G.S. having this problem; we are a small organization compared to the A.C.S. But with nine hundred plus members working in the forefront of the scientific effort of their organizations, it should not be difficult to have fifteen to twenty technical papers available each year at our national symposium.

I have heard a lot of complaints from our membership that we don't receive the professional respect from our employers that we expect. If you are one of these members, you might consider that most of the scientists and administrators for whom we work belong to professional orgainzations and societies that place great emphasis on the presentation of scientific papers and the publication of articles. One of the easiest ways to gain their professional respect is to show that you have the same dedication toward your profession and your society as they have toward theirs.

Our society was founded to promote the art of scientific glassblowing and to disseminate glassblowing technology. The presentation of technical papers is one of our most important ways of accomplishing this goal. Presenting a technical paper brings prestige to you and your employer, and this will go a long way toward your gaining professional respect.

I ask that all of you look back at your association with the A.S.G.S. and total up all the things the society has made available for your benefit. After doing this, please dedicate yourself to doing something for your society, your employer, and even for yourself by actively participating in the society's functions. A technical paper, a workshop, even your attendance at sectional and national meetings is important.

If you are thinking of presenting a paper or know of someone who might have something of interest to glassblowers, please contact me or have this person contact me. I will be happy to provide all the details.

I am appealing to you as professionals to make our technical-paper program a success. I would be more than happy to have a Dual Papers Session next year in Cincinnati.

Professionally yours,
Wilbur C. Mateyka
National Technical Papers Chairman

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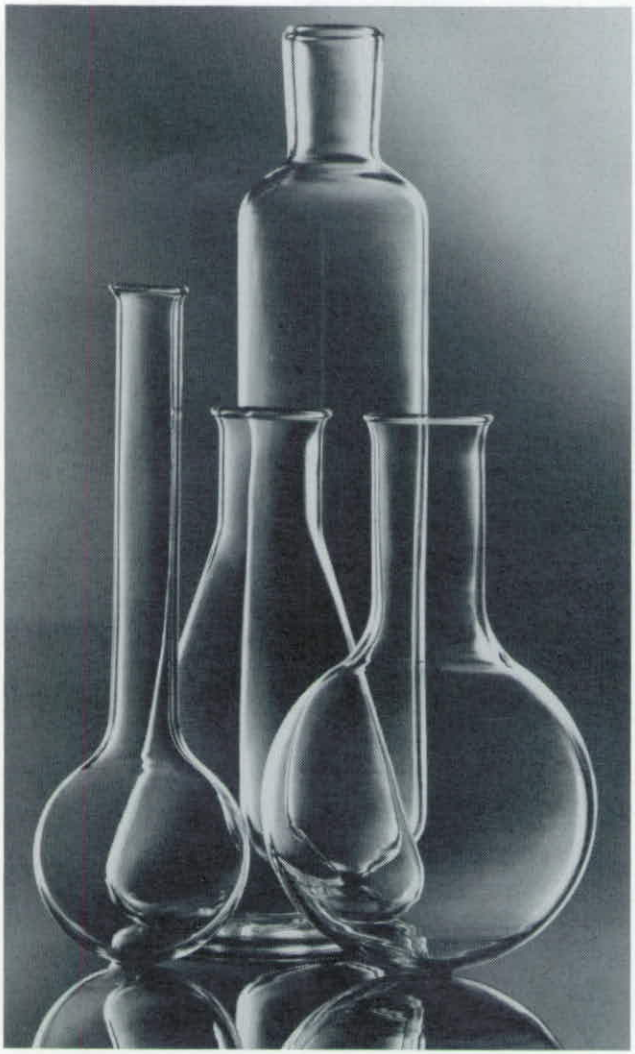

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COME TO CINCINNATI

I invite you to attend the next symposium, in Cincinnati, Ohio, from June 23 through June 27, 1986.

I suppose that most symposia at this stage contain some good news and some not-so-good news. In reference to the latter, response to calls in the last issue of FUSION for people to give papers and ideas for educational seminars has been very poor. If you have anything at all that you think might be of interest in these categories, please contact the appropriate chairman. Names and phone numbers for all committee members are in the August issue of FUSION.

In the good news department – it is my pleasure to tell you that the exhibit area is almost half sold. At this early date this is very encouraging. The women's program is virtually complete and will definitely include something for everyone.

Wednesday's night out will be a riverboat-dinner cruise on the Ohio River. The boat has two air-conditioned decks, plus a third open-air deck for your use; weather permitting. You will have a choice of entrees, plus a sponsored open bar. A live band will provide music for your listening and dancing enjoyment.

Thursday's banquet program will have a few changes from previous years. The biggest change will be the opportunity for you to select and reserve seats at a table of your choice, allowing friends to sit together wherever possible. At the very least this will eliminate the mad crush at the doors when the banquet hall is opened.

Entertainment after the formal program will be a "Big Band" type of orchestra, with plenty of time for dancing and conversation on the last full night of the symposium.

To make this symposium a success, we need the help of all who are willing to present technical papers, workshops, educational seminars, etc. We also need your attendance and we look forward to seeing you in Cincinnati.

I would like to take this opportunity to thank the following confirmed sponsors for their early pledges of support for various parts of our program:

Schott-Ruhrglass: represented by Schott America - for sponsoring the Thursday evening cocktail party.

Wilt Industries - for sponsoring an open bar on the Wednesday night riverboat-dinner cruise.

Corning Glass Company - for sponsoring the band at the Thursday evening banquet.

Very truly yours,
Thomas Kern, Chairman
The A.S.G.S. 31st Annual
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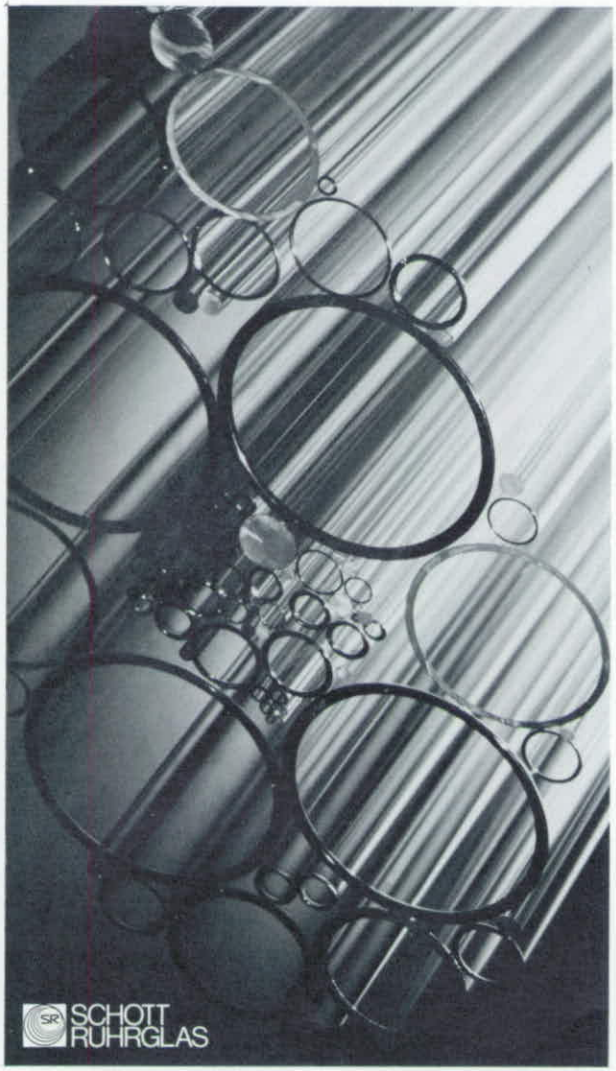

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A COMPACT LARGE-BORE THREE-WAY VACUUM STOPCOCK

The stopcock described was made to fulfill a particular set of requirements for a freeze-drying system. In this system a single pumping unit is used to pump down either or both of two separate evacuation systems at any one time.

The requirement was for single control operation for simplicity and a minimum bore of 15mm to match the flow capability of the rest of the system. The stopcock was to be mounted inside the existing case of the pumping unit so it also had to be of compact size.

A T-bore stopcock will carry flow from either or both of two sources (see fig. 1) but a 15mm T-bore stopcock would have to be very large to leave an acceptable distance between the bores in the key. A 120° stopcock (fig. 2) could be made with an acceptable spacing but it would not offer the option of flowing from both sources at once.

The solution arrived at was to construct a Schiff-pattern stopcock (hollow key high vacuum type with flow along the axis of the key) with two radial arms spaced at 120° and two bores in the key, also spaced at 120° (fig. 3). This arrangement provides exactly the same function as a T-bore stopcock but with smaller overall dimensions for a given bore size. (An equivalent T-bore stopcock would have needed a 60mm key diameter as opposed to the 45 mm diameter needed for this design). The self-seating feature of this type of stopcock under vacuum was seen as an added advantage.

The key and barrel were made to approximately 45/60 standard taper joint size, ground initially with metal cones and carborundum and finally lapped together. Because of the size of the stopcock, it was felt that excessive force might at times be applied to the handle, so instead of the usual glass handle, a plastic knob was used. The knob was made with slots which bear on lugs on the top of the stopcock key and is retained by a plastic cap on a glass screw thread which has been used in this instance as a stud rather than its more common role as a joint in a flow system.

The retention of the knob by a screw cap enabled the stopcock to be mounted behind the steel back of the pumping unit with only the knob on the outside, it being a simple matter to unscrew the cap and remove the knob when the cover has to be removed to grease the stopcock or for machine service.

Fig. 1

15 mm T-bore stopcock (approx. 1/2 scale)

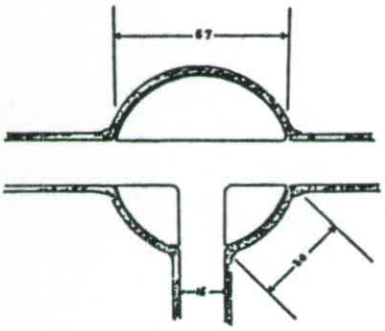
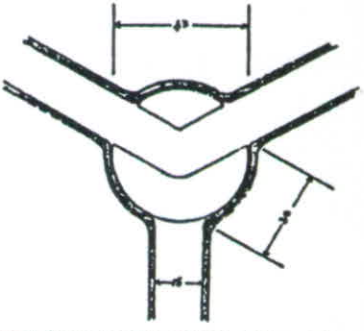


Fig. 2

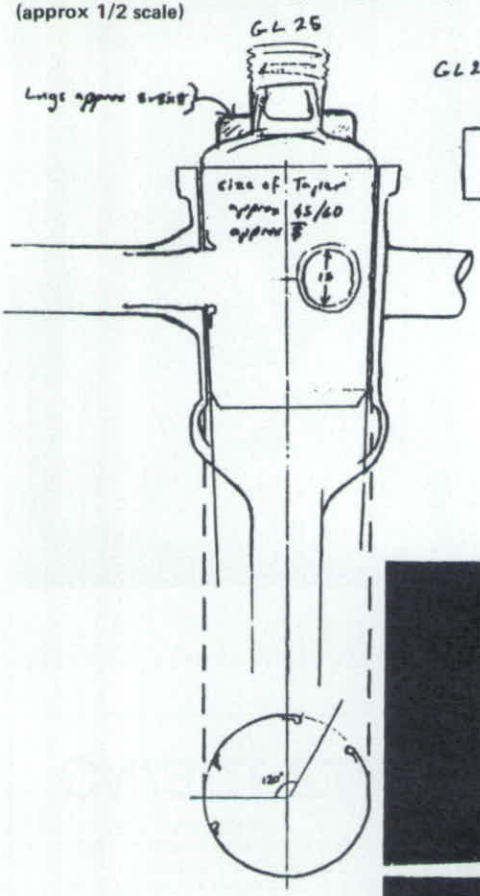
15 mm 120° stopcock (approx 1/2 scale)

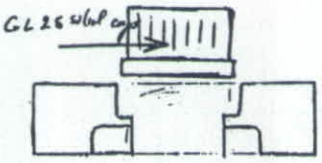


Extracted from the New Zealand Journal – GLASS - SCI

Fig. 3

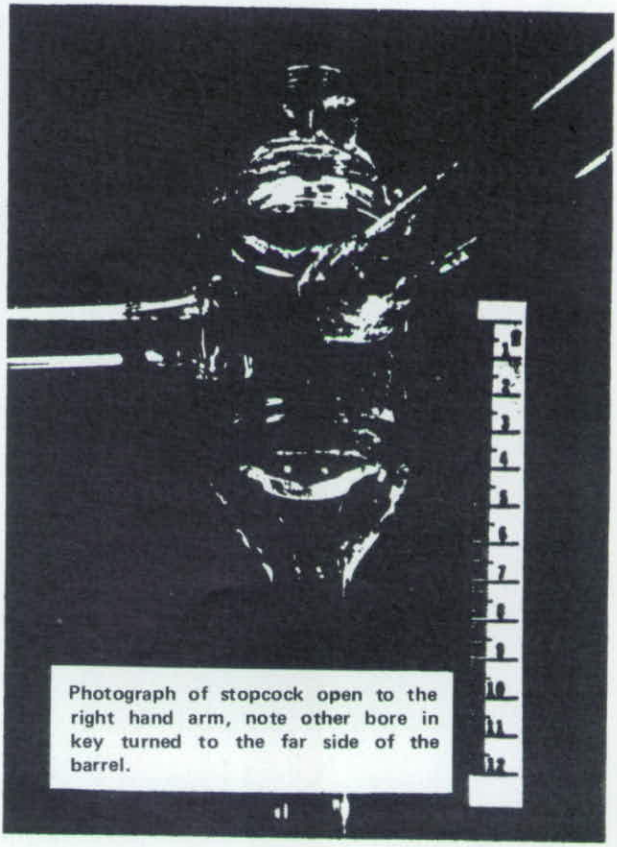
Sketch of 15mm 120° Schiff-type stopcock to provide same function as T-bore stopcock (approx 1/2 scale)





Plastic knob

Sketch of plan of knob not to scale



Photograph of stopcock open to the right hand arm, note other bore in key turned to the far side of the barrel.

JOHN PENNO

"RUG" designed by Abbas Razavi

In the August, 1983 issue of FUSION you were told about a "rug" which was designed by Abbas Razavi and knitted by his sister. At that time they were unable to send it out of their country, Iran, and so we were sent a photograph of it.

The actual work of art arrived at the home office this past summer, and it is an understatement to classify it as a "knitted rug". It is an exquisite tapestry and the execution of the design is a pleasure to see.

It will be framed and on exhibit at the symposium in Cincinnati next June. I am sure you will be delighted with the gift.

On behalf of all members of the A.S.G.S., again we extend "Thanks" to Abbas Razavi, a fellow-member of the Society.

BOOK REVIEW

The Handbook of Glass Manufacture - 3rd Edition
Compiled and Edited by Dr. Fay V. Tooley
Copyright 1984

"The Handbook of Glass Manufacture" is a two volume text of 24 sections (some 1200 pages) of interesting and useful information. Each section is authored by a leading expert in their respective fields. Sections include Raw Materials, Processing of Bottles and other Hollow Ware, Scientific Glassblowing, Annealing and Tempering, Optical Properties and many more. Each section could surely be expanded to book length, but at the same time offers an enormous amount of information on its topic. With the references listed at the end of each section, one could certainly find more detailed information on a particular topic or problem. Although expensive (my copy cost $173.00), I feel these books will be a useful reference resource for years to come. Available from Ceramic Book & Literature Services, 119 Brentwood Street, Marietta, OH 45750.

Respectfully submitted,
Robert J. Ponton
Chairman, Education Committee

AUDIO-VISUAL COMMITTEE

Requests for tapes should be sent to: Owen Kingsbury, Chemistry Department, East Carolina University, Greenville, NC 27834. Users of the tapes are requested to notify him of any damaged areas in the tapes when they are being returned.

ALL TAPES ARE COLOR/SOUND WITH THE EXCEPTION OF "GLASS BELLOWS", WHICH IS SILENT.

Members can call Owen Kingsbury to reserve a tape, **but** they must send a short, signed note asking for the tape or tapes, so he will have some record of who is making the request. (917/757-6237)

Also, add a **donated** film to our individual tape list. **Glassworking At Dounreay** – a demo tape showing Strain, Burners, Equipment and a large Tee Piece being made. (30 min.)

Thank you very much.

Sincerely,
Owen Kingsbury
Audio-Visual Chairman

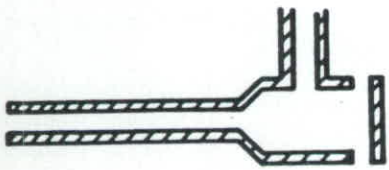
QUESTION and ANSWER REPORT

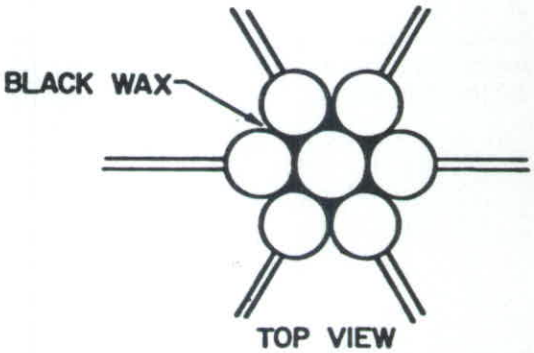
QUESTION:

There have been inquiries regarding the holding of small parts when grinding and polishing in preparation for molecular bonding seals of quartz windows. (A seal described in 1974 Proceedings, pages 79, 80 and 81.)

ANSWER:

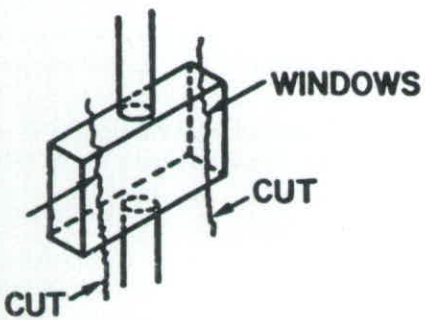
We are frequently called upon to make cells for laser experiments using 6mm OD tubing. This calls for an optical window seal on the end of the 6mm quartz tube which has 4mm inlet and outlet tubulations, as below left.

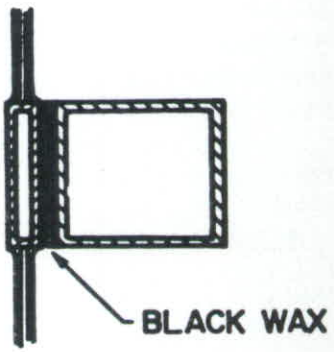




Short lengths of 6mm quartz are prepared with the 4mm side tubes and grouped together with black wax ash shown – above right. This unit is then sawed, ground and polished maintaining a flat surface of the unit; whereas maintaining flatness of an individual piece would be virtually impossible with hand lapping procedures. The windows are crudely cut, waxed to the end of a suitable glass rod and ground circular on a lapping wheel.

Another example using the same principle is shown below.





A 2mm path cuvette needed to be cut and optical windows sealed to each end. In this case the cuvette was waxed to the side of a square tube, sawed, ground and polished. See above right.

QUESTION:

Where can one purchase replacement guns for black and white picture tubes?

QUESTION:

How can a teflon coating be made on the inner wall of a glass vessel?

If anyone can help with either of the above questions, please contact me.

I have recently found an exceptionally good marking pencil for glass. It is not good for high temperature but good for use when marking glass for saw cutting. It does not wash away with water but will easily clean up with alcohol. The name and address are: VWR Scientific, San Francisco, CA 94120. It is called a VWR Lab Marker Cat. # 52877-310.

Sincerely,
David Blessing
Question and Answer Chairman

3rd INTERNATIONAL SYMPOSIUM

Going to Germany? Going to France? If so, here are some of the costs as of this date:

Leaving from New York on the Pot Luck Plan without going to France – $1,500.00. This is the cheapest plan.

Leaving from Los Angeles on the Deluxe Plan and going on to France for 4 days – $2,100.00. This is the most expensive, as of now.

Leaving from New York on the Deluxe Plan with 4 days in France – $1,800.00.

Please take note that the Deluxe Plan includes a private bath in each hotel. Also now included in **all** the plans are a full breakfast and a full dinner; lunch will be of your own choice.

You may still sign up. The cost to sign up now is $60.00 per person and a late charge of $25.00 per family.

These prices are based on today's dollar value in Germany. It's anyone's guess as to the final price, because it's all based on the dollar value.

3rd International Committee

SAFETY AND HAZARDS REPORT

SAFETY NOTICE

LETHAL VOLTAGES PRODUCED ON IMPROPERLY GROUNDED VACUUM SYSTEMS

The conventional ionization gauge can be operated at pressures in which currents flow in the common ground connection between the gauge controller chassis and the vacuum chamber. If this common ground is missing, or unable to support the current, lethal voltages can then be produced between the gauge controller chassis and the vacuum chamber. If only the vacuum chamber is not grounded, these dangerous voltages can appear between the vacuum chamber and ground. For example, when measuring pressures near .1 Pa (10^{-3} Torr), we observed a floating chamber voltage up to about 160 volts relative to ground, with current capacity of several milliamperes, depending upon the system, tube and controller design. **Fibrillation of the human heart could then be caused by ground to chamber contact.** When degassing tubes by electron bombardment, the floating chamber voltage may be as high as 900V relative to ground, and instantaneous currents up to 10 amperes have been measured to ground. **These conditions could cost lives!**

A local gauge pressure in the .1 PA (10^{-3} Torr) range, or greater, will plasma couple the metal parts of the vacuum chamber to the voltage present on the grid of the gauge tube. The chamber potential is typically about 40V less positive than the grid. We have only observed this phenomenon when a filament was operating. Thus, all ionization gauges, but especially those with electron bombardment degas operation are to be considered potentially dangerous **unless the controller and the vacuum chamber have a common ground.**

Please check your ground systems carefully; lives could depend on your care.

INSPECTION PROCEDURE FOR VACUUM CHAMBER AND ION GAUGE CONTROLLER COMMON GROUND SYSTEM

PERFORM THIS INSPECTION ON ALL VACUUM CHAMBERS WITH ION GAUGES

Purpose: The purpose of this procedure is to help you establish that your vacuum system has a common ground with its ion gauge controller. This eliminates the danger of lethal voltages appearing between the vacuum chamber and electronic ground.

Problem: When operating ionization gauges, and especially when degassing them by electron bombardment (EB), some relatively common gas discharge conditions have been found to cause currents through the common ground between the vacuum chamber and the ionization gauge controller chassis. If this ground connection is open when the discharge occurs, nearly the full grid voltage (up to about 900 volts for some controllers during EB degas) can appear between the ground of the controller chassis and the vacuum system. **Human contact could be fatal.** In this dangerous condition, the fuses and

automatic turn-off circuits in the controller are not usually called to action. Thus, this dangerous voltage could remain between the vacuum system and ground for extended periods of time. Lower voltages can occur when using the measurement circuits and some resistive degas circuits. However, they may also be very dangerous. Guaranteeing a good common ground for the vacuum chamber and gauge controller chassis can remove these dangers. It is recommended that this test be applied to all vacuum systems periodically. It appears probable that all brands of gauge tubes and controllers can cause this hazard.

The safety ground on most electronics equipment does not carry continuous current. Thus its potential may differ by several volts from the ground of those vacuum systems which use the power common line as their ground. These two ground systems should have a common junction which is typically at the distribution breaker box. Even though the resistance between these two grounds may be very low, and thus correct, that voltage difference resulting from unbalanced current flow in the common lead complicates the use of the conventional ohmmeter for verifying that low resistance. The placement of a second ground wire between the vacuum chamber and the gauge controller chassis **is not a safe answer**, for large continuous currents could flow through it as a ground loop.

Procedure: Physically examine the grounding of both the ion gauge controller and the vacuum chamber. Is there an intentional heavy duty ground connection to the vacuum chamber? There should be. Note that horizontal "O" ring or "L" ring gasket, without metal clamps, can leave the chamber above it electrically isolated. Power can be delivered to mechanical and diffusion pumps without any ground connections to the system frame or chamber. Water line grounds can be lost by a plastic or rubber tube interconnection. What was once a carefully grounded vacuum system can, by innocent failure to reconnect all ground connections, become a very dangerous device. **Use the following procedure to test each of your vacuum systems which incorporates an ionization gauge.**

This Procedure uses a conventional Volt-Ohm Meter (VOM) and Resistor (10 ohm, 10 watt)

1. With the gauge controller turned off, test for both DC and AC voltages between the metal parts of the vacuum chamber and the gauge controller chassis.
2. If no voltages exist, measure resistance. The resistance should not exceed 2 ohms. Two ohms, or less, implies commonality of these grounds that should prevent the plasma from creating a dangerous voltage between them. This test does not prove that either connection is earth ground, only that they are the same. If more than 2 ohms is indicated, check with your electrician.

3. If AC or DC voltages exist and are less than 10 volts, shunt the meter with a 10 ohm, 10 watt resistor. Repeat the voltage measurement. With the shunt in place across the meter, if the voltage remains at 83% or more of the unshunted value, commonality of the grounds is implied. Repeat the measurements several times to be sure that the voltage ratio is not changing with time. If

$$\frac{\text{Voltage (shunted)}}{\text{Voltage (unshunted)}} = .83 \text{ or more,}$$

this should prevent the plasma from creating a dangerous voltage between these grounds. If more than 10 volts exists between grounds, check with your electrician.

4. If the voltage change in # 3 is greater than 17% due to the placement of the shunt, it complicates the measurement. The commonality of the ground may be satisfactory and the coupling poor, or the commonality could be poor! Your electrician should be asked to check the electrical continuity between these two ground systems.

NOTICE NOTICE NOTICE NOTICE NOTICE

From the Editor of Fusion

What you have just read came to me from Ray Carew, a member in our A.S.G.S. He feels that this is very important and wants every glassblower to take serious note of the article.

In the home office I have on file a 7 page report on this potential danger. If you would like a copy of this report, let me know and I will see to it that a copy is sent you. The report is titled "LETHAL VOLTAGES FROM ION GAUGE/GAS DISCHARGE INTERACTIONS" by C. Morrison, Ph.D., Senior Scientist at Granvilli-Phillips Co.

Jim Panczner
Editor

PAST-PRESIDENT RECEIVES AWARD

The Chancellor's Citation was awarded to Gordon Good in recognition of his exemplary and outstanding performance in the service of the University of Massachusetts at Amherst. A certificate and a monetary award were presented to Gordon by Joseph Duffey, Chancellor, at the Chancellor's Affair in June of this year.

In addition, Gordon also recieved the annual Certificate of Recognition from the University of Massachusetts chapter of Sigma Xi, the Scientific Research Society, for his devotion to the promotion of Research in Science.

Mr. Good has been a member of the A.S.G.S. since June 9, 1966. He was National Director from 1970-1974 and was elected President-Elect in 1976. His term of Presidency was 1977-78. He has also held various offices in the Hudson-Mohawk Valley Section, the most recent being Secretary-Treasurer.



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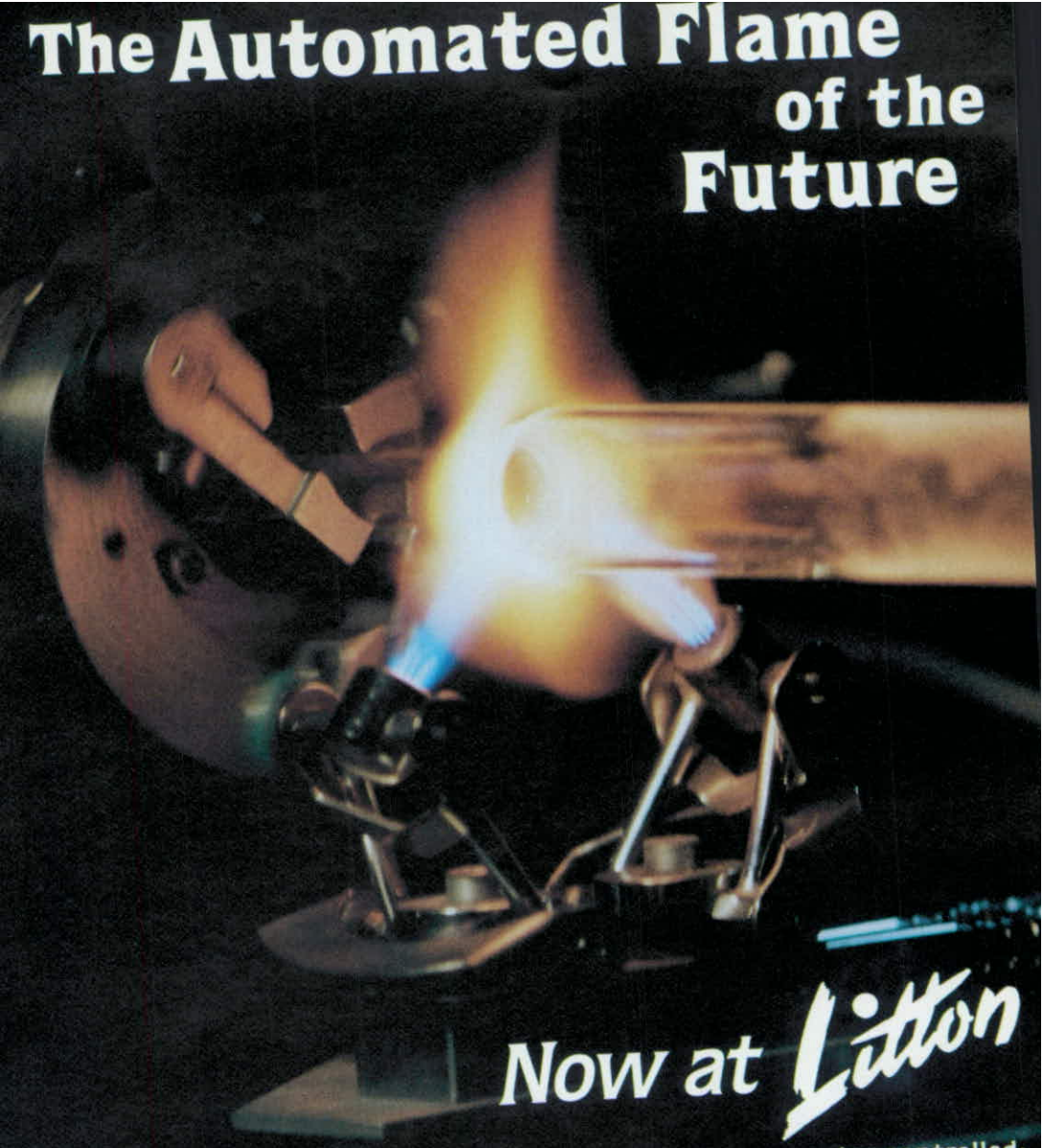

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HOME COMPUTERS and the GLASSBLOWERS

Now that the microcomputer is a fairly common item in many homes and businesses, perhaps the time has come to start sharing the results of our experiences and/or techniques that have made use of the "New Technology".

In the spirit of "put up or shut-up", I submit the BASIC language program reproduced below as an example of the sort of thing I have in mind.

It is a very simple routine developed because I was faced with the problem of "moulding down" a section of fused quartz tubing from its original diameter to a smaller diameter whose I.D. was given but not the O.D.; plus a couple of other things.

It was a rush job and, besides not having a piece of tubing of the smaller size, it would take too long to order a piece which was of a non-standard diameter anyway.

What to do!!

You guessed it. Using a graphite block, I cut and filed out the configuration required using the diameter output in the computer program. It required very little alteration to the original shaping of the block before I was able to rest it on the parent tubing, and, having softened the tube in the area of proposed restriction, pressed down the diameter to shape. A measurement of the I.D. of the constriction confirmed the accuracy of the calculation. It also helped to find out that there is apparently very little sideways flow of glass in this type of press-down operation, so that just heating evenly round a tube and allowing it to constrict naturally to a known O.D. will also result in a quite reproducible I.D., providing you don't overheat the material too much.

Reproduction of BASIC Program.

```
1300 PRINT "(CLR)"; PRINT
1320 PRINT "PROGRAM TO CALCULATE COMPRESSED GLASS TUBE OD";
1330 PRINT "DERIVED FROM ONE TUBE SIZE WHERE OD & ID KNOWN,";
1340  PRINT "COMPRESSED TO ANOTHER TUBE SIZE OF DESIRED ID,";
1345 PRINT "(ASSUMING ONLY THICKENING.), BY LATHE HEATING."
1350 PRINT: INPUT "KNOWN O.D ="; J
1352 INPUT "KNOWN I.D ="; N
1355 A=3.14159* ( (J/2) † 2) - 3.14159* (N/2) † 2)
1400 PRINT:PRINT: INPUT "DESIRED I.D=";L
1435  K=(SQR ((A+(3.14159*((L/2) † 2)))/3.14159))*2
1440 PRINT "DESIRED O.D IS"; K
1450 PRINT: PRINT "ANOTHER CALCULATION ? (Y/N)"
1460 GETA$:  IFA$="" "THEN 1460
1470 IFA$= "Y" THENPRINT "(CLR)":GOTO1350
1480 IFA$ 〈〉 "Y" THENPRINT "(CLR)"
1490 END
```

Points of Interest to Hackers.

The apparently odd spacing in lines 1320 thru 1345 are for easier readability on 40 column screens. My little electronic marvel is a Commodore 64, so anyone with a similar make will recognize the particular format in the above program.

The equations on lines 1355 and 1435 are derivatives of annular area fromulas. Lines 1350 and 1352 refer to the tubing you start with; i.e., you already know the dimensions. Line 1400 refers to the I.D. you want to end up with. Line 1440 gives you the O.D. you must press down to in order to get your desired I.D.

Regarding the equations themselves on lines 1355 and 1435, you can substitute the symbol "π" for 3.14159 if you'd like to cut out some typing. (That is, assuming you have that symbol on your keyboard.) Again, the C64 has that option. Hit Shift "↑" to obtain it.

Now, critics will say, quite rightly, that a cheap calculator will do the same job for less. "Quite right," says I, but now, having got the bugs worked out and the whole thing in storage, I can recall it, and have done, for similar calculations and also as a subroutine for a program to give wall thicknesses tolerant of certain bursting pressures etc. Thus one thing leads to another!

Anyway, I hope this article sparks some interest, and hopefully, serves a useful purpose.

I await similar efforts!!

Anthony J. Hawkins
P.O. Box 591
Alfred, N.Y. 14802

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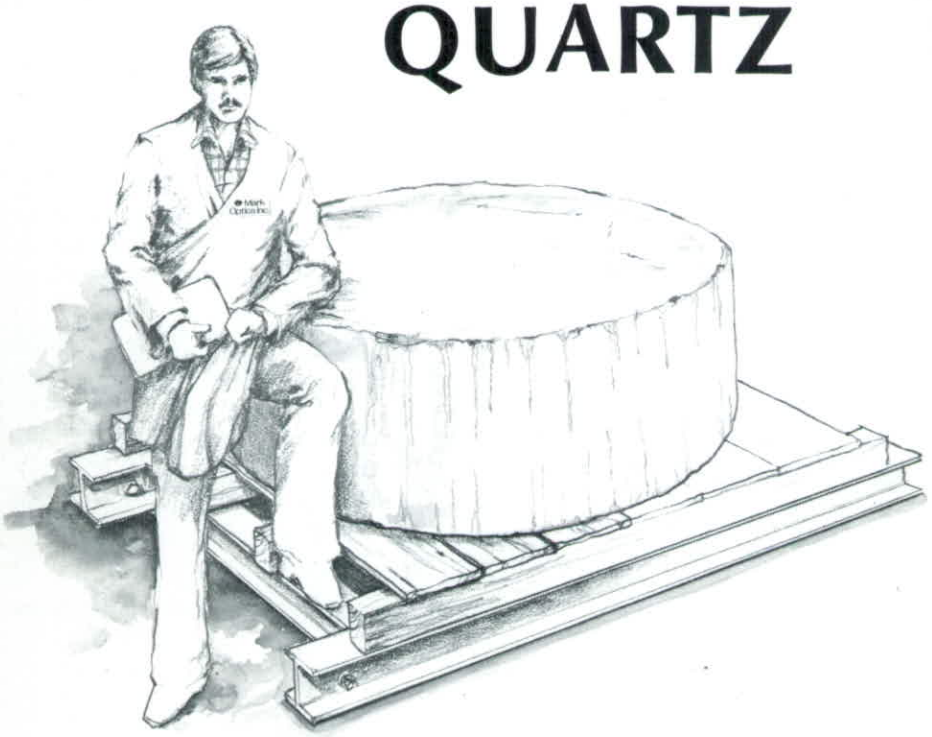

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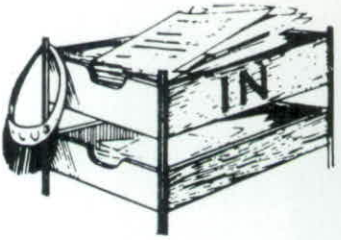
Letters

to the Editor . . .



September 23, 1985

To The Editor
Fusion
American Scientific Glassblowers Society
1507 Hagley Road
Toledo, OH 43612

I read with some amusement the report of the annual business meeting held in Toronto on June 20, 1985, specifically "the concern about the rising numbers of retired members in our society" and about the "reduced fee for membership" which they pay causing reduced income to the society. It seems to me someone's got the cart before the horse!

The fact that retired glassblowers stay active in the society represents a continued interest in the profession on the part of those with the most experience. They have a great deal to contribute and should be encouraged **in any way** to stay active, whether by reduced annual dues, or by no dues at all, presuming prior active participation.

Rather than be concerned over a member's legitimate retirement and subsequent reduced fee for membership, let's concentrate on attracting new members to our society to make it a stronger, broader based organization. How about some reports in Fusion of what the National Membership Committee is doing to attract new members, and similar reports from the sections — along with some numbers of membership increases and how they were obtained?

Respectfully,
David W. Edson
Lurex Manufacturing

As a Dutch scientific glassblower who attended the 30th Symposium in Toronto, I am complimenting the officials on the perfect organization, the interesting lectures, technical papers and workshops which I attended.

I hope my technical paper contributed to the Symposium.

Especially I would like to thank Bob Campbell, Fred Leslie, Ed Powell, Tom McKelvey, and Dick Hapstack for their help and for making my stay such a pleasant experience.

I sincerely hope to be able to come and attend another symposium and meet all of you again in the not too distant future.

Igno Dur

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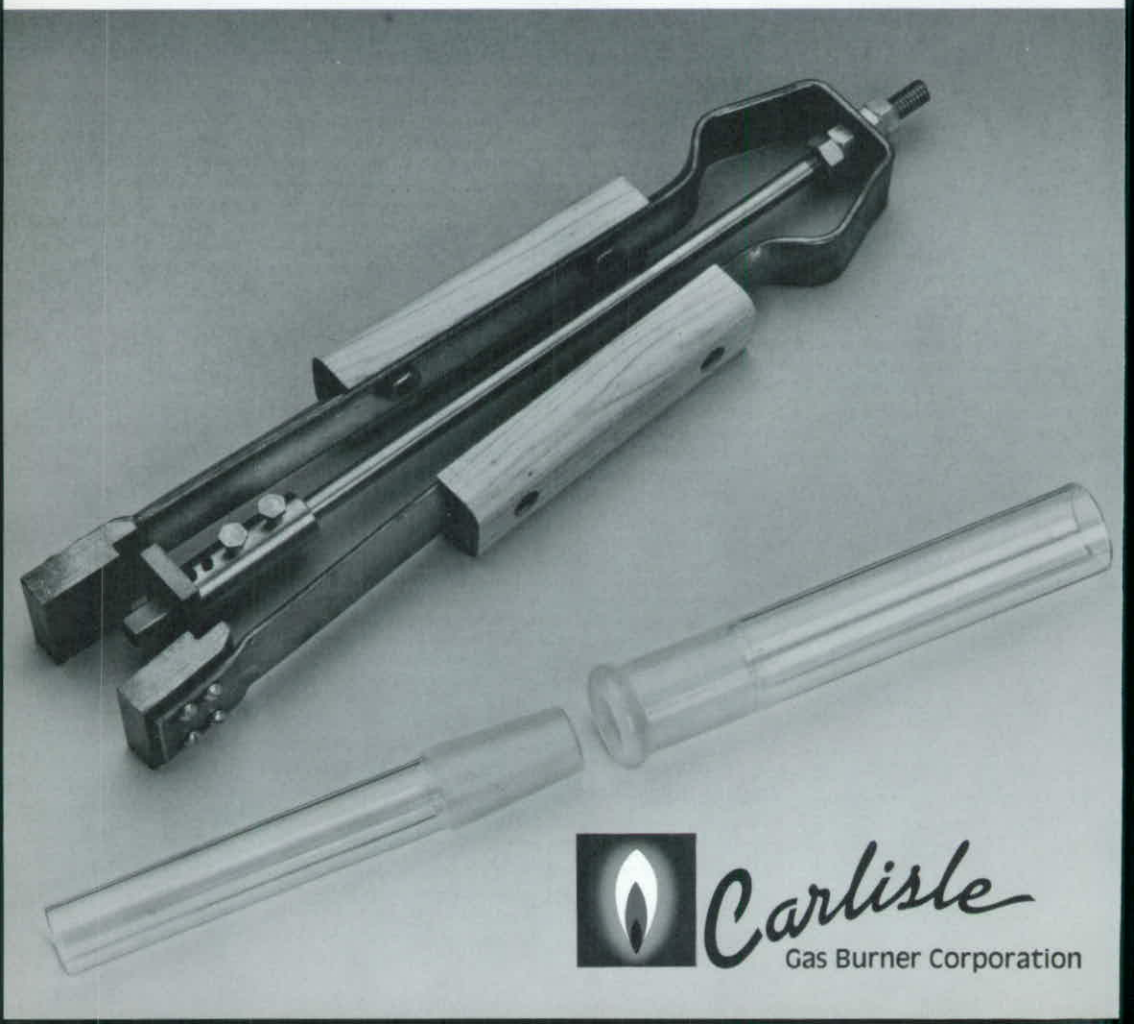

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The A.S.G.S. wishes to thank the above for their early registration.

FOURTH ANNUAL SEMINAR OF

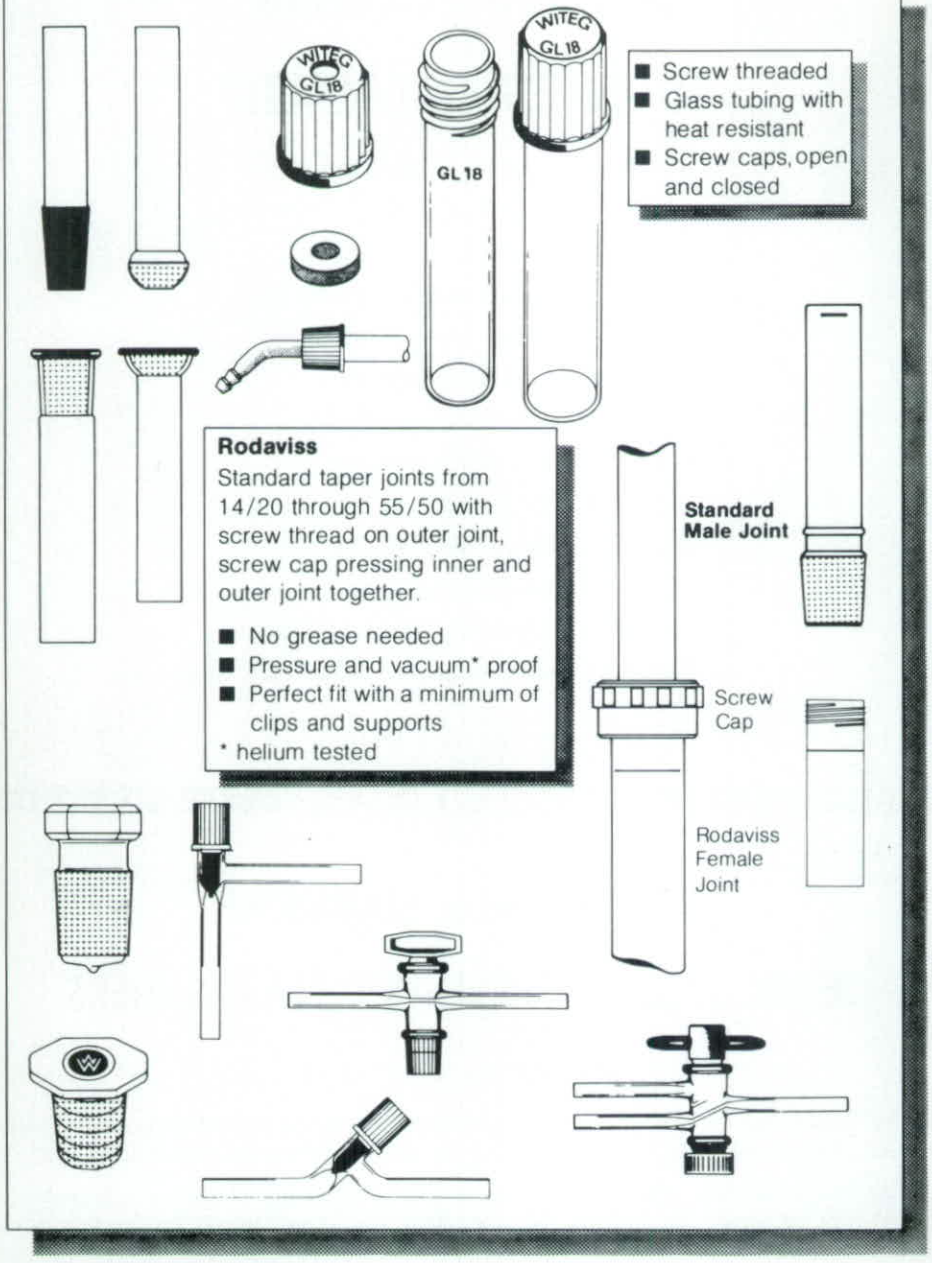
INDIAN SOCIETY OF SCIENTIFIC GLASSBLOWERS

DECEMBER 5, 6 and 7, 1985

The Indian Society of Scientific Glassblowers is holding its 4th consecutive annual seminar at the Indian Institute of Technology in Kanpur during December 5 - 7, 1985.

The Indian Society was registered some four years back. This was achieved after decade-long persuasion and efforts of some dedicated glassblowers. The Society has its headquarters at Madras in the state of Tamil Nadu. Ours is a newly-born society, slowly gaining in strength and membership. Three seminars have been organized so far at Madras, Bangalore and Bombay. The last one at Bombay proved to be a great success, with some 200 glassblowers and representatives from industry participating.

J. N. Sharma
Secretary, Organizing Committee
Central Glass Shop
IIT Kanpur - 208016
INDIA



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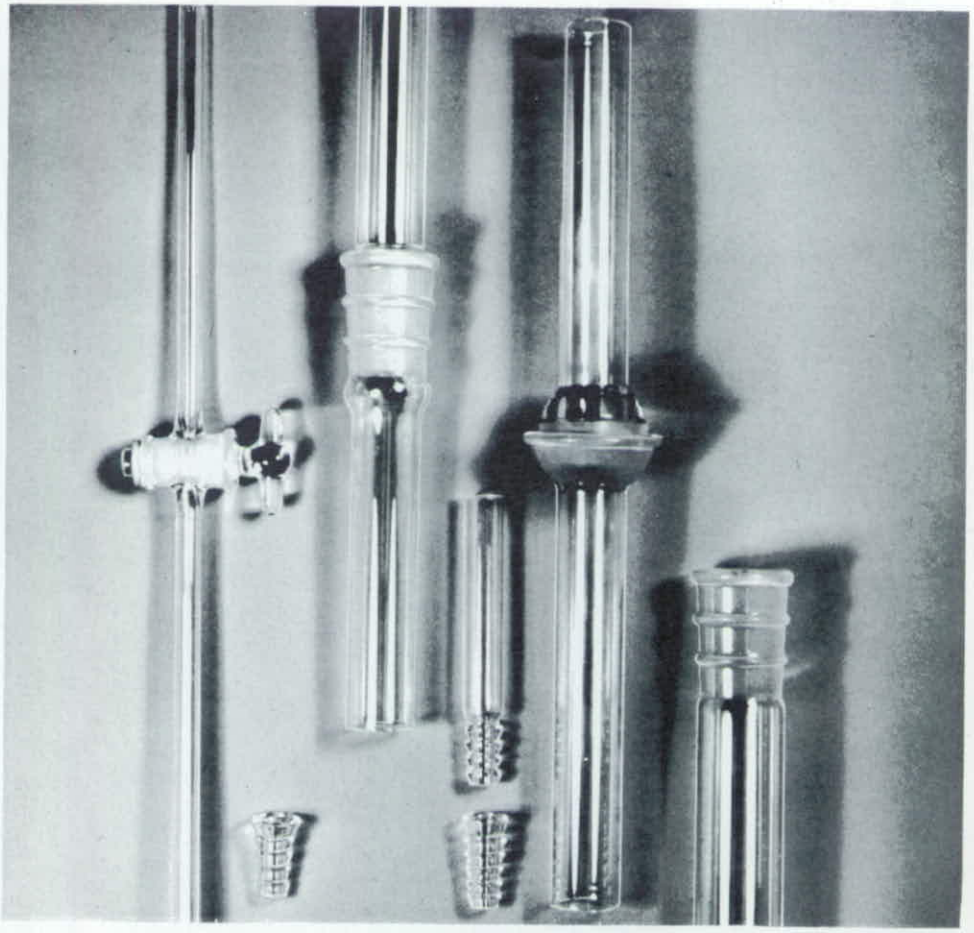

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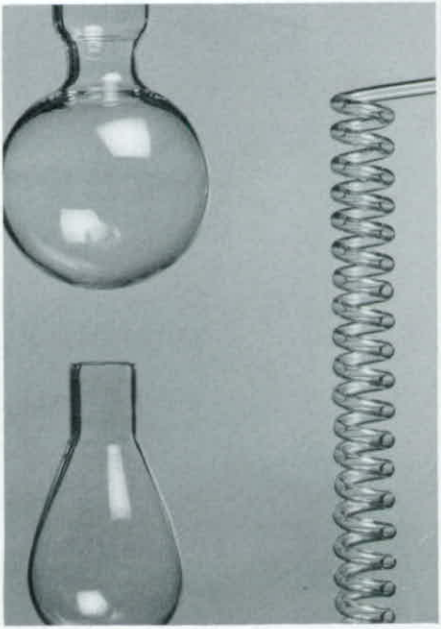

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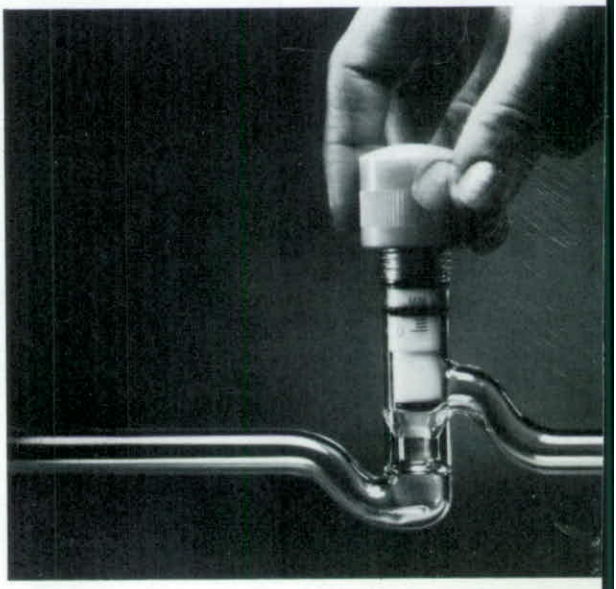

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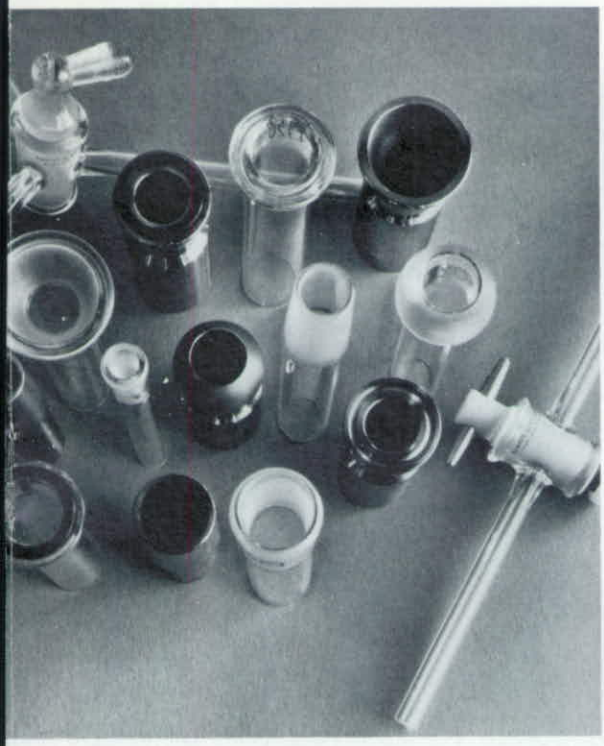

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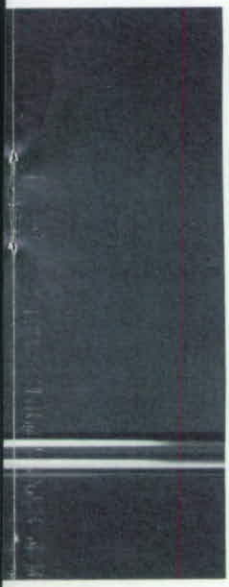

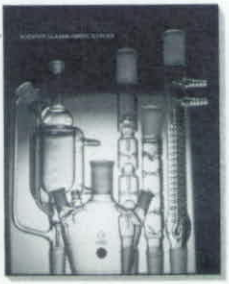

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SECTION NEWS

Southwestern Section

The Harris County domed stadium, better know as "The Astrodome", was the location early in August for the summer meeting of the Southwestern Section.

About 80 members and guests were present for an afternoon and evening of renewing acquaintances, exhibitors' products, excellent technical presentations, an Astrodome club buffet of endless variety, diet-wrenching desserts and a lively, entertaining baseball game that the local heroes won in the last inning..

In addition, our national president, Jerry Cloninger came over from Atlanta for the occasion. We are indeed very grateful for the support of President Cloninger and the national organization in assisting us in our membership recruiting efforts.

Jerry Cloninger, Fred Kennedy, Dan Wilt.

The success of this meeting was largely due to the outstanding efforts of our sponsors. First among equals was Mr. Sigmond Grozinger of Witeg Scientific Co. of Anaheim, California whose long distance efforts brought together the other sponsors, Mr. Michael Sweeney of Litton Engineering Laboratories of Grass Valley, California and Franklinville, NJ, and everybody's favorite after-dinner speaker Mr. Dan Wilt of Wilt Industries, Lake Pleasant, NY, and Mr. Juergen Kramer of Schott America, Yonkers, NY.

L-R: Derald Cleckley, Michael Sweeney, Dan Wilt, Juergen Kramer, Shorty Yeaman, Jerry Cloninger, Sigmund Grozinger.

Shorty Yeaman.

It is not possible to say enough about the importance of our sponsors who provide up-to-date, state of the art technical information to the rank and file glassblowers. Two months later we are still receiving many highly favorable comments from our section members directly related to the sponsors' presentations. A very big "Thank You" is directed to our sponsors and their representatives from the entire Southwestern section.

L-R: Dan Wilt, Juergen Kramer, Shorty Yeaman, Michael Sweeney.

Further thanks for a meeting "Well Done" are due Fred Kennedy, who was first approached about a possible meeting, and to section Chairman Shorty Yeaman, who put it all together. Those of our members who missed this occasion missed a great meeting and those who attended have a memory worth recalling.

Derald Cleckley
Section Secretary

Midwest Section

The Friday, September 20, 1985 meeting was held at the Northwestern University Technological Institute in Evanston, Illinois. The social hour was sponsored by William A. Sales, Ltd., of Wheeling, Illinois. A scientific workshop was held with a special demonstration of a method of cleaning quartz after fabrication.

Wm. Sales, Jr. demonstrating cleaning quartz.

Bill Sales, Jr. demonstrated the cleaning of quartz. Bill said that the most important thing is to wear cotton gloves all of the time and not touch the quartz with bare hands. After working the quartz, wash it with 10% hydroflouric acid and 90% deionized water. The purpose of the deionized water is so that no minerals are deposited on the quartz. The quartz gets immersed in the solution for about 45 seconds to one minute. Bill tested the rubber gloves by filling them with water and twisting the arm covers tightly to compress the inside water and observing for leaks. After rinsing, he put the quartz in the lathe and torched it to remove the remaining white marks. He showed us that, when not using the HF solution, he had to chase the silica deposit all over the Quartzware.

Bob Ponton demonstrated the making of graded seals and Joe Gregar made a quartz cell using 0.5 mm stainless steel as a spacer.

Following the workshop, cocktails and dinner, Chairman Chester Swopes opened the meeting at 8:07 and thanked Bill Sales for sponsoring the workshop and social hour.

Secretary George Jahn read the minutes of the last meeting, Jim Morris made the motion to accept the minutes, seconded by Larry Guzman and accepted by the members.

Chester thanked Bob Ponton, Joe Gregar and Bill Sales, Jr. for giving the demonstrations.

Bill Sales thanked members for honoring him by giving him The Midwest Section Achievement Award. Bill had catalogs available from Schott and G.E.

Bob Ponton gave a few words on the section library which now has 14 books and he is now compiling an index. He also mentioned that awards will be given to junior members who are active in the section.

Chester thanked Bob Ponton and mentioned that we should wear name tags at meetings. The subject was not further pursued.

Host William Sales, William A. Sales, Ltd.

The Midwest Gang.

L-R: Bob Russell, Ohio Valley Director; Bob Ponton, Midwest Director; Bob Marchen, Ace Glass and Keith Krumnow.

L-R Standing: John Squeo, Ed Hyland. Seated: Barbara Komenda, Walley Haym, Chester Swopes, Midwest Chairman and Ed Baldis.

Joe Gregar thanked us for the large turnout and mentioned that there was a position open as glassblowing instructor at Illinois Benedictine College in Lisle, Ill. This position is

part time and was previously held by Tom Doody. Joe mentioned that a prize award paper slip was under somebody's chair. Norman Moeller was the prize recipient of a glass key that was the ancient glass makers insignia. This prize was donated by Schott Glass. Thank you to Schott America. Norman thanked everyone for the prize.

Joe Gregar nominated Larry Guzman as a director at large. The nomination was seconded by George Jahn and accepted.

The meeting adjourned at 8:35.

Written with the cooperation of John Squeo
George Jahn
Secretary

San Francisco Bay Section

The San Francisco Bay Area Section held their annual picnic on August 4, 1985 at Huddart County Park in San Mateo, California. Including members and their families, we had a total of 58 people in attendance. There was plenty of good food and refreshments and everyone had a great time.

L-R: John Bronzovic, Mel Lockwood.

L-R: Dan Baker, Ernie D'Amico.

There were many door prizes, and a raffle was held which brought us a donation of $90.00. This amount has been added to monies from previous functions, bringing us a total of $500. The money was donated to the East field Children's Shelter on August 5, 1985.

Co-Chairmen for this event were Dan and Kathy Baker, Dave Bogart, and Ernie D'Amico. Additional help was provided by Al Kalbin and Frank Szephegyi.

Ernie D'Amico
Secretary-Treasurer

L-R: Ed Howard, Dave Bogart, Pablo Messina, Lewis Candee.

Southern California Section

Our October meeting was held at Witeg Scientific in Anaheim. We were provided with a sample of Oktober fest by our host, Siegmund Grozinger, with plenty of authentic food and German bier (beer). A short business meeting was held by our chairman, Gary Coyne, with a few words from Ray Carew, Southern California candidate for chairman-elect. Jim Merritt gave a demonstration of cracking flasks using a diamond pencil. To round out the evening, an auction of donated equipment was held to raise funds for the section.

Jim Merritt giving demonstration.

Members and guests.

Siegmond starting the auction.

Thanks to Merle Bendickson and Siegmund Grozinger for donations of auctioned items. A special thanks to our host, Siegmund. Our next meeting will be on December 6th at Cal State, LA.

Southeastern Section

The 30th anniversary of the Southeastern Section is forthcoming with the April 1986 meeting. This meeting will be held on April 4th and 5th (Friday and Saturday) in Atlanta, Georgia. Special events are planned for this milestone meeting and will be finalized in the February issue of Fusion. Start making your plans to attend this important event. Y'ALL COME, HEAR!!

Richard Smith
Secretary/Treasurer

New England Section

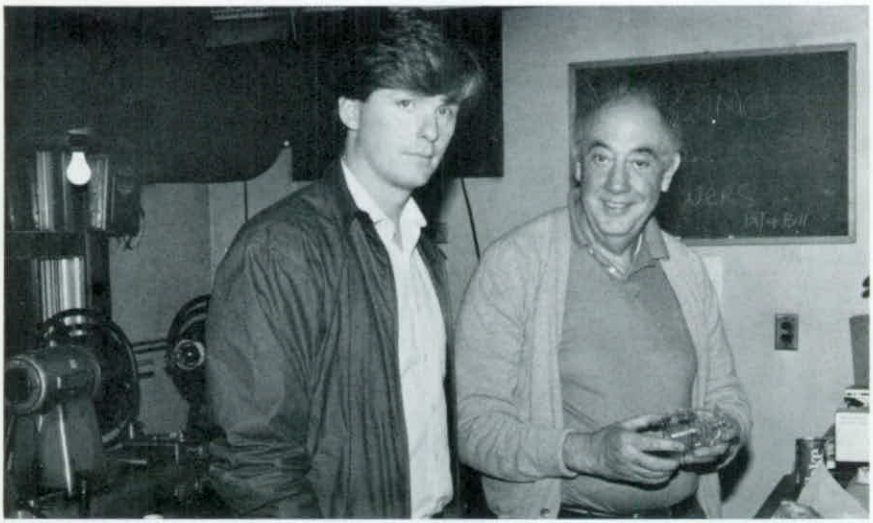
Our 4th and final business meeting of 84-85 was held at Bill and Pat DeFlorio's Yankee Glassblower in Carlisle, MA on Thursday, June 6th.

A sandwich buffet was served before the meeting. The business meeting began at 7:30. The secretary and treasurer's reports were given as the "Year in Review". Since this was the final meeting of 84-85, the business was to elect officers to serve for the 85-86 year. The results were: Director (2 year) – David Hovey, MIT Lincoln Labs; Chairman (1 year) – Gary Anderson, Corning Glass Works; Co-Chairman (1 year) – Peter Gale, HNU Systems Inc.; Treasurer (1 year); Andrea Kennedy, R.V.A.; Secretary (1 year) – Edward Mitchell, DuPont, N.E.N. Products.

Officers elected for 85-86 (L to R): Peter Gale, David Hovey, Ed Mitchell, Andrea Kennedy, Gary Anderson.

Bill (R) and Pat (L) Deflorio of Yankee Glassblowers welcome N. E. Section members.

Pat DeFlorio Describes shop layout.



Ed Mitchell and Bill DeFlorio discuss one of Yankee's many products.

The business meeting was followed by workshops by Bill and Pat DeFlorio, which included induction sealing of glass windows to glass tubing, a refinishing machine for restoring damaged glassware and how to make a fixture to hold Ace threaded glassware.

This year we tried to make our section meetings informative, unique, interesting and enjoyable. I wish to thank our hosts, sponsors, demonstrators and membership who participated and made this year a success.

Gary L. Anderson
Secretary

NOTICE

The New England Section Roster was completed in May. Copies are now available for our section members. If you would like a copy, please contact Gary Anderson.

SPECIAL NOTICE

To all members of the Great Lakes and Canadian Sections and open to all others who would like to come: Plan to attend a joint meeting at Wolfgang Eberhart's studio on Saturday March 8, 1986. Look in the February issue for all the final plans.

AWARDS COMMITTEE REPORT

In the August issue of Fusion, details of the "MEMORIAL AWARD" were published. At this time I am appealing for donations, it is my hope that this award will eventually be self supporting.

May I emphasize the dual purpose of this award, one to honour our deceased members in a visible and lasting manner, and two, encourage and reward our junior members.

I am inviting donations from all levels of our society, Industry, Institutions, and of course non-members, or just those who are friends of our society. For those of you who wish to do so, please send your donations to our Home office, and make your cheques, or money orders payable to "THE MEMORIAL AWARD", care of the A.S.G.S.

Remember this award is now in effect, the deadline for nominations for a junior member is February 1st, 1986. This is a wonderful opportunity, and it can only be realized by your nominations, keeping in mind that our youth are our future.

At the June Board meeting in Toronto, the B.O.D. agreed that as the Past-President is no longer on the Board, the Past-President is now eligible to be nominated for National awards.

David Chandler
Awards Committee Chairman

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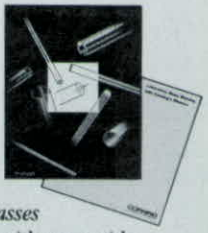

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Heathway lathe model-8A. Complete with 6 chucks. Size 41" wide at base, 84" long at base. Lathe is mounted on a dolly with wheels. 4½" bore with a 21" swing. Call Jim Panczner, Ph. (419) 476-5478 or write to me at the home office.

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Used XORBOX OXYGEN GENERATOR, 1-XMC-2400. Three years old, two hundred cubic feet an hour, excellent condition – $6,500. Call or write: Arthur G. Reeves, Scientific Specialties, Inc., 1601 Hobbs Road, P.O. Box 545, Auburndale, Florida 33823 – (813) 967-0681.

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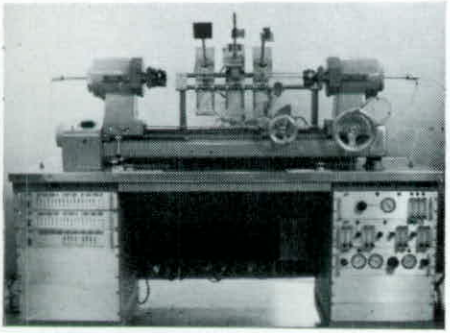
New Products and Literature

The listing of a product or literature does not necessarily include the endorsement of the Society or ***Fusion*** *staff. All such items are entered only as a service to the readers of the publication. If further information is desired concerning the item, sufficient address is given so that the company may be contacted directly. We would appreciate your mentioning in any such communication the fact that you are corresponding as the result of seeing the item in* ***Fusion****.*

AUTOMATION FOR MID SIZED PRODUCTION RUNS

Following years of research and development, Litton Engineering Laboratories in Grass Valley, California is now marketing an automated glassworking lathe which can perform such sophisticated procedures as the Kovar, 7052 glass seal.

The automated functions of the lathe include motor driven tailstock, firecarriage, toolingbar and paddles. Programmable air and AC logic outputs control the spindle motor, co-axial drive, sequential spindle pressure, gas delivery and the air actuated chucking system. Manual on/off override switches accompany each possible output control.



Controlled by the 9665 Programmable Controller, Litton's Automated Lathe is designed to fill the need for accuracy and repeatability in the mid sized production run. A short amount of time is required to set up or change jobs on the lathe and there is very little loss of material.

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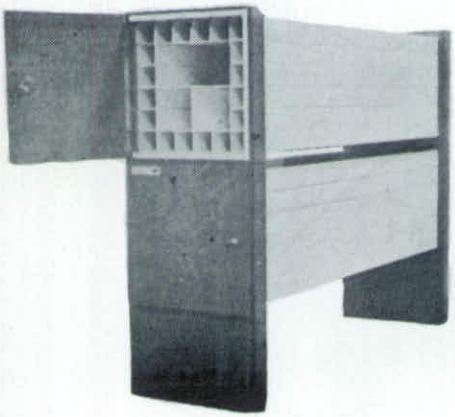

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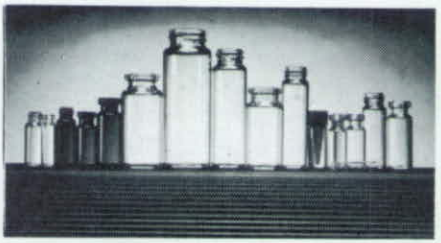

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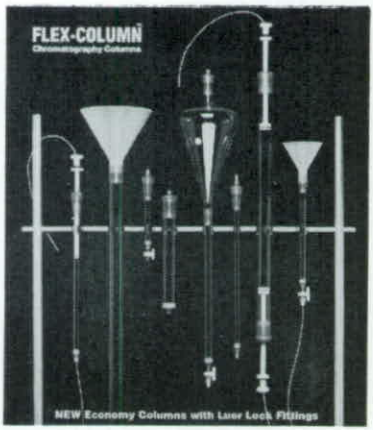

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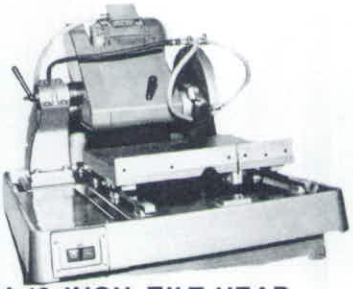

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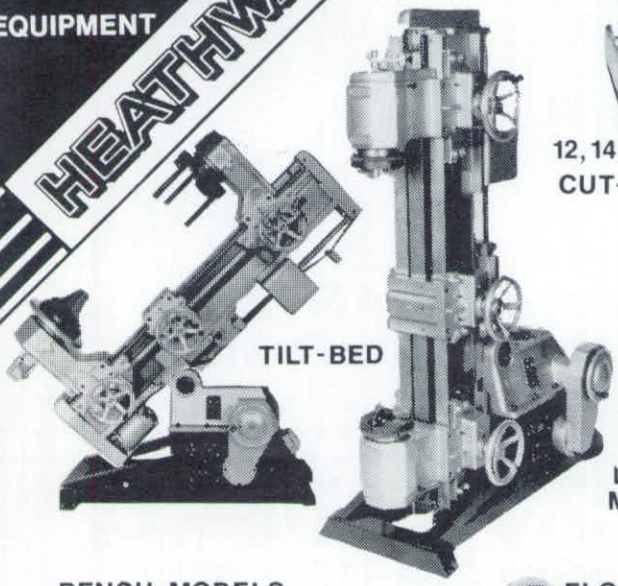

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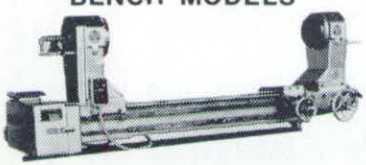

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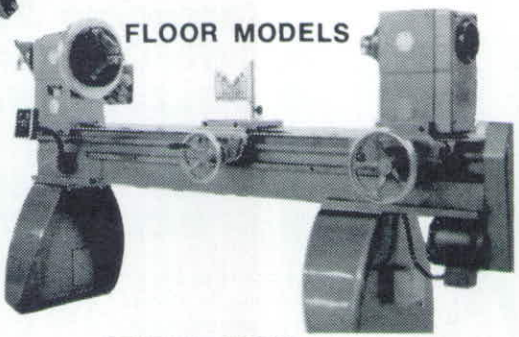

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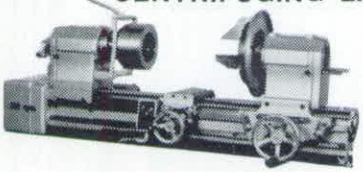

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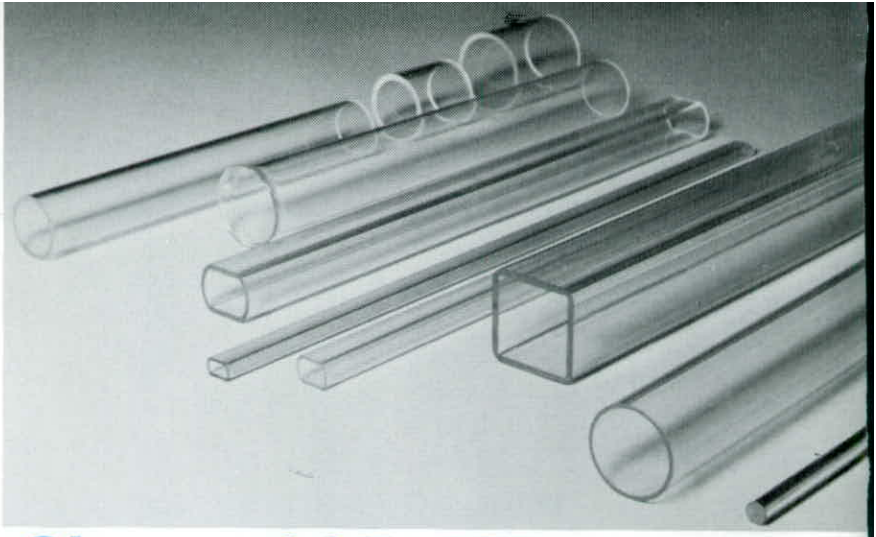

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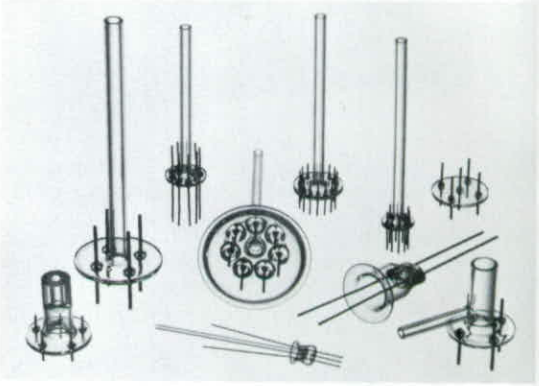

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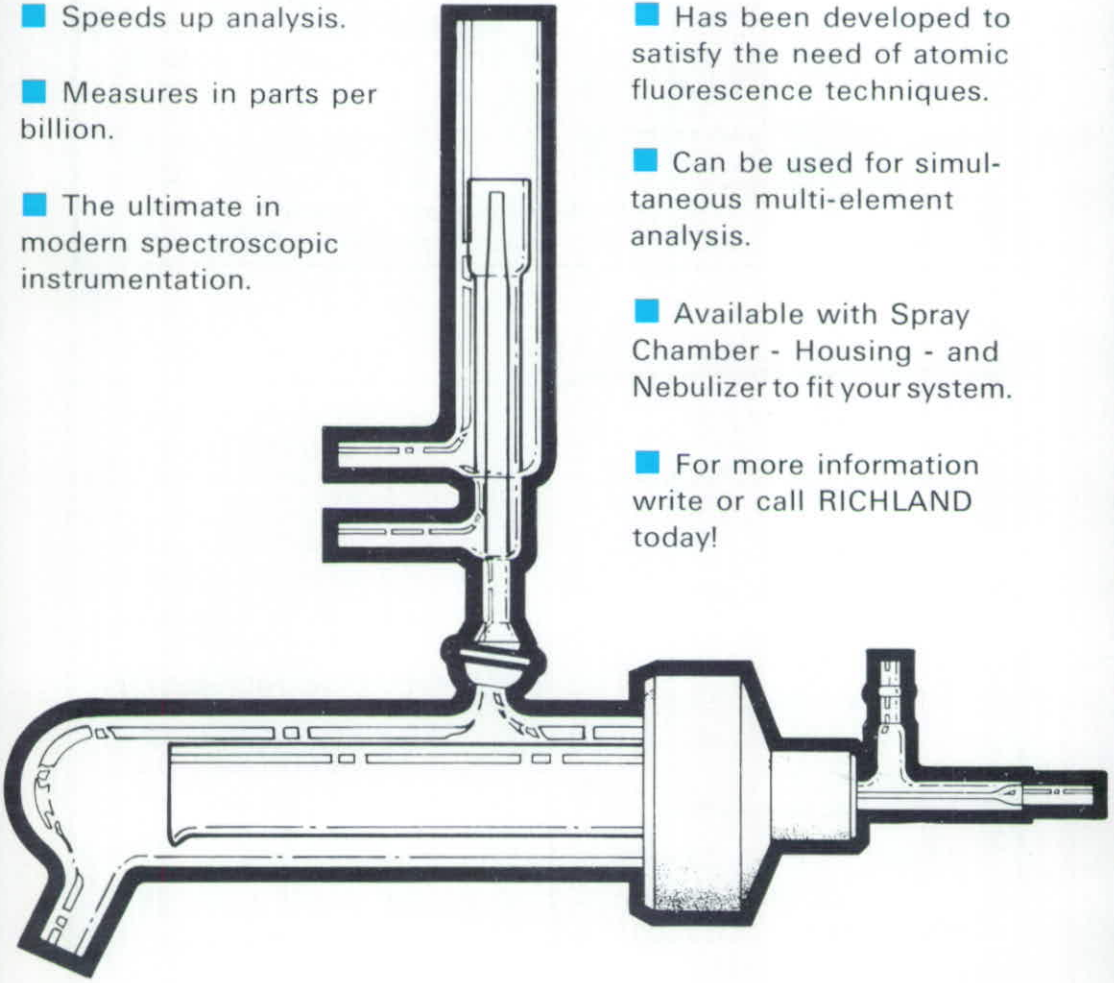

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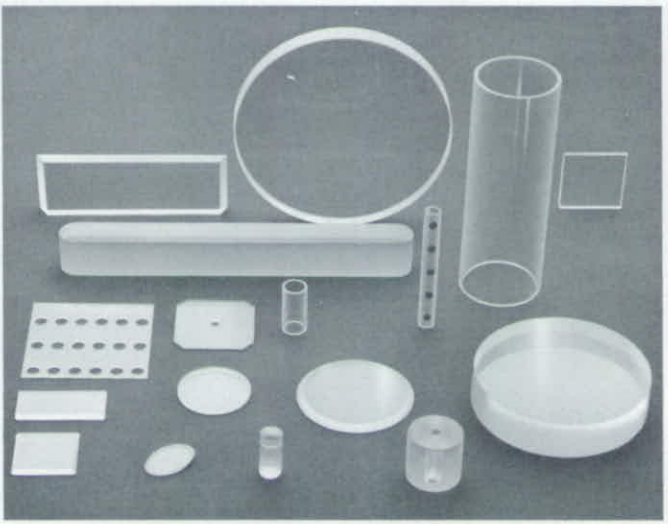

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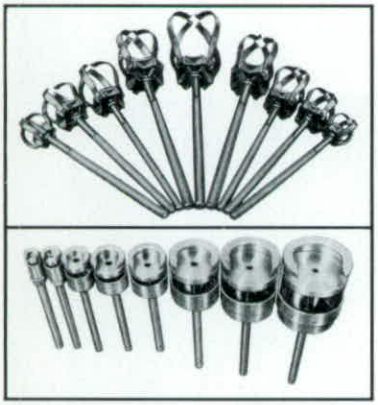

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CELLS

Conductivity Cells and the Glass Techniques, by T. W. Rejda and H. deJong, BSSG Journal, Vol. 22, No. 4, October, 1984, pp. 112-117. Explanation of electrical conductivity in metal and fluids and its terms. Describes method of constructing conductivity cell using platinum electrodes. 5 figures.

CHROMATOGRAPHY

Glass Capillary Columns for Gas Chromatography by Dr. D. McCalley, BSSG Journal, Vol. 22, No. 3, July, 1984, pp. 87-91. Brief history of gas chromatography. Describes method of forming capillary tubing for columns and also fused silica columns. 3 figures.

CHROMATOGRAPHY

An efficient and Inexpensive Temperature Controlled Chromatography Column by B. L. Henderson and D. J. McLoughlin, Journal of Chemical Ed., Vol. 62, No. 5, May, 1985, pp. 430. A relatively inexpensive column that can be quickly and easily constructed from old distillation columns.

CHROMATOGRAPHY

Static and Dynamic Headspace Analysis, Pt. 1, by M. E, McNally & R. L. Grob, American Laboratory, Vol. 17, No. 1, January, 1985, pp. 20-31. Discussion of chromatographic headspace analysis with brief mentions and diagrams of glass apparatus. May be useful to those involved with this area of research.

FIBERS

IR Fiber: Three Views by Paul A. Trick and David A. Thompson, Marcel Poulain, Paul White, Photonics Spectra, Vol. No., July, 1985, pp. A tripartite report from fiber's advance guard: Corning Glass Works; Le Verre Fluore,

the French firm that markets a line of fluoride fibers; and Galilie E-O, which recently announced chalcogenide fiber.

GLASS – APPARATUS

Experimental Distillation Apparatus by P. L. Timms, BSSG Journal, Vol. 22, No. 4, October, 1984, pp. 100-108. Brief history of distillation. Describes typical vacuum distillation column and apparatus for molecular distillation. 5 figures.

GLASS – CHEMISTRY

Glass of the Past by Cesare Moretti, Chemtech, Vol. 15, No. 6, June, 1985, pp. 340-344. As scientists have been trying to study the "secrets" of the Stradivarius Violin, glass scientists have been trying to unlock the secrets of the early melts used in Venice. This article is a fascinating overview of the early "recipe books" and life of the glassblower from the 11th through the 19th century.

GLASS – CLEANING

A Simple and Inexpensive Wash Unit for Low-Pressure CVD Reactor Tubes by M. Hitchman & R. Pilkington, Vacuum, Vol. 35, No. 7, July, 1985, pp. 283-285. An apparatus is described that is used to clean sublimates from the walls of tubes used in low-pressure chemical vapor deposition (LPCVD). May be useful to those in the fiber/optics or microchip fields.

GLASS – CLEANING

UV/Ozone Cleaning of Surfaces by J. R. Vig, J. Vac. Sci. & Tech (A), Vol. 3, No. 3, pt. 1, May/June, 1985, pp. 1027-34. Describes an experimental method of cleaning surfaces using quartz-tube apparatus which is U.V. transparent. The contaminants were applied to a thin quartz wafer for measurement purposes. Results showed high effectiveness using this simple method.

GLASS – MACHINING

Glass Screw Threads by K. George, BSSG Journal, Vol. 22, No. 4, October, 1984, pp. 92-96. Method of making external screw threads on glass tubing using the lathe. Describes how to construct the necessary tools. 2 pictures, 2 figures.

GLASS – PROPERTIES

Photochromic Glass by R. J. Araujo, Journal of Chemical Education, Vol. 62, No. 6, June, 1985, pp. 472-473. Material is photochromic if its absorption spectrum changes when irradiated with light and returns to its original state upon cessation of the light irradation. This article discusses several categories of glass with photochromic properties.

HEALTH AND SAFETY

Laboratory Safety: More Important Than Ever by Brian Howard, American Laboratory, Vol., No., July, 1985, pp. A very good article to remind us that safety should always be foremost in our minds.

HEALTH AND SAFETY

Handling of Oxygen in Research Experiments by R. J. Burnett and J. E. Cole, Jr., Journal of Chemical Ed., Vol. 62, No. 5, May, 1985, pp. A. 157-9. An informative article on handling oxygen and organic compounds together under pressure.

HEALTH AND SAFETY

A Safe Practice Check List for Handling Compressed Gases by Richard P. Bookman, American Laboratory, Vol. 17, No. 3, March, 1985, pp. 76-80. An interesting article for all who use high pressure cylinders. The article contains information related to safe handling of cylinders and basic information about high pressure cylinders; diagrams and explains markings on cylinders.

HEALTH AND SAFETY

Upgrading Older Fume Hoods by G. Thomas Saunders, Journal of Chemical Ed., Vol. 62, No. 6, June, 1985, pp. A. 178-80. Discusses the operation and ways to improve the efficiency of fume hoods.

LABORATORY EQUIPMENT

Grinding Wheels and Safety by T. Butcher, BSSG Journal, Vol. 22, No. 3, July, 1984, pp. 58-63. Review of grinding wheels, their composition, uses, grain size, and grade. Touches on safety in use of grinding wheels.

EQUIPMENT AND TECHNIQUES

A Simple Inexpensive Stirrer for Spectrometer Cuvettes by R. A. Vaida, R. E. Hermes, L. J. Mathias, & J. L. Bridges, American Laboratory, Vol. 17, No. 7, July, 1985, pp. 84-85. Ingenious inert gas-driven stirrer for viscous liquids being studied using ultra-violet visible (U.V./VIS) spectrometers. The small space and/or amount of liquid to be studied requires a very small stirrer. This article documents such a device.

EQUIPMENT AND TECHNIQUES

Rapid Transfer Device for Aqueous and Organic Solutions by M. J. Black and R. B. Brandt, American Laboratory, Vol. 17, No. 8, August, 1985, pp. 96. This device will be of interest to those who have encountered difficulty in extraction of the top layer of solvent in a two component liquid mixture.

LASERS

J. Vac. Sci. & Tech. (B), Vol. 3, No. 3, pt 2, May/June, 1985, pp. (several). This edition features several papers on methods of preparing glass-microspheres as laser target material.

LASERS

Commercial Lasers – The Next Five Years by Lewis Holmes, Laser Focus, Vol. 21, No. 5, May, 1985, pp. 146-154. Review article of laser projects underway. Includes brief mentions of laser devices suitable for cutting/welding mounted on computer-driven robot arms.

LASERS

Many Duties in Many Fields, (Editorial), Photonics Spectra, Vol. 19, No. 1, January, 1985, pp. 76-80. Review article dealing with probable uses of laser devices and robotics.

OPTICAL FIBERS

Wavelength-Selective Coupling of Two-Core Optical Fibers: Application and Design. Two-Core Optical Fibers: Experiment by Ken-ichi Kitayama and Yukinori Ishida, J. Opt. Soc. of Amer. (A), Vol. 2, No. 1, January, 1985, pp. 84-94. Two-part paper dealing with twin-core fiber optic technique.

PATENT

Patent No. 4479918 – Apparatus for Safely Generating & Dispensing of a Gas Vacuum, Vol. 35, No. 4/5, April/May, 1985, pp. 224. Glass pressure/syphon device illustrated for generation of gases suitable for use in fiber/optics, plasma experiments, etc.

SILICA

Orientational Ordering of Hydrogen Molecules Absorbed on Graphite by P. R. Kubik and W. N. Hardy, Canadian Journ. of Physics, Vol. 63, No. 4, April, 1985, pp. 605-619. Research paper that includes diagram and construction detail for a grafoil cell useful in N.M.R. studies. Illustrates method for solder fabricating a copper/quartz tubing joint with Indaloy No. 5 solder and resin flux.

SURFACE

A New Trench Fabrication Technique for Silicon Substrates Utilizing Undercutting and Selective Etching by Shiro Suyama, Toshiaki Yachi, and Tadashi Serikawa, J. Vac. Sci. & Tech. (B), Vol. 3, No. 3, May/June, 1985, pp. 905-908. Research paper presenting a new technique for etching substrates on silicon-based semiconductors.

SURFACE

Masking and Etching for Microcircuits and Semiconductor Chips (various), J. Vac. Sci. and Tech. (B), Vol. 3, No. 1, January/February, 1985, pp. (various). This edition reports several papers devoted to methods of masking, etching, or producing microcircuits on semiconductor chips, etc.

TEMPERATURE MEASUREMENT

Thermodynamic Properties of the Dilute Solutions of Silver Chloride and Aluminum Trichloride by P. J. Tumidajski and S. N. Flengas, Canadian Journ. Chemistry, Vol. 63, No. 5, May, 1985, pp. 1080-88. Research paper having good diagrams of high-temperature melting apparatus utilizing fused quartz tubing. Quite useful for anyone faced with same type of problem.

VACUUM

Vaccum Systems for Vacuum-Microbalances by E. Robens, Vacuum, Vol. 35, No. 1, January, 1985, pp. 1-4. Review article on most-used types of microbalances with diagrams.

VACUUM

A Versatile System for Vacuum-Line Manipulations by A. L. Wayda and J. A. Dye, Journal of Chem. Education, Vol. 62, No. 4, April, 1985, pp. 356-9. A well designed system which permits handling and transfer of gases, liquids, and precipitates in a completely closed system. Also supplies a list of suppliers where parts are available.

VACUUM – MEASUREMENT

Controller Simplifies Pressure Measurement in Vacuum Systems by Martin Cox, Research and Development, Vol., No., April, 1984, pp. A device that combines Pirani and Penning gauges to measure pressures from 5 x 10^{-8} to 760 Torr.

VACUUM – TRAPS

Self-Pressurizing Liquid Nitrogen Filler by D. E. Chembley and M. M. Hulse, Rev. of Scientific Instruments, Vol. 56, No. 7, July, 1985, pp. 1478-9. A self-pressurizing system which avoids the disadvantage of using heating elements or external gas sources for pressurization.

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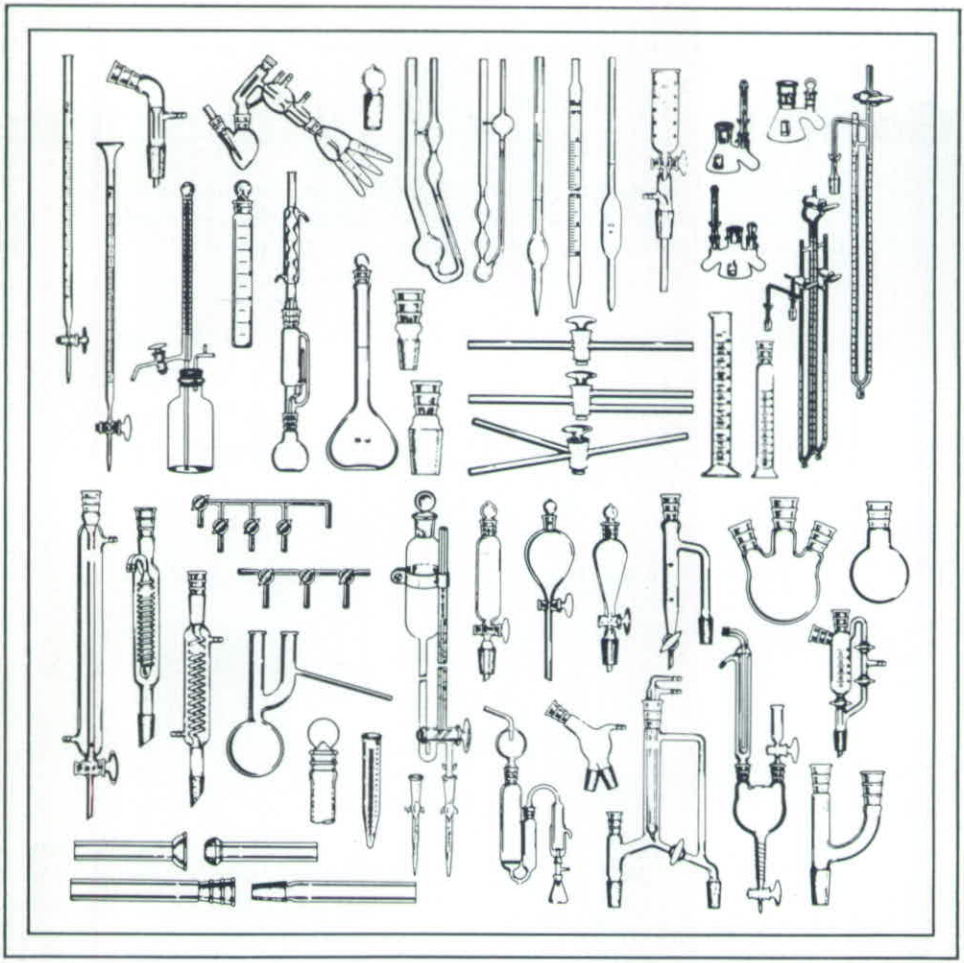

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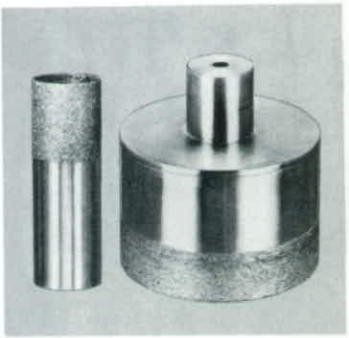

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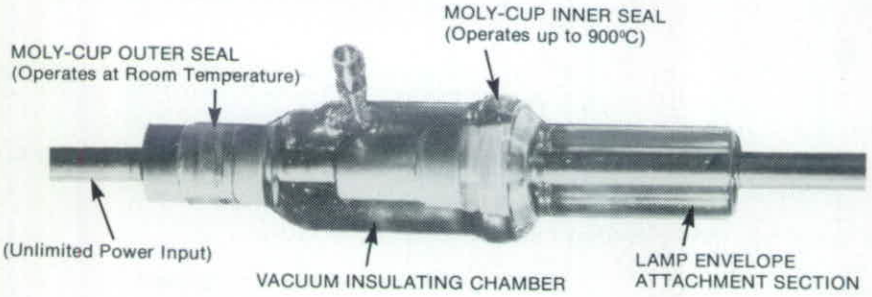

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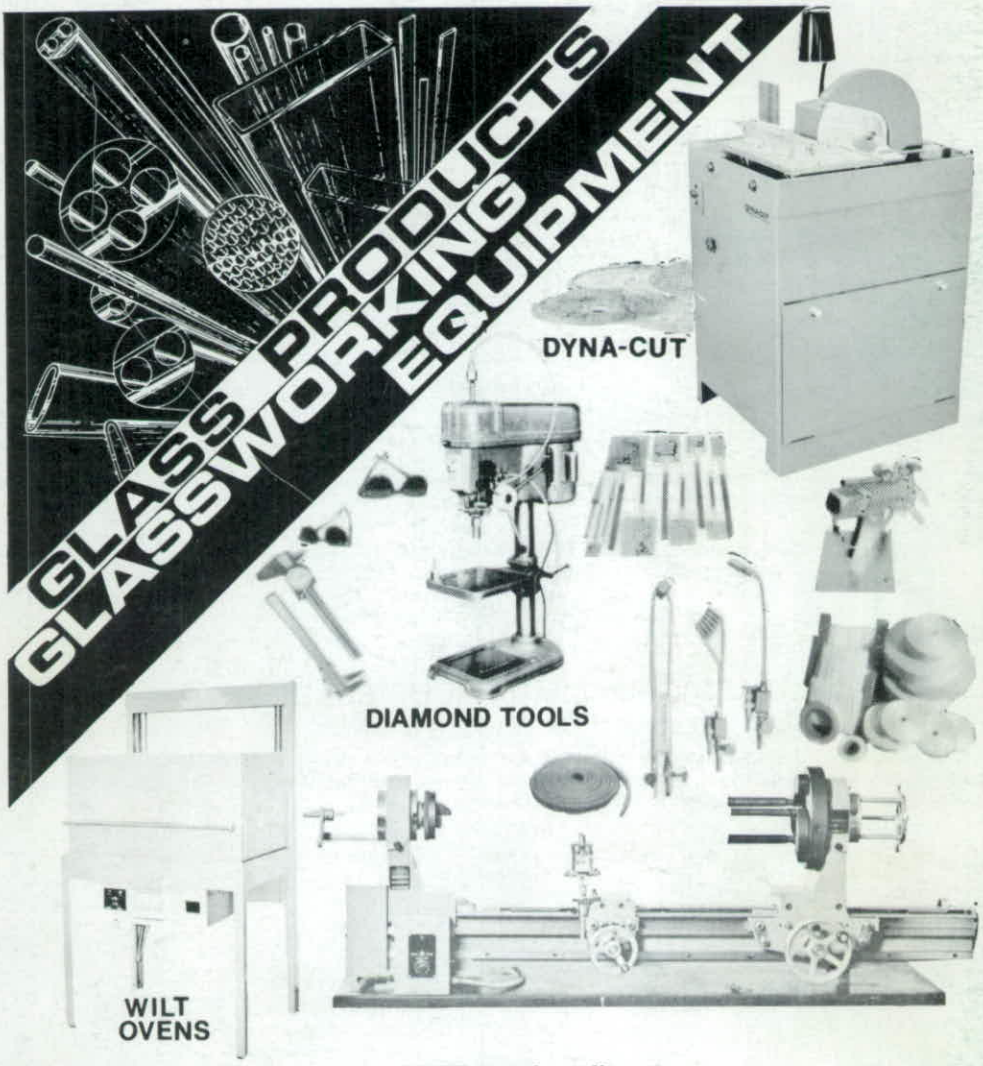

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Minimum Knowledge: Thorough knowledge of the physical laws and safety practices of glassblowing: thorough knowledge of glass to metal sealing.

Minimum Abilities: Ability to design often from rough sketches and oral directions only, simple and complex glass and quartz apparatus; ability to shape and blow glass and quartz tubing, stopcocks and standard taper joints; ability to advise faculty members, students and other staff personnel as to the best solutions to all problems related to the needs for scientific glass and quartz apparatus; including time, cost and construction, or procurement estimates; ability to instruct students in the fundamentals of scientific glass-blowing; ability to test completed apparatus for conformance with the necessary stress, pressures, temperatures, etc.

Minimum Experience: Equivalent to one year experience as a journey level blower in a scientific laboratory concerned with the fabrication of experimental and instructional glassware, or two years experience as a journey level glass-blower in a private or industrial glassblowing shop.

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